Annexure “F”

Information of Mentor of Training Centre

ANNEXURE – "F"

Information of Mentor of Training Centre

It shall be verified by the Head of the concerned Training Center,

Sr. No.	Particular	-	Information to be filled
01.	Name of the Mentor		Dr. Manisha Parag Ghurde
02.	Date of Birth	:	29/04/1974
03.	Address		Gulmohar Chs B – 108, Gavand Baug, Pokhran Road No.2 Thane (W)
04.	Tel. No./ Mob. No.		7722088789
05.	E-mail id	:	mipccoursecoordinator@gmail.com
06.	Nationality	:	Indian
07.	Qualification in details : (attach documentary proof)	:	B.H.M.S, M.D
08.	Teaching Experience / Health Sciences: Profession Experience (Attached document proof with signature of Head of the Institute. Also it is mandatory to attach self-attested Photocopy of the Experience Certificate of each Mentor in the Subject of concerned Fellowship/Certificate Course)		Teaching Experience : 24 Years Clinical Experience : 24 Years
09.	Present Appointment	:	Mentor
10.	Publications (List & Proof)	:	Attached
11.	Post Graduate Teaching experience(Attach documentary evidence)	:	05 Years
12.	Any other relevant information	:	-

Dr. Manisha Parag Ghurde
Name & Sign. of Mentor

Date: - 23.05.22

For the use of affiliated Training Center:

I have verified the eligibility of the above Mentor as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended) and UniversityCircular No. MUHS/UDC/FCCC/736/2019 dated 30/09/2019.

Head of the Department
Date: 23.05.22

Dean/ Principal/ Director of Training Centre
Date: 23.05.22

Madhavbaug Institute of Preventive Cardiology ★ MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

॥ श्री ॥

Reg No. E20159 (Mah)

Vd. Sane
Ayurvedic Education & Agricultural Research Trust (Regd.)
6, Rajput Kori Dnyati Mahal, Govandi, Mumbai - 400088. Tel : 022-2558 5306
www.madhavbaug.org

SANE

LETTER OF APPOINTMENT

To,
Dr. Manisha Ghurde
Thane.

Date: 13th April, 2017

Dear Dr. Manisha,

With reference to your application dated 1st April, 2017 and subsequent interview for the post of Course Coordinator, we are pleased to appoint you for the said post from **15th April, 2017.**

Your probation period is of 6 months and your appointment will be confirmed thereafter.

You will be deputed on VRT's Madhavbaug Institute of Preventive Cardiology with immediate effect.

Your monthly remuneration will be **Rs. 65,000/-** Professional tax, Provident Fund and other taxes applicable (if any) will be deducted as per Govt. Rule.

You will be abide by all the rules, regulations, terms and conditions, currently existing or modified / newly developed by Vd. Sane's Ayurvedic Education and Agricultural Research Trust.

You need to submit your joining report and a copy of Annexures regarding Remuneration, Job Responsibilities / KRAs, Terms and Conditions to us duly signed by you.

Congratulations on your appointment and a warm welcome to Vd. Sane's Ayurvedic Education and Agricultural Research Trust.

Thanking You.

Yours faithfully,

Dr. Vilas Potnis
Trustee
Vd. Sane's Ayurvedic Education and Agricultural Research Trust.

TRUE COPY

Madhavbaug Institute of Preventive Cardiology MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Joining Letter

To,

Date: 15.04.2017

The Trustee
Vd.sane's Ayurvedic Education & Agricultural research

This with reference of your Appointment letter Dated.14.04.2017 I hereby confirm that I have joined the duty today i.e.15th April 2017 before noon.

Submitted for your kind information and necessary action please.

Thanking you,

Yours Faithfully,

Ghurde 15/04/2017

(Dr.Manisha Ghurde)

Madhavbaug Institute of Preventive Cardiology
MIPC

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]
MUHS
VRT

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Manisha P. Ghurde is working with us as a Director, since 20th July 2019 till date.

Dr. Vilas D. Potnis
Trustee
Vd. Sane's Ayurvedic Education
& Agricultural Research Trust

VAIDYA SANE AYURVEDIC EDUCATION & AGRICULTURAL RESEARCH TRUST
Reg No 20159

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

TRUE COPY

Office : Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No.- 022-41235315/16 / 7722088789
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

॥ श्री ॥

Reg No. E20159 (MUM)

Vd. Sane
Ayurvedic Education & Agricultural Research Trust (Regd.)
6, Rajput Kori Dnyati Mahal, Govandi, Mumbai - 400088. Tel : 022-2556 5306
www.madhavbaug.org

SANE

PROMOTION LETTER

Date- 20th July 2019

Dr. Manisha Ghurde
Designation- Course Coordinator
Employee ID – 40296

Dear **Dr. Manisha,**

Congratulations!

Consequent to the review of your performance, we are pleased to inform that you are promoted as **Director- MIPC** with effect from **20th July'2019.**

All other terms and conditions of your appointment remain unchanged.

All the other terms and conditions as detailed in your appointment letter remain unchanged. We look forward to your valuable contributions and wish you all the very best for a rewarding career with the Trust.

Please sign the duplicate copy of this letter as a token of acceptance of the same.

For,

Vd. Sane's Ayurvedic Education and
Agricultural Research Trust

Dr. Rohit M. Sane
Secretary

VAIDYA SANE'S AYURVEDIC EDUCATION & AGRICULTURAL RESEARCH TRUST
Reg No E 20159 Mumbai

Institute of Preventive Cardiology MIPC Madhavbaug

Received & accepted
22/07/2019

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Manisha P. Ghurde is working with us as a Course - coordinator, since 15th April 2017 till date.

Dr. Vilas D. Potnis
Trustee
Vd. Sane's Ayurvedic Education
& Agricultural Research Trust

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Office : Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No.- 022-41235315/16 / 77220887
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

MUHS

VRT

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Manisha P. Ghurde is working with us as a Mentor, since 15th April 2017 till date.

Dr. Vilas D. Potnis
Trustee
Vd. Sane's Ayurvedic Education
& Agricultural Research Trust

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

TRUE COPY

Office : Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No.- 022-41235315/16 / 7722088789
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

KONKAN EDUCATION & MEDICAL TRUST

Reg. No. E - 1129/TNA
Veer Savarkar-Marg, VIRAR (E) 401 305. Tal. Vasai, Dist. Thane, Maharashtra (INDIA)
Tel.: 0250 - 252 7773 / 252 9461 • E- mail - kcmtvhmc@hotmail.com

Ref. No.: KEMT/033/2017

Date :- 22/03/2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Dr. (Mrs.) Manisha Parag Ghurde was working with KEMT's Virar Homoeopathic Medical College, Veer Savarkar marg Virar (E) 401305 as Principal from 01/11/2013 to 22/03/2017. She started her academic career with us as a Lecturer in department of Homoeopathic Repertory and case taking from 20/06/2001 and with her sincere efforts & excellent performance she was promoted to Reader from 21/06/2006 and then professor from 23/05/2015 in the same department and Principal of KEMT's Virar Homoeopathic Medical College, Virar (E). She was having 2 yrs. 4 mths. Previous Experience from Takhatmal Shrivallabh Homoeopathic Medical College & Hospital, Amravati. Her total experience is 18 yrs. 1 mth.

During her tenure with our College she performed all the tasks given to her with lot of determination, integrity and sincerity. She is an active and motivated person and sincerely performed her duties as a teacher as well as Principal. Besides in my opinion, she is a devoted, professional, hard working and innovative person.

Moreover, Dr. (Mrs.) Manisha Parag Ghurde has demonstrated excellent behaviour and attitude during her service and has maintained cordial relationship with everyone. We found her to be sincere, truthful, reliable and sociable. She was also a pleasant person to talk and work within a team.

She has willingly resigned from her services however, we still hope she will succeed in any path of career.

We wish her all the very best for her future endeavours.

TRUE COPY

Madhavbaug Institute of Preventive Cardiology MIPC

Director
Madhavbaug Institute of
Preventive Cardiology &
Research Center

Secretary,
Konkan Education & Medical Trust's
Virar (E), Dist. Palghar.

☎ : 677356

Takhatmal Shrivallabh Homoeopathic Medical College & Hospital

"Homoeo Sadan" Rajapeth, AMRAVATI - 444 606

Sal. No. ..... Date .....

EXPERIENCE CERTIFICATE

This is to certify that Dr. Ku. Manisha H. Dubey is working as a Demonstrator on Temporary basis in the Department of Obstetrics & Gynaecology of T.S.H.M. College and Hospital Since 26th Feb. 1998 to 30th June 2000.

I wish her each and every success in her endeavour in future.

PRINCIPAL,
Takhatmal Shrivallabh,
Homoeopathic Medical College,
Rajapeth, AMRAVATI.

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

समचिकित्सा शल्य स्नातक

कु. सरिता हनुमानप्रसादजी दुरे यांनी

अमरावती विद्यापीठाची समचिकित्सा शल्य स्नातक

परीक्षा दिवाळी १९९६ मध्ये श्रेणीत उत्तीर्ण केल्यावदल

त्यांना ही पदवी प्रदान करण्यात येत आहे.

कुलगुरू

अमरावती
28 FEB 1998

Amravati University

Bachelor of Homoeopathic Medicine & Surgery

This degree of Bachelor of Homoeopathic Medicine & Surgery

is conferred upon Ku. Manisha Hanumanprasadji Dube

on having passed the examination for the said degree

in Winter 1996

Director
Madhavbaug Institute of
ventive Cardiology &
Center

MIPC

TRUE COPY

No 14111

CERTIFICATE OF REGISTRATION

MAHARASHTRA COUNCIL OF HOMOEOPATHY, MUMBAI

Similia Similibus Curentur

Certificate No. 26730

Date of Registration 06/06/1998

THIS IS TO CERTIFY THAT

Dr./ ~~Shri~~/ ~~Smt.~~/ Kumari DUBEY MANISHA HANUMANPRASADJI

has been duly registered under the Mumbai Homoeopathic Practitioners' Act, 1959 (Mumbai XII of 1960).

In witness whereof are herewith affixed the seal of the Maharashtra Council of Homoeopathy, Mumbai and the signature of the Registrar.

Subject to the provision of the Act, this certificate is valid until it is duly cancelled and the name of the practitioner is removed from the register.

05th June 2013

MIPC

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

Signature of the Registrar

TRUE COPY

MAHARASHTRA COUNCIL OF HOMOEOPATHY

235, PIRAMAL MANSION, 3rd FLOOR, Dr. D.N. ROAD, FORT, MUMBAI - 1.
Phone No:- 270 3242, 270 3086, 270 4400 FAX NO:- (022) 2703086

E-mail:- alphamch@vsnl.net

Ref.No:- MCH/REG/ 26730/2001 Date:- 31-JAN-2001

FORM "K"

[See rule 12(5)]

ntimation to a registered /enlisted practitioner under section 26(1)(a)(iii)
f the Bombay Homoeopathic and Biochemic Practitioner's Act, 1959.

To,

DR.DUBEY MANISHA HANUMANPRASADJI
'BAGESHREE' N/82
NEW CONGRESS NAGAR

D/ pin 444606
AMRAVATI
MAHARASHTRA

Dear Sir/Madam,

You are hereby informed that your certificate of Registration No. 26730 shall continue in operation subject to the provisions of section 26 unless it is duly cancelled under the Act.

Yours Faithfully,

Registrar,
Maharashtra Council of Homoeopathy,
Dr. D. N. Road, Mumbai-1.
Maharashtra State.

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

We, the Chancellor, the Pro-Chancellor, the Vice-Chancellor, the Members of the Management Council and the Academic Council of the Maharashtra University of Health Sciences, Nashik, certify that

Shri/Smt. DUBEY MANISHA HANUMANPRASADJI

of Kakasaheb Mhaske Homoeopathic Medical College & Hospital, Ahmednagar

having been examined and found duly qualified for the

Doctor of Medicine in Homoeopathic Repertory

In Nov-2008 the said Degree has been conferred on him/her. In testimony whereof is set the seal of the said University.

Director
VPT's Madhavbaug Institute of Preventive Cardiology & Research Center

PRN. 310829371

25th May 2009

COPY

09310124

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ, नाशिक

आम्ही, महाराष्ट्र आरोग्य विज्ञान विद्यापीठाचे कुलपति, प्रकुलपति, कुलगुरु, व्यवस्थापन परिषद व विद्यापरिषद सदस्य प्रमाणित करतो की,
अहमदनगर येथील काकासाहेब म्हस्के होमिओपॅथिक वैद्यकीय महाविद्यालय आणि रुग्णालय चे/च्या

दुबे मनिषा हनुमानप्रसाद

हे/हया नोव्हेंबर - २००८ मध्ये

एम्.डी. होमिओपॅथी
(रेपर्टरी)

परीक्षा उत्तीर्ण झाल्याबद्दल त्यांना ही पदवी प्रदान करण्यात येत आहे.
याचा साक्ष म्हणून विद्यापीठाची अधिकृत मुद्रा येथे अंकित करण्यात येत आहे.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES
(An ISO 9001:2008 Certified University)
MUHS
Tel : (0253) 2539194, Fax : (0253) 2539190
Website : www.muhs.ac.in
अ. का. सोनावणे
सह. कुलसचिव

No. MUHS/(UG)/E4/4103/[illegible]/2018

Date: 30/04/2018

To
The Principal,
Virar Homoeopathy Medical College,
Veer Savarkar Marg,
Virar (E), Tal – Vasai,
Dist – Thane – 401 303.

Sub :- Temporary approval to the appointment of teachers.

Ref :- Your letter No. KEMT/001/2018 dated 20/04/2018

Sir,

With reference to the above cited subject regarding the proposal for approval to the appointment of teachers of your College under Local Selection Committee, I am directed to inform you that the Hon'ble Vice-Chancellor is pleased to grant approval to the appointment of following teachers as indicated below:

Sr. No.	Name of Teacher	Subject	Post	Status of approval
1	Dr. Manisha P. Soni	Physiology	Reader	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only
2	Dr. Pooja Daunde	Pathology	Lecturer	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only
3	Dr. Jayanti A. Kulkarni	Surgery	Lecturer	w.e.f. date of joining i.e. [illegible] temporary for one year only
4	Dr. Satishkumar R. Dubey	Obst. & Gync.	Lecturer	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only
5	Dr. Parmar Bharat J.	Medicine	Professor	w.e.f. date of joining i.e. [illegible] temporary for one year only
6	Dr. Burase S. J.	Medicine	Reader	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only
7	Dr. Mahendrakumar Yadav	P.S.M.	Lecturer	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only
8	Dr. Manisha P. Ghurde	Repertory	Professor	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only
9	Dr. Barve Rajesh S.	Repertory	Reader	w.e.f. date of joining i.e. 20/04/2018 temporary for one year only

You are requested kindly to handover the copy of this letter to the above mentioned teachers.

Yours sincerely,

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

Asstt. Registrar
(Academic section) [illegible]

TRUE COPY

Details of Publication / Research Publication in Chronological Order:

Sr. No.	Title Of Paper / Book	Name Of Research Journal	Issue no. & Month Of Publication	Whether as a First Author Or Other
1	Impact of Comprehensive Diabetes Care (CDC) Management Program in Type II Diabetes Mellitus: A Retrospective Study	The Classical Science ISSN 2278-8646	Vol.13 Issue No.09 September 2019	Other
2	Efficacy of a polyheral oral formulation in the management of essential hypertension: an open label, pilot clinical study	The Classical Science ISSN 2278-8646	Vol.13 Issue No.10 October 2019	Other
3	Impact Of Comprehensive Diabetes Care (CDC) Management Program In Type Ii Diabetic Obese Patients: An Observational Study	The Classical Science ISSN 2278-8646	Vol.13 Issue No.10 October 2019	Other
4	Impact of Comprehensive Diabetes Care on Glycaemic Control with Reduction in Dependency of Oral Hypoglycaemic Medicines in Diabetic Patients: A Retrospective Study	The Classical Science ISSN 2278-8646	Vol.13 Issue No.10 October 2019	Other
5	Study Of The Liver And Renal Function In Patients Of Chronic Heart Failure Based On The Body Mass Index: A Retrospective Study	The Classical Science ISSN 2278-8646	Vol.13 Issue No.09 September 2019	Other
6	To Study Effect of Heart Failure Reversal Therapy (HFRT) on the Anthropometric Obesity Parameters in Patients of Chronic Heart Failure	The Classical Science ISSN 2278-8646	Vol.13 Issue No.09 September 2019	Other

Madhavbaug Institute of Preventive Cardiology MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

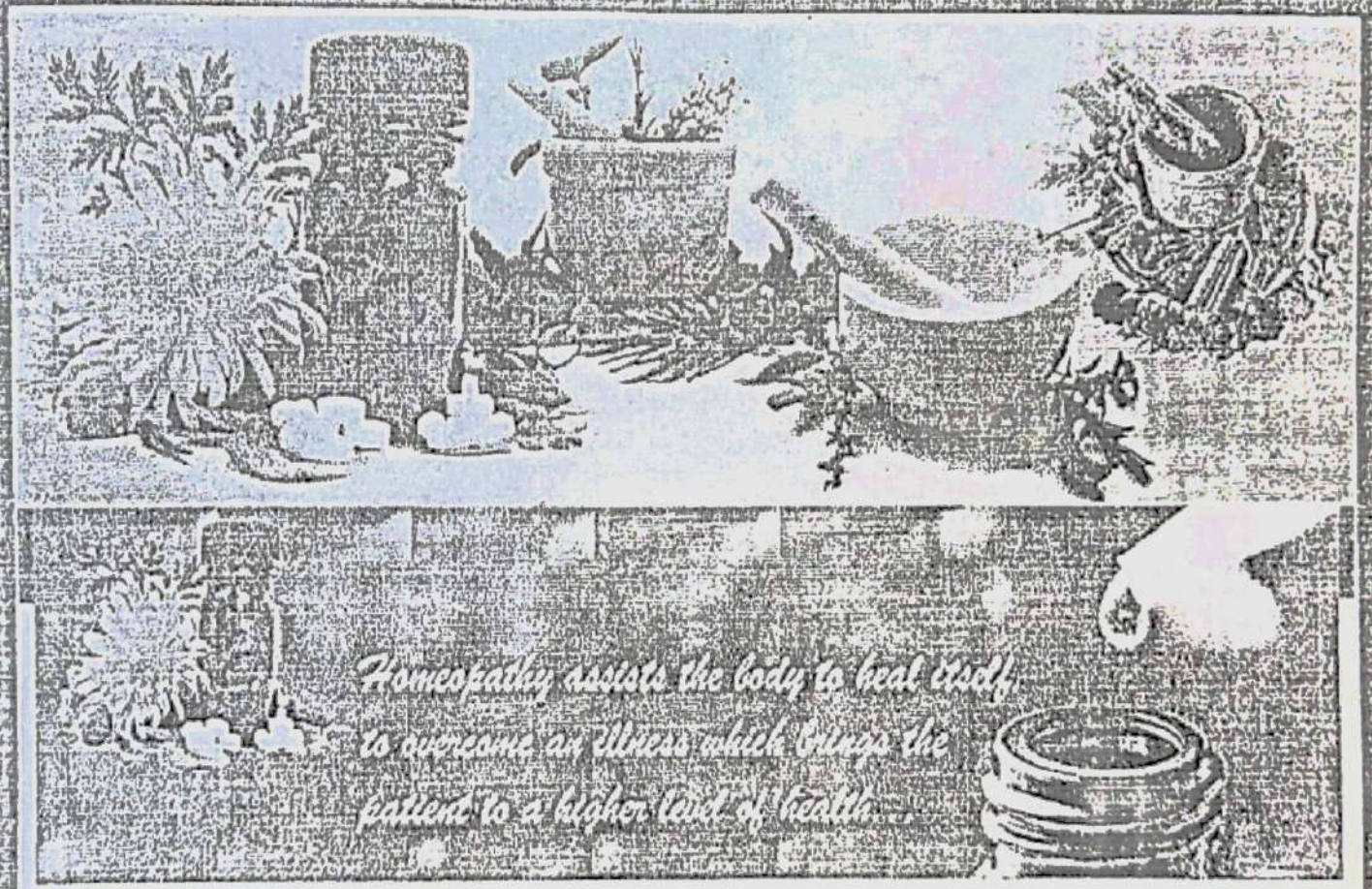
Postal Registration No
STR/038/2016-2018

ISSN 2278 - 8646
RNI. No. MAHMUL/2007/19492

THE CLASSICAL SCIENCE

A PEER REVIEWED MONTHLY MEDICAL JOURNAL

Vol.13 | Issue No 09 | SEPTEMBER 2019 | Rs. 25/-



Inside

धन्वंतरी नागरी सहकारी पतसंस्था मर्या., सातारा

Reg.No.SAT/SAT/RSR/(CR)/340/89-90 Dt.16-10-1989

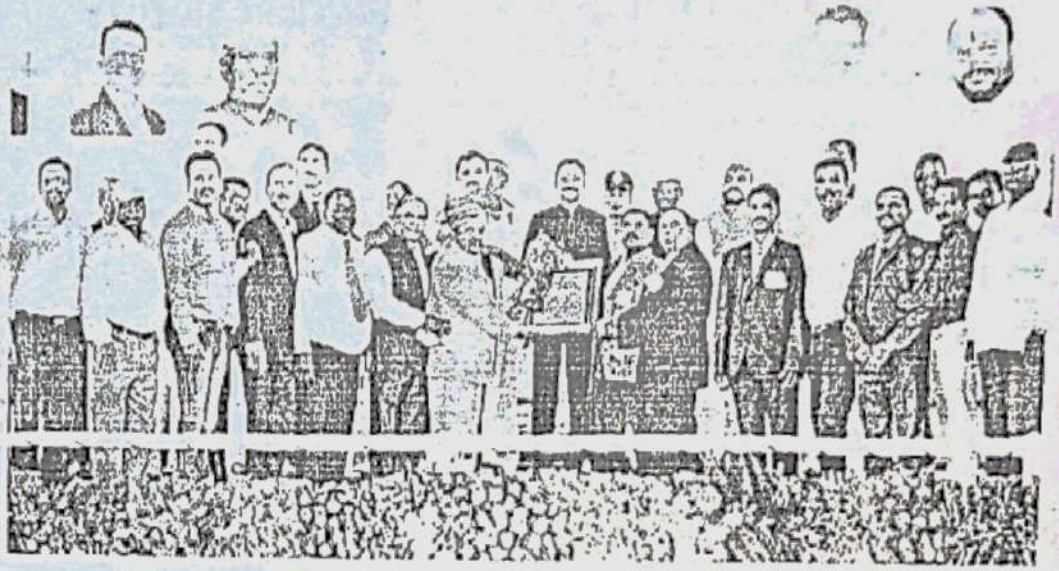
डॉ. रविंद्र भोसले
संस्थापक-चेअरमन

मुख्य कार्यालय : 'धन्वंतरी भवन', ९३ शनिवार पेठ,सातारा फोन :(०२१६२)२३८३४१

शाखा : सातारा, कोरेगांव, फलटण, कराड, निगडी-पुणे, धनकवडी पुणे

Website : www.dhanvantaripatsanstha.in Email : dhanvantari_patsanstha@rediffmail.com

डॉ. कांत फडतरे
व्हा. चेअरमन



संस्थेच्या सातारा शाखेत कामकाज सकाळी ९ ते रात्री ९

संस्थेच्या सातारा शाखेत कामकाज सकाळी ९ ते रात्री ९

सन २०१५-२०१६ करिता महाराष्ट्र शासनाचा पुणे विभागातून 'सहकार भूषण' पुरस्काराने मा. राज्यपालसो यांचे हस्ते गौरव

३०/०९/२०१९ अखेरील माहिती

१)	खेळत भाग भांडवल	२०७ कोटी ९९ लाख
२)	वसूल भाग भांडवल	१० कोटी ४३ लाख
३)	एकूण निधी	२४ कोटी ८२ लाख
४)	एकूण ठेवी	१७१ कोटी ७१ लाख
५)	एकूण येणे कर्ज	११४ कोटी ७८ लाख
६)	एकूण गुंतवणूक	९२ कोटी ८० लाख
७)	एकूण सभासद	९९४४
८)	सी.डी.रेशो	६१.२०%
९)	थकबाकी शेकडा प्रमाण	८.७१%
१०)	सी.आर.ए. आर.	४८.१९%

ठेवीचा प्रकार व मुदत	द. सा. द. शे
३० दिवस ते ९० दिवस	५ %
९१ दिवस ते १ वर्ष	६%
१ वर्ष ते ३ वर्ष मुदतीसाठी	७.५०%
पेन्शन ठेव (दरमहा व्याज	७.५०%
धनसंचय ठेव	३.००%
रिकरिंग ठेव	८.५०%
सेव्हिंग्ज ठेव	४%
दामदिडपट ठेव	७.२५%
दामदुप्पट ठेव	७.२५%
जादा नागरिक मुदत ठेव	८.००%

५० वर्षे [illegible] नागरिकांना १ वर्षापुढे मुदत ठेवीत व किमान २ वर्षापुढे पेन्शन [illegible] प्रचलित व्याजदरापेक्षा १/२% जास्त व्याज देण्यात येईल.

श्री. संजय यादवराव पवार
सरव्यवस्थापक

Director
VPT's Madhavbaug Institute of Preventive Cardiology & Research Center

डॉ. कांत नारायण फडतरे
व्हाईस चेअरमन

MIPC Madhavbaug Institute of Preventive Cardiology

डॉ. रविंद्र नामदेव भोसले
संस्थापक- चेअरमन

TRUE COPY

संचालक मंडळ

डॉ. श्री. लाहोटी, डॉ. शिरीष भाईटे, डॉ. अरविंद काळे, डॉ. शकील अत्तार, डॉ. सुनिल कोडगुले, डॉ. हेमंत शिंदे, डॉ. राजेंद्र जाधव, डॉ. राजेंद्र सरगर, डॉ. वैजयंता खडतरे, डॉ. सौ. सारिका सरकार, डॉ. अभिजीत भोसले.

आमचा संकल्प आपली सेवा - आपला मात्र सहकार्याचा हात हवा.

STUDY OF THE LIVER AND RENAL FUNCTION IN PATIENTS OF CHRONIC HEART FAILURE BASED ON THE BODY MASS INDEX: A RETROSPECTIVE STUDY

Dr. Rohit Sane[1], Dr. Gurudatta Amin[2], Dr.Manisha Ghurde[3], Dr. Snehal Dongre[1], Dr.Prabha Acharya[4] and Dr. Rahul Mandole*[1]

Department of Research and Development, Madhavbaug Hospital, Khopoli, India.
Department of Clinical Operations, Madhavbaug Hospital, Khopoli, India.
Medical Head, Madhavbaug Hospital, Khopoli, India
Department of Research and Development, Madhavbaug Hospital, Khopoli, India.
VRT's Madhavbaug Institute of Preventive Cardiology, Thane India.

*Corresponding Author: Dr. Rahul Mandole
Department of Research and Development, Madhavbaug Hospital, Khopoli, India

ABSTRACT

Background: Chronic heart failure (CHF) is known to affect hepatic and renal function adversely, but relevant Indian data is scarce. This study aimed to assess liver function tests (LFTs) and renal function tests (RFTs) of CHF patients and their relation to BMI status. **Methodology:** The retrospective study considered data of patients who consulted Madhavbaug clinics in Maharashtra, India between July-December 2018. Baseline LFTs and RFTs were analyzed wholly and based on BMI status, viz. normal-BMI, overweight and obese. **Results:** Of 147 patients, majority were males (74.15%) with mean age of 59.15±10.28 years. Based on BMI, three patient sub-groups were made: (56 with normal BMI, 60 were overweight and 30 were obese). Mean SGOT and SGPT were lower in obese group, but this was insignificant ($p>0.05$). OverallALP was increased in all CHF patients but was comparable in all three sub-groups ($p>0.05$). Mean direct bilirubin were above-normal in all sub-groups, but mean total and indirect bilirubin were normal. Mean A:G ratio was normal in all sub-groups. Total serum protein was below normal in all sub-groups, being lowest in overweight group, but these findings were insignificant ($p>0.05$). RFTs, viz. BUN and serum creatinine, were normal and comparable in all sub-groups ($p>0.05$). **Conclusion:** Mild elevation in direct bilirubin and notable ALP elevations were seen in CHF patients but their RFTs were normal. Mean LFTs and RFTs were comparable in patients with normal BMI, overweight or obese patients, indicating lack of association between BMI and hepatic or renal function.

KEYWORDS: Liver function, Renal function, Body Mass Index, Heart Failure.

INTRODUCTION

Cardiovascular diseases (CVDs) are few of the commonest reasons for morbidity as well as mortality in the world, and India is no exception. According to available data, CVD is the commonest cause of death in India. Chronic heart failure (CHF), which is reduced proficiency of the heart to pump the blood in the systemic circulation or inability to fill itself suitably with blood, affects about 10 million Indians. The prevalence of CHF is about 1% in thecountry.

CHF is associated with hepatic derangement due to liver congestion, which are generally asymptomatic but associated with deranged liver function tests (LFTs). Abnormal biochemical LFTs may be seen in CHF patients, but studies have shown variability in the findings. Also, if there are massive elevations seen in LFTs of CHF patients, these may be predictive ofadverse outcomes. There are studies based on the LFTs in CHF patients in the developed countries, but suchdatain the Indian setting is scarce.

Renal function is a known, but often neglected determinant of CHF prognosis. Studies have reported that renal insufficiency may be associated with poor CHF outcomes. However, there is a definite paucity of data with respect to the prevalence of renal insufficiency in CHF patients in the Indian context.

Body mass index (BMI), which is used to indicate the presence or absence of obesity in the population, is considered to be an important determinant of CHF risk and prognosis. Studies have shown that there is an increased risk of CHF development in patientswith increased BMI. Obesity, which is defined as BMI

more than 30 kg/m2, is considered an important risk factor for development of hypertension (HTN), diabetes mellitus (DM) and dyslipidemia, all of which are diseases which worsen the CHF prognosis. Literature search revealed that majority of CHF patients are obese, and this may be related to the impaired LFTs and RFTs in these patients. However, the specific impact of increasedBMI on the RFTs and the LFTs have not been studied in detail

In this retrospective study, we planned to assess the baseline LFTs and RFTs of CHF patients who visited the Madhavbaug clinics in India to tap the abnormalities in the hepatic or renal functioning. We also tried to assess these biochemical parameters based on the BMI status of the patients, after classifying the patients as those with normal BMI, overweight or obese

METHODOLOGY

This retrospective study was conducted utilizing the data of patients who suffered from CHF and visited the Madhavbaug clinics in the Indian state of Maharashtra. These CHF patients visited the clinics for check-up between July 2018 to December 2018. The case record files of these patients were assessed for completeness of the baseline characteristics, viz demographic details, anthropometric details, liver function tests (LFT) and the renal function tests (RFT). Data of only those patients was assessed who had completeness of the baseline records.

The CHF patients who came to the Madhavbaug clinics for the first time were subjected to general and systemic

examination, followed by blood collection to assess the LFTs and the RFTs. The blood was collected from the antecubital vein and sent to the laboratory for reporting. The biochemical values obtained were then entered in the case records of these patients after the test reports arrived. The LFTs which were taken into consideration from the baseline clinical records included alkaline phosphatase, serum glutamic-oxalacetic transaminase (SGOT), serum glutamic-pyruvic transaminase (SGPT), serum bilirubin (total, direct and indirect), albumin to globulin ratio and total protein levels. The baseline RFTs which were checked for in the medical records included serum creatinine and blood urea nitrogen (BUN). The normal range for the LFTs and RFTs were considered from standard textbooks and published literature (Table1)

The patients were classified based on the BMI as those having BMI in normal range, those who are overweight or obese based on the WHO classification followed worldwide. The BMI of between 18-24.9 kg/m2 were considered normal, between 25 to 29.9 kg/m2 were considered overweight while those above 30 kg/m2 were considered obese. The mean RFTs and LFTs values were calculated separately for these three BMI sub- groups and then the mean values werecompared.

Table 1: Normal Range for LFTs and RFTs.

Serum BUN	0-45
SGPT/ALT	0-35
ALP/ALT	30-120
Total bilirubin (mg/dl)	0.2-1
Direct bilirubin (mg/dl)	0-1
Indirect bilirubin (mg/dl)	1
Albumin/Globulin ratio	1.5-2.5:1
Total protein (g/dl)	6-7.8
BUN (mg/dl)	7-20
Serum creatinine (mg/dl)	0.7-1.2

Data entry as well as coding was done in Microsoft Excel. Graphpadinstat software was utilized for data analysis. Categorical data was represented in the numeric form and continuous data was described as mean ± SD. The mean values of LFTs and RFTs were compared between the three subsets (normal BMI, overweight and obese) using Analysis of Variance (ANOVA) test. P value of less than 0.05 was considered statistically significant

RESULTS

147 patients visited the Madhavbaug clinics between the study period and had all the relevant details present in the case records. The data of these 147 patients was included in the study for analysis. The demographic details were recorded, and it was found that most of the patients were males (109 patients, 74.15%). The mean age of the CHF patients included in the study was 59.15 years, witha mean weight of 69.21 and mean heightof

1.6 meters, i.e. 160 centimeters. The mean BMI calculated forthe patients was 26.69 kg/m (Table2)

Based on the BMI the patients were classified as per the WHO guidelines in three categories: those having normal BMI, those who were overweight and those who were obese (Table 3). 56 patients were found to

have normal BMI, 60 patients were over-weight while the remaining 30 were found to beobese.

Table 2: Demographic Details of CHF Patients (n=147).

Mean age (years)	59.15 ± 10.28
Median age (years)	59 (Range: 30-80)
Number of males	109 (74.15%)
Number of females	38 (25.85%)
Mean baseline weight (kg)	69.21 ± 14.39
Mean baseline height (meter)	1.6 ± 0.08
Mean Body mass index (BMI) (kg/m2)	26.69 ± 4.97

Table 3: Classification of patients based on BMI (n=147).

Normal BMI (18.5-24.99 kg/m²)	Overweight (25-29.99 kg/m²)	Obese (>30 kg/m²)
56	60	30

The mean values of all the LFTs and the RFTs were calculated based on the BMI-based subgroups and the comparison of these mean values was made between the three sub-groups. Amongst the LFTs, the mean SGOT and SGPT values were lower in the obese group, but this was not statistically significant ($p>0.05$). The overall ALP was increased in all the CHF patients. However, the mean ALP was comparable in all the three sub-groups ($p>0.05$) but was lowest in the normal BMI group. The mean direct bilirubin levels were found to be above the normal range in all the groups, but the total and the indirect bilirubin levels were in the normal range. Total bilirubin and indirect bilirubin were lowest in the obese group, and this was a statistically significant finding ($p<0.05$). The mean A/G ratio was found to be in the normal range, but the total serum protein was lower than the normal range in all the sub-groups. The mean A/G ratio was lowest but mean total protein was highest in the normal-BMI group, but these findings were statistically insignificant ($p>0.05$). The RFTs, viz. BUN and serum creatinine, were all in the normal range in all the groups, and comparable in the sub-groups ($p>0.05$) (Table 4).

Table 4: Comparison of Liver function test and Renal Function test according to BMI parameters in CHF patients.

Variables assessed	Overall mean values (n=147)	Normal BMI (18.5-24.99 kg/m²) (N=56)	Overweight (25-29.99 kg/m²) (N=60)	Obese (>30 kg/m²) (N=30)	P value
SGOT (U/L)	31.03 ± 15.04	34.01 ± 14.07	32.79 ± 17.96	27.67 ± 9.32	0.56
SGPT (U/L)	26.36 ± 15.05	27.46 ± 17.95	26.12 ± 13.60	24.87 ± 11.87	0.62
Alkaline phosphatase (ALP)	213.87 ± 82.1	210.16 ± 90.22	210.25 ± 70.38	215.84 ± 78.48	0.47
Total bilirubin	0.94 ± 0.11	1.04 ± 0.38	0.93 ± 0.39	0.79 ± 0.42	<0.001*
Direct Bilirubin	0.31 ± 0.19	0.35 ± 0.21	0.31 ± 0.11	0.33 ± 0.31	0.43
Indirect bilirubin	0.59 ± 0.3	0.66 ± 0.2	0.59 ± 0.31	0.48 ± 0.28	<0.001*
Albumin/Globulin ratio	1.57 ± 0.65	1.49 ± 0.37	1.65 ± 0.86	1.56 ± 0.57	0.27
Total protein	6.6 ± 0.94	6.6 ± 0.98	6.41 ± 1.22	6.47 ± 1.35	0.8
BUN	12.71 ± 8.11	11.5 ± 7.71	12.76 ± 6.26	14.81 ± 11.6	0.71
Serum creatinine	1.12 ± 0.44	1.12 ± 0.34	1.14 ± 0.45	1.1 ± 0.59	0.43

DISCUSSION

Obesity is an important risk factor for CVDs including CHF, and BMI is an important indicator for imminent or prevalent obesity. Multiple studies have found that CHF patients having BMI higher than the normal range are at an enhanced risk of mortality [1]. Higher than normal BMI is related to the development of multiple metabolic diseases including HTN and DM. Hence, directly and indirectly, BMI affects the CHF development and prognosis. CHF is also known to affect the liver and the renal function of the body according to many studies published in the developed countries, but it is not clearly known whether the same can be said about Indian CHF patients. It is also not clear that whether BMI plays a role in the deranged LFTs and RFTs in the CHF patients. Hence, the authors decided to analyze the available baseline data to evaluate whether CHF patients showed any biochemical derangement in LFTs or RFTs, both as a whole as well as based on the BMI status of the patients.

The baseline LFT and RFT data of 147 CHF patients were analyzed. On evaluation of the whole data set, it was found that, out of the LFTs, the mean ALP and the mean direct bilirubin were raised above the normal range. The mean serum total protein was found to be mildly lowered in the CHF patients. However, the mean SGOT, mean SGPT, mean total bilirubin as well as indirect bilirubin, and the mean A/G ratio were in the normal range. An increase in the direct bilirubin is seen in parenchymal liver disease, which may be due to CHF. The mean ALP levels in this study were increased approximately twice the normal range. The increased central venous pressure (CVP) leads to passive congestion of the liver in CHF, which can lead to ALP elevation along with elevation of other liver enzymes.[2] Another important reason for elevated liver enzymes is decreased hepatic perfusion due to reduced cardiac output in CHF, thereby causing hepatocellular damage and elevated liver enzymes and bilirubin. However, the ALP is a non-specific enzyme which may be raised in bile duct obstruction, cirrhosis or even in bone disease. Hence, the raised ALP may not be linked with CHF, in the presence of normal SGOT and SGPT. The decreased mean protein, which was mild, can also be physiological due to aging or due to decreased liver function. Once again, the change in serum protein is mild and hence, inconclusive.

The RFTs which were noted down were serum creatinine and BUN, and both were in the normal range. This was in contrast to multiple studies in the western countries, which have shown that how long-term CHF can compromise renal functions. In a study by Tonelli et al., 33% of patients with CHF developed chronic kidney disease (CKD) in late life while the number was 32% in another study by Damman et al. Just like for liver function, the main causes for compromised renal function in CHF patients are increased CVP and reduced renal blood flow. Initially, renal auto-regulation maintains the kidney function and this may be the reason why patients in our study had normal RFTs. However, glomerular filtration rate (GFR) declines over a period of time, and there is compromised renal function in the later stage of life.[3]

The mean BMI for the CHF patients in this study was 26.69 kg/m^2, falling in the overweight category.[4] 60 of the 147 patients were overweight, 56 of them fell in the normal BMI category while 30 of them were in the obese category. It was found that all the values, except total bilirubin and indirect bilirubin, were comparable in the three BMI categories. Even though the total and the indirect bilirubin were significantly lower in the obese class of CHF patients, the values in all the groups were in the normal range and hence this statistical significance was clinically irrelevant. In our knowledge, this is one of the first studies which has tried to assess the LFTs and RFTs in CHF patients, based on the BMI and hence, this study holds a novelty factor.

The study had a few limitations. The study was carried

only in Western India, and hence patients of the whole country were not represented in the sample, creating region bias. Also, the sample size was low. A study with a bigger sample size, multiple centers and over a longer period may help in creating more robustevidence.

CONCLUSION

Mild elevation in direct bilirubin and notable elevations in ALP were seen in CHF patients but their RFTs were in the normal range. The mean LFTs and RFTs values were comparable in patients with normal BMI, overweight or obese patients indicating possible lack of association between BMI and hepatic or renal derangement in CHF patients. More evidence needs to be generated in Indian

CHF patients to create stronger evidence with regards to the LFTs and RFTs in CHF patients.

REFERENCES

1. Prabhakaran D, JeemonP, Roy A Cardiovascular Diseases in India. Circulation, 2016; 133(16):1605-20.
2. Coronel R, de Groot JR, van Lieshout JJ. Defining heart failure. Cardiovasc Res., 2001; 50:419–22.
3. Seth S. Heart Failure in India: Need for Indian Guidelines. Cardiological Society of India. Accessed from www.csi.org.in/Cardio pdf-21.pdfon 6-February2018.
4. Auer J. What does the liver tell us about the failing heart? EHJ., 2013; 34:711-14.
5. Aaronson KD, Schwartz S, Chen TM. Development and prospective validation of a clinical index to predict survival in ambulatory patients referred for cardiac transplant evaluation. Circulation. 1997; 95: 2660- 67.
6. McAlister FA, Ezekowitz J, Tonelli M, Armstrong PW. Renal insufficiency and heart failure: prognostic and therapeutic implications from a prospective cohort study. Circulation, 2004, 109(8): 1004-9.
7. KenchaiahS, Evans JC, Levy D. Obesity and the risk of heart failure. New Engl J Med, 2002; 347: 305–13.
8. Gierach M, Gierach J, Ewertowska M, Arndt A, JunikR. Correlation between Body Mass Index and Waist Circumference in Patients with Metabolic Syndrome. ISRN Endocrinology. 2014;1-6.
9. Giallourakis CC. Liver Complications in Patients with Congestive Heart Failure. Gastroenterology & Hepatology. 2013; 9(4): 244-46.
10. LimdiJK, Hyde GM. Evaluation of abnormal liver function tests. Postgrad Med J., 2003, 79:307-12.
11. Harrison T, Kasper D. Harrison's principles of internal medicine. 20ed. New York: McGraw-Hill Medical Publ. Division,2018.
12. Nuttall FQ. Body Mass Index: Obesity, BMI, and Health: A Critical Review. NutrToday, 2015; 50(3): 117-128.
13. Martinez S, BykuM, Novak E, Cedars A, Eghtesady P, Ludbrook P et al. Increased Body Mass Index Is Associated with Congestive Heart Failure and Mortality in Adult Fontan Patients. Congenital Heart Disease, 2015, 11(1):71-9.
14. AuneD, Sen A, Norat T, Janszky I, Romundstad P, TonstadS, VattenLJ. Body Mass Index, Abdominal Fatness, and Heart Failure Incidence and Mortality: A Systematic Review and Dose-Response Meta- Analysis of Prospective Studies. Circulation. 2016; 133(7):639-49.
15. Tian CR, Qian L, Shen XZ, Li JJ, Wen JT. Distribution of serum total protein in elderly Chinese. PLoSOne, 2014; 9(6):e101242.
16. DammanK, Valente MA, Voors AA, O'Connor CM, Van VeldhuisenDJ, HillegeHL. Renal impairment, worsening renal function, andoutcomein patients with heart failure: an updated meta- analysis. Eur Heart J. 2014; 35, 455-69.
17. Tonelli M, Wiebe N, Culleton B, House A, Rabbat C, FokM, McAlister F, Garg AX. Chronic kidney disease and mortality risk: a systematic review. J Am Soc Nephrol. 2006; 17:2034-47.
18. Damman K, TestaniJM. The kidney in heart failure: an update. European Heart Journal, 2015, 36:1437-44.

To Study Effect of Heart Failure Reversal Therapy (HFRT) on the Anthropometric Obesity Parameters in Patients of Chronic Heart Failure

Dr. Rohit Sane [1], Dr. Gurudatta Amin [2], Dr.Prabha Acharya[5], Dr. Snehal Dongre[3], Dr.Manisha Ghurde[5], Dr. Rahul Mandole [*4]

[1]Department of Research and Development, Madhavbaug Hospital, Khopoli, India [2]Department of Clinical Operations, Madhavbaug Hospital, Khopoli, India [3]Medical Head, Madhavbaug Hospital, Khopoli, India

[4]Department of Research and Development, Madhavbaug Hospital, Khopoli, India

[5]VRT's Madhavbaug Institute of Preventive Cardiology, Thane, India

**Corresponding author* - Dr. Rahul Mandole

Abstract

Background: Chronic heart failure (CHF) is a common cause of mortality and morbidity. Obesity influences the CHF development and prognosis. This study was conducted to assess effect of Heart failure reversal therapy (HFRT), a combination of panchakarma and allied therapies, on anthropometric parameters in CHF patients. ***Methodology:*** This retrospective study was conducted on data of patients who visited Madhavbaug clinics in Maharashtra, India between July-December 2018. Selection was based upon the availability of complete baseline (day 1 of HFRT) and follow-up data (day 30 of HFRT) of CHF patients who were admitted for minimum 5 days for HFRT. ***Results:*** Out of 147 patients, 74.15% were males with mean age 59.15±10.28 years. There was statistically significant decrease ($p<0.05$) in both mean BMI and abdominal girth at day 30 of HFRT. 42 of 147 patients (28.57%) had hypertension (HTN) with CHF, 22 patients (14.97%) had diabetes mellitus (DM) and 61 patients (41.49%) had both HTN and DM. In all these sub-groups, mean BMI and abdominal girth was significantly decreased ($p<0.05$) at day 30. Strong positive correlation was found between BMI and abdominal girth on day 1 ($R=0.9$, $P<0.05$) and day 30 ($R=0.83$, $P<0.05$) by Pearson's correlation. Similar correlation was found between the two parameters in subsets of CHF patients having HTN or DM or both DM and HTN ($p<0.05$). ***Conclusion:*** HFRT decreased BMI and abdominal circumference significantly in CHF patients, irrespective of the presence of HTN or DM. Both the anthropometric parameters correlated strongly in all co-morbidity subsets of CHF patients.

Keywords: *HFRT, Obesity, Body mass Index, Abdominal Girth, Comorbidity*

Introduction

Globally, cardiovascular diseases (CVDs) are few of the commonest causes of morbidity and mortality and the picture in India matches the global scenario. In the true sense, CVD has become the commonest cause of death in the country.[1] Chronic heart failure (CHF) is an intricate clinical syndrome which involves reduction in the ability of the heart to pump the blood in the systemic circulation or inability to fill itself appropriately with blood.[2] Approximately 8-10 million Indians are suffering from CHF, with an estimated prevalence of 1%.[3] There are well-known guidelines which talk about different pharmacological agents like angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), vasodilators as well as beta blockers for the management of CHF. However, despite these multiple treatment options, the CHF mortality in India is as high as 20%- 30%.[4] Hence, there is a need of new treatment modalities which will improve the prognosis of CHF.

The role of obesity in the development or the CHF is widely debated. According to the Framingham Study there is an enhanced risk of developing CHF in people having elevated body mass index (BMI) (5% risk in men and 7% risk in women for every rising point of BMI).[5] Though there are doubts over the role of obesity as a solitary risk factor in the CHF development as well as prognosis, it is a proved fact that obesity is associated indirectly or directly in the

development of hypertension, type II diabetes mellitus and dyslipidemia, all of which are risk factors for CHF progress and development.[9] Hence, there needs to be development of therapeutic options which can help control obesity, benefitting the patients of CHF.

Physicians practicing alternative medicine believe that in the chronic stage of heart failure, use of *panchakarma* therapy (a 5- step procedure for delivering internal body purification) is an effective add-on therapy.[7] Heart failure reversal therapy (HFRT), also known as *sampurnahrudayshudhikaran*(SHS) therapy, is a blend of herbal treatment with panchakarma and allied therapeuticmodalities.[8-10] The techniques utilized in HFRT include snehana (massage), swedana (passive heat therapy) and basti (medicated enema), which are known to free the body from the toxins.

There has been some recent published evidence on the effect of the HFRT therapy on CHF patients. However, there is a paucity of data on the specific effect of HFRT on the modifiable anthropometric parameters for obesity in the CHF patients, which are BMI and abdominal circumference. Though BMI is a commonly utilized parameter to monitor obesity in the population, it does not give information on the adipose tissue distribution in an individual. Abdominal obesity, which is indicated by waist circumference, plays a crucial role in the cardiovascular risk assessment. Major health organizations like World Health Organization (WHO) have also suggested the combination of BMI as well as abdominal obesity to determine the distribution of adipose tissue in a more profoundway.[11]

In this retrospective study, the effect of HFRT was analyzed on BMI as well as waist circumference in CHF patients, to know the impact of HFRT on both the generalized body fat as well as on the abdominal obesity. We also assessed the correlation of the two anthropometric obesity parameters to check whether they go hand- in-hand, both before as well as after HFRT intervention

Methodology

This was a retrospective study conducted on the data of the patients who visited the Madhavbaug clinics in Maharashtra, India between July 2018 to December 2018. The data of only those patients was considered who had been administered HFRT over minimum 5 days of admission in the Madhavbaug clinics. Cases were identified, and data was assessed from the medical records of Madhavbaug clinics in Maharashtra. The selection was based upon the availability of complete relevant baseline data (day 1 of HFRT) and follow-up data (day 30 of HFRT) of the patients. The information about co-morbidities, if any, were noted down from the medicalrecords.

The HFRT is an amalgamation of panchakarma as well as allied therapies. HFRT uses different oils and decoctions, which constitutes of a 4-step procedure, described below in table 1.

Table 1: Study Treatment: Heart Failure Reversal Therapy (HFRT)

Step of HFRT	Type of Therapy	Herbs used for therapy	Duration of Therapy
Snehana	Massage [illegible] upper strokes [illegible] towards heart	[illegible] Oil processed [illegible]	[illegible] minutes
Swedana	Passive heat therapy	*Dashmoola* group of ten herbal roots with [illegible]	10-15 minutes [illegible] 3-4 minutes [illegible] procedure
Hrudaydhara	[illegible] therapy [illegible] height of [illegible]	[illegible]	[illegible]
Basti	Medicated enema administered [illegible] should be [illegible] for [illegible] minutes for maximum absorption	[illegible] ml aqueous extract)	10 minutes

Madhavbaug Institute of Preventive Cardiology MIPC

TRUE COPY

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

On the first day of hospital admission before starting HFRT, the BMI was evaluated by taking into consideration the height and the weight of the patients and using the formula: weight in kilograms/(height in meters)². The abdominal girth of patients was measured on day 1 before initiating HFRT using a measuring tape and noted down in medical records. In a similar way, the measurements of height, weight and abdominal girth were done on day 30 from HFRT initiation and the comparison with the baseline BMI and abdominal girth was done.

Data was entered and coded in Microsoft Excel spreadsheet. GraphpadInstat software was used to analyze the data. Categorical data were represented in the numeric form and continuous data were presented as the mean ± SD. Paired t-test was used to assess the difference between the values at baseline and 30th day after treatment initiation. Correlation between BMI and abdominal girth was calculated using Pearson's correlation coefficient. P value <

0.05 was considered statistically significant.

Results

A total of 147 patients' data was included in the study for analysis. The demographic details were compiled, and it was found

that majority of the patients were males (74.15%). The mean age of the CHF patients was 59.15 years, with a mean baseline weight of

69.21 kilograms and mean height of 1.6 meters (Table 2).

Table 2: Demographic Details of CHF Patients (n=147)

Mean age (years)	59.15 ± 10.28
Median age (years)	59 (Range: 30-80)
Number of males	109 (74.15%)
Number of females	38 (25.85%)
Mean baseline weight (kg)	69.21 ± 14.39
Mean baseline height (meter)	1.6 ± 0.08

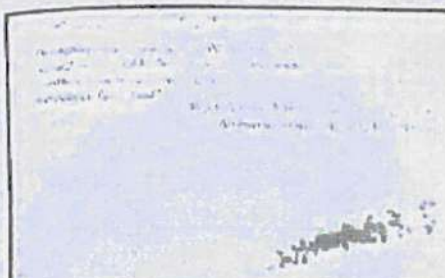
On comparing the mean BMI of all CHF patients between day 1 and day 30 of HFRT treatment, there was statistically significant decrease, assessed by paired T test. Similar findings were noted for mean abdominal girth, with statistically significant decrease at day

30. 42 of the 147 patients (28.57%) had hypertension (HTN) associated with CHF, 22 patients (14.97%) had type II diabetes mellitus (DM) and 61 patients (41.49%) had both HTN and DM along with CHF. In all these sub-groups, the mean BMI and mean abdominal girth was found to be significantly decreased at day 30 compared to that on day 1. (Table3)

Table 3: Change in Anthropometric Obesity Parameters in Patients of CHF based on co-morbidities

		Day 1 of initiation	Day 30 of treatment	P value
All CHF patients [N=147]	Mean BMI (kg/m2)	26.00 ± 4.6[illegible]	25.[illegible] ± 5.05	0.01*
	Mean Abdominal girth (cm)	98.82 ± 12.74	93.68 ± 12.36	0.01*
CHF with Hypertension (HTN) [N=42]	Mean BMI (kg/m2)	26.6[illegible] ± 4.64	25.00 ± 5.05	0.01*
	Mean Abdominal girth (cm)	[illegible]	[illegible]	0.01*
CHF with Diabetes mellitus (DM) [N=22]	Mean BMI (kg/m2)	[illegible]	24.46 ± 6.25	0.01*
	Mean Abdominal girth (cm)	[illegible]	91.44 ± 14.96	0.01*
CHF with both HTN and DM [N=61]	Mean BMI (kg/m2)	27.31 ± 4.83	25.66 ± 5.44	0.01*
	Mean Abdominal girth (cm)	101 ± 12.9	95.79 ± 12.35	0.01*

P<0.05 considered significant by Paired T test



s Pearson Correlation Coefficient: R=0.9 (Strongcorrelation

Pearson Correlation Coefficient: R=0.83 (Strongcorrelation)

On subgroup correlation analysis based upon the associated co-morbidities, we found strong correlation between BMI and abdominal girth in subsets of CHF patients having only HTN, only DM or both DM and HTN, and all these correlations were statistically significant.Table 4: Correlation between BMI and Abdominal girth in patients of CHF with various co-morbiditie

Obesity poses as a risk factor for multiple CVDs, prominent of which are CAD and CHF. BMI is considered as an important indicator of sedentary lifestyle as well as impending or prevalent obesity. Many studies have shown that CHF patients having high BMI are at an increased risk of mortality.[12,13] Abdominal obesity, indicated by calculating the abdominal girth, is associated with development of multiple metabolic diseases like HTN and DM. These metabolic diseases are known risk factors for not only the development of CHF but also alters the prognosis. Hence, measuring of the anthropometric obesity indicators, which are BMI and abdominal girth, are equally important to predict the development or prognosis of CHF.

The existing treatment modalities have positive effects on the cardiovascular parameters but when it comes to their effect on BMI or abdominal girth, none of the drugs of CHF are known to be affecting them. There is certainly a dire need of modalities which can help modify these anthropometric parameters, which may directly and indirectly help in making the CHF prognosis more positive. Physicians practicing alternative medicine utilize panchakarma therapy as an add-on therapy for treatment of CHF and HFRT is a combination of panchakarma with allied therapies.[14] However, the effect of HFRT on the specific anthropometric parameters in patients of CHF are not well established, and no study has taken the co-morbidities besides CHF into consideration. Hence, it was thought to evaluate the effect of HFRT on BMI and abdominal girth in CHF patients, and also analyze

Day of assessment	Comorbidity seen	R (Correlation coefficient)	Interpretation	P value
Day 1 of HFRT	All CHF patients [N=147]	0.9	Strong positive correlation	<0.01*
	CHF with Hypertension (HTN) [N=42]	0.83	Strong positive correlation	<0.01*
	CHF with Diabetes mellitus (DM) [N=22]	0.91	Strong positive correlation	0.01*
	CHF with both HTN and DM [N=64]	0.91	Strong positive correlation	0.01*
Day 30 of HFRT	All CHF patients [N=147]	0.83	Strong positive correlation	<0.01*
	CHF with Hypertension (HTN) [N=42]	0.8	Strong positive correlation	<0.01*
	CHF with Diabetes mellitus (DM) [N=22]	0.95	Strong positive correlation	<0.01*
	CHF with both HTN and DM [N=64]	0.8	Strong positive correlation	<0.01*

Discussion

the data based on the subgroups suffering from HTN or DM orboth.

In this study, we assessed the effect of HFRT, a novel treatment modality, in CHF patients, on the obesity parameters of BMI and abdominal girth, after 30 days of HFRT initiation. It was found that HFRT significantly lowers the BMI and abdominal girth at day 30, compared to the baseline. The sub-group analysis to assess the effect of HFRT in CHF patients suffering from DM and HTN, separately and together, yielded positive results. This was done to evaluate whether any underlying metabolic disease will affect the positive effect of HFRT on the anthropometric measurements, which was not the case. Hence, irrespective of the underlying metabolic disease of HTN and DM, HFRT may benefit the patients based on BMI and abdominal girth.

HFRT comprises of *Snehana*(external oleation or massage), *Swedana*(passive heat therapy), *Hridaydhara*(decoction dripping therapy) as well as *Basti* (per rectal drug administration). Published literature states that the sympathetic nervous system is activated in obesity.[14] It has been theorized that *Snehana*decreases the sympathetic activity of the body, which may be one of the factors which may be decreasing the body fat. *Swedana*involves exposure of the body to external heat, which is believed to decrease the subcutaneous body fat. Stress is a common factor which is associated with increasing BMI as well as obesity which may be tackled by *Hridaydhara*, which leads to patient relaxation both mentally as well as physically. According to a published research on obese patients, *Basti* moderates the immune responses by controlling the pro-inflammatory cytokines, immunoglobulins and functional properties of T-cells. These alterations are associated with a reduction in the bodyweight.[15]

BMI does not discriminate between the fat mass and fat-free mass, which is an accepted indicator of the general health status. The robustness of BMI as an adequate obesity indicator is not proved in elderly individuals, as the fat-free mass decreases with age.[16] Waist circumference or abdominal girth helps in determining abdominal adiposity, which is a better indicator of risk to develop various metabolic diseases. By checking the correlation between BMI and abdominal circumference, it was proved that irrespective of the associated co-morbidity with CHF, HFRT significantly decreases general body mass as well as on abdominal adiposity, which correlated well in all subgroups of CHFpatients.

The study had a few limitations. The study assessment was done only after 30 days of HFRT, so long term effects of HFRT on the anthropometric parameters was not assessed. The study was of retrospective design, and so was dependent on the availability of patient data. Future research over a longer study period and with a prospective study design may be planned to generate more evidence for effect of HFRT on anthropometricmeasurements.

Conclusion

HFRT decreased BMI and abdominal circumference significantly in patients of CHF, irrespective of the presence of any other co-morbidity like HTN or DM. Both the anthropometric parameters correlated strongly in all the co-morbidity subsets of CHF patients.

Acknowledgements:

The authors thank the study participants and their families, without whom this study would not have been accomplished. We would also like to acknowledge Dr. KritarthNaman Singh for medical writing.

References

[1] Prabhakaran D, JeemonP, Roy A.

Cardiovascular Diseases in India Circulation.2016;133(16):1605-20.[2] Coronel R, de Groot JR, van LieshoutJJ Defining heart failure. Cardiovasc Res.2001;50:419-22.

[3] Seth S. Heart Failure in India: Need for Indian Guidelines. Cardiological Society of India. Accessed from www.csi.org.in/Cardio_pdf/21.pdf on 6th February 2018.

[4] Seth S, Ramakrishnan S, Parekh N, Karthikeyan G, Singh S, Sharma G. Heart failure guidelines for India: Update 2017. J Pract Cardiovasc Sci2017;3:133-8.

[5] KenchaiahS, Evans JC, Levy D Obesity and the risk of heart failure. New Engl J Med2002;347:305–13.

[6] Gierach M, Gierach J, Ewertowska M, Arndt A, JunikR. Correlation between Body Mass Index and Waist Circumference in Patients with Metabolic Syndrome. ISRN Endocrinology2014,1-6.

[7] Mishra LC, ed. In: Scientific basis for ayurvedic therapies. September. CRC Press;2003.

[8] Vinjamury SP, Vinjamury M, Suchanitakul S, Ziegler I, Panchakarma: ayurvedic detoxification and allied therapies—is there any evidence? In: Evidence-based practice in complementary and alternative medicine. Berlin, Heidelberg: Springer;2012:113–137.

[9] Mandole R, Sane R. A retrospective cohort to study the mortality and survival rate amongst chronic heart failure (CHF) patients after Ayurvedic SampurnaHrudayShudhikaran (SHS) therapy. J Clin Exp Cardiol. 2015;6:4.

[10] Sane R, Hanchate M Effect of the SampurnaHridayShuddhikaran (SHS) model in heart failure patientsin India: a prospective study Br J Med Med Res. 2014;4(1):564.

[11] Shields M, Tremblay MS, Connor SG, and Janssen I Abdominal obesity and cardiovascular disease risk factors within body mass index categories. Health Reports. 2012;23(2):7–15.

[12] Martinez S, BykuM, Novak E, Cedars A, Eghtesady P, Ludbrook P et al. Increased Body Mass Index Is Associated with Congestive Heart Failure and Mortality in Adult Fontan Patients. Congenital Heart Disease. 2015,11(1):71-9.

[13] Aune D, Sen A, Norat T, Janszkyl, RomundstadP, Tonstad S, Vatten LJ. Body Mass Index, Abdominal Fatness, and Heart Failure Incidence and Mortality: A Systematic Review and Dose-Response Meta-Analysis ofProspective Studies. Circulation.2016;133(7):639-49.

[14] Davy KP, Orr JS. Sympathetic nervous system behavior in human obesity. NeurosciBiobehav Rev. 2008;33(2):116-24.

[15] Thatte U, Kulkarni A, GhungralkarR, Panchal F, Vetale S, Teli P et al. Immunological & metabolic responses to a therapeutic course of Basti in obesity. Indian Journal of Medical Research 2015;142(1):53-62

[16] Chinedu SN, OgunlanaOO, AzuhDE, Iwcala EEJ, Afolabi IS, Uhuegbu CC et al. Correlation between body mass index and waist circumference in Nigerian adults: implication as indicators of health status. Journal of Public Health Research 2013;2(e16):93-98.

Impact of Comprehensive Diabetes Care (CDC) Management Program in Type II Diabetes Mellitus: A Retrospective Study

Rohit Sane[1], Pravin Ghadigaonkar[2], Rekha Chaure[3], Sangeeta Jain[3], Shweta Wahane[4], Manisha Ghurde[6], Aarti Nadapude[5], AaratiBadre[3], Prabha Acharya[a],Rahul Mandole[1,*]

[1]Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India [2]Department of Medical Operations, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India [3]Madhavbaug Cardiac Care Clinics, Mumbai, India

[4]Madhavbaug Cardiac Care Clinics, Nagpur, India

[5]Madhavbaug Cardiac Care Clinics, Latur, India

[a] VRT's Madhavbaug Institute of Preventive Cardiology,Thane, India

Email address: cromilagro@gmail.com(R. Mandole)

Corresponding author

Abstract: Globally, Diabetes mellitus (DM) prevalence has created menace, being a major culprit of increased mortality and morbidity and health care expenditures. India is the 2nd country with maximum number of diabetic patients, with an estimated prevalence of around 10%. Comprehensive Diabetes Care (CDC) is a combination of *Panchakarma* and Diet management. This study was conducted to evaluate the effect of CDC on glycosylated haemoglobin (HbA1c), body mass index (BMI), body weight, abdominal girth and dependency on conventional therapy in DM Patients. This retrospective study was conducted from July 2017 to January 2018, wherein the data of elderly male type 2 DM patients (HbA1c >6.5%) who attended *Madhavbaug clinics* in *Maharashtra*, India were identified. Data of patients who were administered CDC (60-75 minutes) with minimum 6 sittings over 90 days (± 15 days) were considered. Variables were compared between day 1 and day 90 of CDC. Out of 48 enrolled elderly male patients, 34 were included for analysis. CDC showed significant improvement in HbA1c from 8.27 ± 0.96to 7.1 ± 1.30; p=0.0001), BMI from 27.65 ± 3.20 to 25.91 ± 3.29, p< 0.0001), weight from 73.75 ± 10.76to 69.46 ±10.39, p<0.0001). Abdominal girth (from 100.0 ± 9.08 to 95.36 ± 9.10; p<0.0001), also showed significant reduction. Dependency on concomitant medicines was reduced, with number of patients on no concomitant medicines increasing from 3% to 15%. CDC and allopathy both are found to be efficacious; but CDC acts dually, by reducing HbA1c, as well as reducing dependency on allopathic medications.

Keywords: Comprehensive Diabetes Care, CDC, Panchakarma, HbA1C, BMI, DM, Alternative Medicine

1. Introduction

Diabetes mellitus type II (DM) prevalence has reached epidemic levels in global scale. International diabetes federation quotes that number of diabetics in 2030 will rise by estimated 200 million rise in number of cases, as compared to prevalence in 2011 [1]. This is far more concerning in India, where it is estimated that around 1/10th of the population is inflicted by DM, with significantlyhigh mortality rates [2, 3]. Historically, fastingblood sugar level >126 mg/dl and post-meal blood sugar level >140 mg/dl, which together constitute an oral glucose tolerance test is used for diagnosis of DM. Nowadays, glycosylated hemoglobin (HbA1c) is used for diagnosis of DM, as it depicts blood glucose levels over preceding 2-3 months. HbA1c levels >6.5% is diagnostic of DM, while levelslessthan 6.5 but more than 5.7% are dietary

considered as prediabetics. Most of the guidelines suggest target HbA1c as ≤ 6.5% [4]. Plethora of complications of DM, grouped as macrovascular and microvascular, short term and long term, makes the disease more dangerous. Stroke, myocardial infarction, peripheral vascular disease are some of the macrovascular complications, while retinopathy, neuropathy and nephropathy are grouped under microvascular complications. However, major culprit for morbidity and mortality in diabetic patients is cardiovascular diseases (CVD) [5]. Foot ulcers, amputations are some of the after effects of diabetic neuropathy, while diabetic nephropathy is one of the major cause of morbidity and mortality in diabetic patients after CVD [6-9]. Diabetes is presently managed by advocating dietary corrections and regular physical exercise along with treatment with oral antidiabetic drugs/oral hypoglycemic agents (OADs). It is recommended to start OAD only when diet management and other measures are unable to bring down levels of HbA1c to < 6.5% after 2 months. The majority of the OADs act by either, reducing the intrinsic glucose production, increasing tissue uptake or increasing excretion. Sulphonylureas, thiazolidinedione, biguanides, etc. are some of the examples of conventional class ofantidiabetic drugs. When 1 OAD is unable to reduce the HbA1c below 7.5% or if baseline HbA1c is too high, it is recommended to use combination of OADs from different class [10]. But, major issues faced withthe use of OADs are a plethora of adverse effects which include hypoglycemia, pancreatitis, anemia, etc [11]. These adverse effects along with the increased cost of therapy has found to drastically reduce medication adherence in patients of DM [12]. Despite the availability of numerous classes of OADs and extensively laid down guidelines, number of cases ofDM are consistently increasing [12]. Thus an effective alternative therapy is needed, that will counteract these adverse effects of conventional medicines and increase patient adherence to medications for optimal outcome. OADs act by reducing blood sugar levels in the body. Various herbal drugs have shown similar effects in clinical studies, including significant reduction in HbA1c [13-15]. This makes Ayurveda a potential therapeutic alternative in patients of type 2 DM. Ayurvedic physicians advocate Panchakarma- a multi-step body detoxification process in the chronic phase of disease. *Panchakarma* and diet therapy is combined in Comprehensive Diabetes Care (CDC) Management Program. Three techniques are used in *Panchakarma* in CDC- *Snehana*i.e. oleation, *Swedana*i.e. passive heat therapy and *Basti* i.e. per rectal drug administration. *Panchakarma* is a well-known procedure for internal detoxification of the body [16-17]. Since reduction in quality of life, depression are associated with DM,we planned this retrospective study in elderlymale patients of type 2 DM, to assess the efficacy of CDC on various parameters like HbA1c, BMI, reduction in body weight, abdominal girth and reduction in dependency on conventional medications after completion of CDC

2. Subjects and Methods

Study Design

Retrospective record based study.

Study Site

Madhavbaug Clinics from all over Maharashtra

Study Period

July 2017 to January 2018.

Study Participants

Elderly male (>60 years), suffering from type 2 DM (HbA1c≥6.5%),[10] who attended *Madhavbaug clinics* across *Maharashtra*.

Methodology

The data of patients who had been administered CDC with minimum 6 sittings over a span of 90 days (± 15 days) were considered for the study, out of the 6 sittings were done in the 1st month, and 1 sitting per month for next 2 months. These patients

were maintained on a diet plan of 800-1000 calories intake per day, according to patient medical records. The diet plan consisted of low carbohydrates, moderate proteins, and low fats. Cases were identified, and data was assessed from the records of *Madhavbaug clinics* in *Maharashtra*. The selection was based upon the availability of complete relevant baseline data (day 1 of CDC) and final day data (day 90 of CDC) of the patients. The information about prescribed concomitant medicines, if any, was also noted down. On day 1 of CDC, the patients had undergone HbA1c, weight, BMI, abdominal girth measurements as per guidelines [18]. This readings were considered as baseline reading. This process was repeated on day 90 of CDC to calculate the change from baseline reading. The BMI for day 1 and day 90 of the patients was calculated by checking the weight and the height from the medical data sheets ofpatients and using the formula: *weight in kilograms/ (height in meters)*^{2}. The dependency on standard medication was calculated both on day 1 and day 90 of CDC as the percentageof patients out of the total enrolled ones who required a conventional allopathic therapeutic agent during the study period of 90days.

The CDC is a 3-step procedure which was performed on the patients of type 2 DM after a light breakfast. One sitting of the procedure took 65-75 minutes, as described in table 1 [19-20]

Table 1. Study Treatment: Comprehensive Diabetes Care (CDC).

Step of CDC	Type of Therapy	Herbs used for therapy	Duration of Therapy
Snehana Swedana	Massage or external oleation (centripetal upper strokes on the body)	100 ml Azadirachta indica (neem) extract processed in sesame oil	25-30 minutes
	Passive heat therapy to the body	Dashmoola (group of ten herbal roots) with steam at <40	15-20 minutes +3-4 minutes
Step of CDC	Type of Therapy	Herbs used for therapy	Duration of Therapy
		degrees Celsius)	of relaxation after procedure
Basti karma	Per-rectal drug administration should be in body for > 15 minutes for maximum absorption	Mixture of 40% Cashmir (Gymnemasylvestre), 20% Dhanwantar (Barbens aristata) and 40% Yashtimadhu (Glycyrrhiza glabra)	10 minutes

Statistical Analysis

Data were pooled and coded in Microsoft Excel spreadsheet, R Version 3.4.1 software was used to analyze the data. Categorical data were represented in the frequency formandcontinuousdatawerepresentedastheMean ± SD. Paired t-test was used to assess the difference between baseline values and 90thday after treatment. The histogram were used to represent thegraphs.

I. Results

Studypopulation:

A total of 48 patients' data was screened for inclusion in the study. However, based on the availability of data (Day 1 and Day 90) and the inclusion criteria, 34 patients were selected, and their data was considered for analysis. The present study involved a total of 34 male patients with more than 60 years age having a diabetic history and HbA1c ≥ 6.5. The mean age of the patients was 66.32 ± 4.86 years and mean height was 163.34 ± 6.53 cm. Clinical parameters compared between baseline values and after 90thday was as shown in Table 2. After 90 days of treatment there was significant reduction in the HbA1c (*P=0.0001; Figure 1*). There was significant reduction in weight (P<0.001; Figure 2), BMI (P<0.0001; Figure 3) and Abdomengirth (P<0.0001; Figure4)posttreatmentof90days.

Table 2. Comparison of clinical parameters between baseline values and 90th day

Variable (n=34)	Baseline	After 90 days	t statistic	p-value
HbA1c	8.27 ± 0.96	7.1 ± 1.30	4.71	0.0001
Weight (Kg)	73.75 ± 10.76	69.46 ± 10.39	10.964	< 0.0001
BMI	27.65 ± 3.20	25.91 ± 3.29	7.35	<0.0001
Abdomen girth (n=25)	100.0 ± 9.08	95.36 ± 9.10	8.1	<0.0001

HbA1c; Glycated haemoglobin, BMI; Body mass index

Table 3. Correlation of BMI and Abdomen girth with HbA1c at 1st day and after 90 days

Correlation between	Baseline		After 90days	
	R	p-value	r	p-value
BMI and HbA1c	0.05	0.76	[illegible]	0.69
Abdomen girth and HbA1c	-0.049	0.82	0.05	0.81

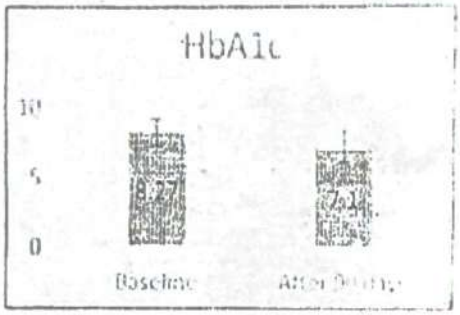


Figure 1. Comparison of HbA1c at baseline and after 90 days

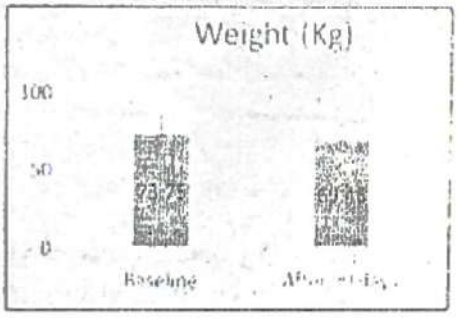


Figure 2. Comparison of weight of the patients at baseline and after 90 days

Figure 3. Comparison of BMI of the patients at baseline and after 90 days

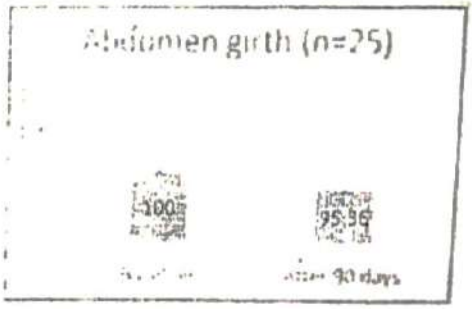


Figure 4. Comparison of Abdomen girth of the patients at baseline and after 90 days

We also assessed the correlation between the BMI and HbA1c, abdominal girth and HbA1cb (table 3). There was a weak positive correlation between BMI and HbA1c (r= 0.05) on the 1st day of the treatment and it was not statistically significant (p=0.06), the same is shown in figure 5a. After 90 days of treatment we found nearly same positive relationship between BMI and HbA1c (r -0.07 p 0.70) which is shown in figure 5b.

We found a negative relationship between HbA1c and abdomen girth (r -0.049) on the 1st day of the treatment which was not statistically significant (p 0.82) (figure 5c). We found a weak positive relationship between them after the treatment (r=0.051) on day 90, and it was not statistically significant (p = 0.81) (figure 5d).

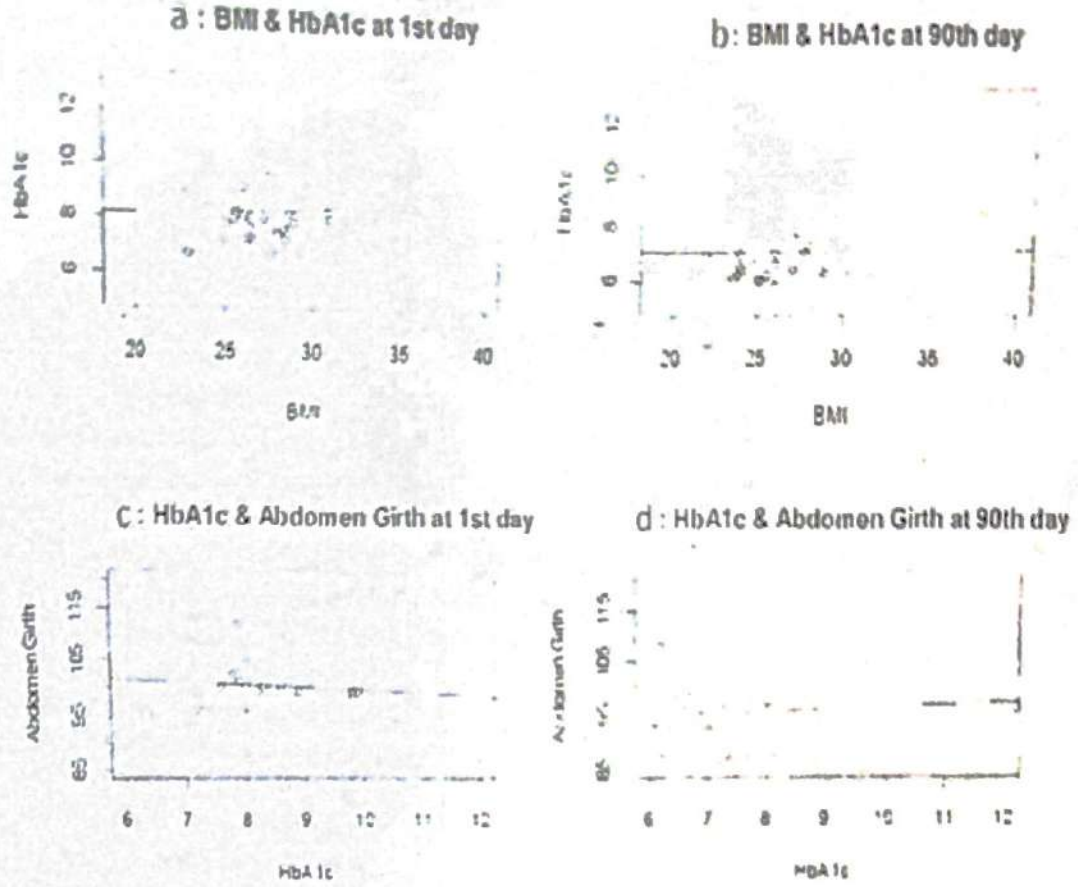


Figure 5. Correlation between BMI and HbA1c, abdomen girth and HbA1c

Allopathic medicines consumption on day 1 and after the 90th day of therapy were as shown in Table 4. Most of the enrolled subjects were treated with biguanides (58.82%), sulfonylurea (38.24%), nonsteroidal anti-inflammatory drugs (35.29%), statin (29.41%). All the subjects who were allopathic medicines before therapy was decreased after 90th day. However, the subjects with nonsteroidal anti-inflammatory drugs were not varied after the therapy. An illustration is given in figure 6.

Table 4. Consumption of allopathic medicines on day 1 and after 90 days

Medicine	Day 1	After 90 days
Sulfonylurea	13 (38.24)	10 (29.41)
Biguanide	20 (58.82)	13 (38.24)
Thiazolidinedione	4 (11.76)	2 (5.88)
DPP-4 inhibitor	8 (23.53)	5 (14.71)
Alpha-glucosidases inhibitors	5 (14.71)	3 (8.82)
Insulin	3 (8.82)	3 (8.82)
NSAID	12 (35.29)	12 (35.29)
Statin	10 (29.41)	6 (17.65)
ARB	8 (23.53)	6 (17.65)
Beta blocker	5 (14.71)	2 (5.88)
CCB	6 (17.65)	5 (14.71)
Antiplatelet	7 (20.59)	7 (20.59)
Nitrate	1 (2.94)	1 (2.94)
No medicine	1 (2.94)	5 (14.71)

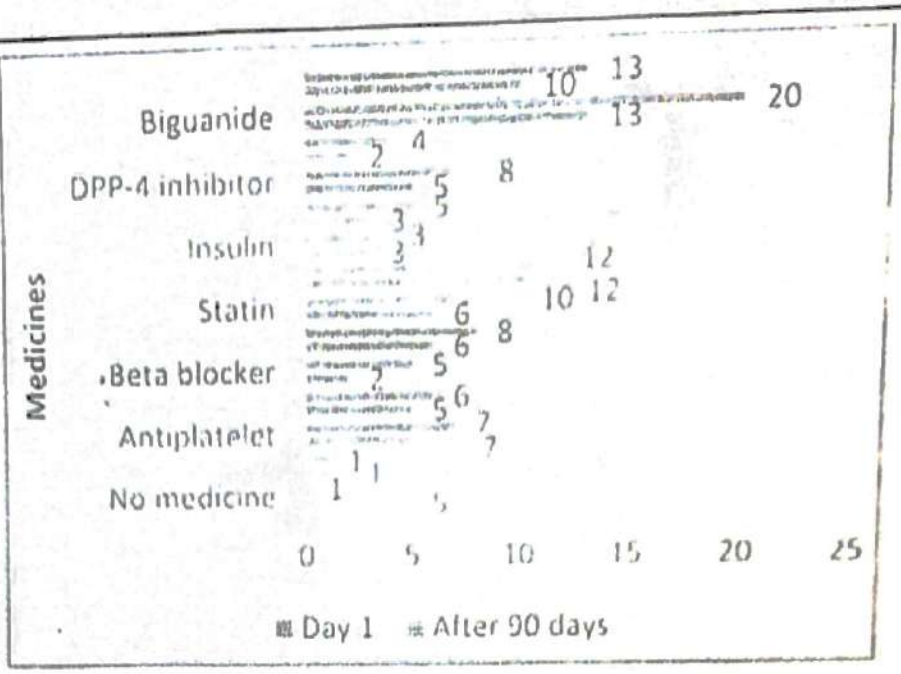


Figure 6. Comparison of consumption of allopathic medicine at 1st day and after 90 days

1. Discussion

Despite the availability of a plethora of therapeutic options for treatment of type II DM, its prevalence and contribution to global morbidity and mortality remains significantly high and is increasing continuously. Therefore, alternate therapeutic option to curb the menace of DM is the urgent necessity of current time. Conventionally used allopathic medicines in the treatment of type II DM act by reducing blood sugar levels. Ayurvedic medicines serves as a potential alternate therapeutic option for management of type II DM, since many herbal drugs have been found to significantly lower blood glucose levels in clinical studies. Ayurvedic physicians administer Panchakarma to the patients of DM [16]. Panchakarma along with diet therapy consisting of low carbohydrates and fats with moderate amount of proteins is administered in CDC. Probable mechanism, by which CDC might benefit patients with type II DM are:

1. Reducing glucose production in the liver by hampering sympathetic stimulation ongluconeogenesis,
2. Reducing the shear stress of vascular endothelium by promoting water loss via sweating. This may help in reducing vascular complications significantly [16].

In the present study, the CDC was found to significantly reduce ($p<0.001$) HbA1c, BMI, body weight, abdominal girth, at the end of study period i.e 90th day. Another crucial finding of our study was that there was significant reduction in patients' dependency on conventional allopathic antidiabetic medications at the end of the studyperiod.

HbA1c value is one of the most crucial parameter in diabetic patients as it echoes blood sugar level control over preceding 2-3 months [4]. Another important feature of HbA1c is its prognosticator value in type 2 DM, since it has been found that morbidity and mortality is directly related to sustained increased HbA1c [21]. Thus it can be anticipated from the findings of our study that CDC carries a good prognosis in diabetic patients as it significantly reduces HbA1c. Obesity and sedentary lifestyle contribute to development of DM which is indicated by increased BMI [22]. Apart from DM, high BMI has epidemiological linkage with many chronic diseases like HTN and other CVDs [23]. Sustained

control of blood sugar levels is the utmost important factor in diabetic patients, since it has been established that poor blood sugar level control is associated with increased incidence of complications [24]. CDC can help in reducing complications of DM since it showed sustained reduction in all parameters like HbA1c, BMI, body weight,etc.

Another major issue with the use of conventional drugs is increased cost of therapy along with increased incidence of adverse effects associated with use of these drugs [25]. Hence, we assessed the effect of CDC on dependency on conventional medications. In our present study, we found that there was an overall reduction in dependency of patients on conventional medications at the end of the study period. Also, the number of patients who went off the conventional drugs increased at the end of 90th day.

In order to generalize the findings of our study to the larger population, we recommend conduction of similar studies with dual arms, to allow direct comparison with conventional therapy, prospective design, and long follow up period with larger samplesize.

1. Conclusion

Major parameters of the body deranged in DM are BMI, body weight, abdominal girth all of which worsen complication rate. Although conventional correct these parameters to some extent, cost of therapy and adverse effects offset their beneficial effects and decrease patient compliance. CDC corrected all these parameters effectively and also reduced dependency on conventional drugs, all of which have positive contributory effect on enhancing patient compliance. Thus it is safe to conclude that CDC canbeconsidered as effective and safe therapeutic option for treatment of DM.

Acknowledgements

The authors thank the study participants and their families, without whom this study would not have been accomplished.

References

[1] Unwin N, Whiting D, GuariguataL, Ghyoot G, Gan D (Eds). The IDF Diabetes Atlas, 5th edition. Brussels, Belgium: International Diabetes Federation, 2011. pp 7-12.

[2] Vijayakumar G, Arun R, KuttyV. High Prevalence of Type 2 Diabetes Mellitus and Other Metabolic Disorders in Rural Central Kerala. JAPI. 2009;57:563-7.

[3] Singh PS, Sharma H, Zafar K, et al. Prevalence of type 2 diabetes mellitus in rural population of India- a study from Western Uttar Pradesh. Int J Res Med Sci 2017;5:1363-7.

[4] Verma M, PaneriS, BadiP, et al. Effect of increasing duration of diabetes mellitus type 2 on glycated hemoglobin and insulin sensitivity. Indian Journal of Clinical Biochemistry, 2006, 21 (1) 142-146.

[5] KaveeshwarSA, Cornwall J. The current state of diabetes mellitus in India. AMJ 2014, 7, 1,45-48.

[6] RamachandranA. Type 2 diabetes in India: Challenges and possible solutions. Retrieved from http://www.ruralindia.org/medicine update_2013/chap40.pdf [last accessed on 3rd June2018].

[7] Tripathi K, Srivastava A. Diabetes mellitus: Complications and therapeutics. Med Sci Monit. 2006; 12(7): RA130-147.

[8] Silva F, FerreiraC, PinhoL. Risk factors and complications in type 2 diabetes outpatients. Rev Assoc Med Bras 2017; 63(7):621-627.

[9] Complications of diabetes mellitus. Retrieved from http://semmelweis.hu/belgyogyaszat3/files/2017/03/Complications-of-diabetes-mellitus.pdf [last accessed on April 21st, 2018].

[10] Matthaei S, Bierwirth R, FritscheA, et al. Medical Antihyperglycaemic Treatment of Type 2 Diabetes Mellitus. Exp Clin Endocrinol Diabetes 2009; 117: 522 557.

[11] Meneses M, Silva B, Sousa M, et al. Antidiabetic Drugs: Mechanisms of Action and Potential Outcomes on Cellular Metabolism Current Pharmaceutical Design. 2015; 21 (25): 3606-3620.

[12] EgedeL, Axon R, Gebregziabher M, et al Medication Nonadherence in Diabetes. Diabetes Care. 2012; 35:2533–2539.

[13] Elder C., Aickin M, Bauer V, et al Randomized Trial of a Whole-System Ayurvedic Protocol for Type 2 Diabetes. Alternative Therapies in Health and Medicine. 2006; 12 (5): 24-30.

[14] Vidyashree K, Prasad K, Shilpa A. Role of Panchkarma in madhumehaw.s.r. to type 2 diabetes mellitus: a review. International Ayurvedic Journal. 2018; 6 (4):835-840.

[15] Choudhary U, Pandey A. A clinical assessment of the role of panchakarma therapy in the care of young prediabetics. International Journal of General Medicine and Pharmacy. 2013: 2(1):15-24.

[16] GiriS, Patnaik S, Kumar K, et al. Potential of ayurvedic panchakarma in prevention and management of lifestyle disorders with special reference to madhumeha. J of Ayurveda and HolMed (JAIIM). 2015. 3(5):82-91.

[17] Nair D. Understanding the Role of Ayurveda Panchakarma Therapy W. S. R. to Vasthi(Enema) in the Management of Type II Diabetes Mellitus- A Case Review. Int J Complement Alt Med. 2017; 8 (6):00276.

[18] Definition and 'diagnosis of diabetes mellitus and intermediate hyperglycemia. Retrived from http://www.who.int/diabetes/publications/Definition%20and%20diagnosis%20of%20diabetes new.pdf [Last accessed on Dec 21"2017]

[19] UebabaK, Xu F, Ogawa H, et al. Psychoneuroimmunologic effects of ayurvedic oil dripping treatment. J Altern Complement Med. 2008;14:1189–1198.

[20] Sane R, AklujkarA, Patil A, Mandole R. - on therapy in patients with chronic heart failure: A randomized, open-label study. Indian Heart Journal 2017; 69 (3) 299-304.

Effect ofheart failure reversal treatment as add-on therapy in patients with chronic heart failure: A randomized, open-label study. Indian Heart Journal 2017; 69 (3):299-304

[21] "Clinical importance of Glycosylated hemoglobin (HbA1c) in diabetes mellitus patients" Retrieved from https://www.researchgate.net/publication/26575867_Clinical_Importance_Of_Glycosylated_Hemoglobin_HbA1c_In_Diabetes_Mellitus_Patients. [Last accessed on march 11"2018]

[22] Dua S, Bhuker M, Sharma P, Dhall M, Kapoor S Body mass index relates to blood pressure among adults. North Am J Med Sci 2014;6:89-95

[23] DanasekaranR, Vinoth R. A study on relation between BMI and hypertension among adolescents in Kancheepuram district, Tamil Nadu IJAR 2015, 1 (2):8-12

[24] Chaudhury A, Duvoor C, Reddy V, et al. Clinical Review of Antidiabetic Drugs: Implications for Type 2 Diabetes Mellitus Management Front Endocrinol 2017; 8(6):1-12.

[25] PerwitasariD, UrbayatunS. Treatment Adherence and Quality of Life in Diabetes Mellitus Patients in Indonesia. Sage Open. 2016 1-7

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC Madhavbaug Institute of Preventive Cardiology

TRUE COPY

Posted on 15th of every month

SAWKAR INSTITUTES

SAMARTH EDUCATIONAL TRUST SATARA

A.M. 1/1 : Additional M.I.D.C., Degaon Road Satara - 415 004
Ph.: (02162) 240036, 240063
web site : www.samaratheducationaltrust.com

SAWKAR HOMOEOPATHIC MEDICAL COLLEGE, SATARA.
B.H.M.S.

SAWKAR PHARMACY COLLEGE, JAITAPUR, SATARA.
D. PHARM

ARVIND GAVALI COLLEGE OF PHARMACY, JAITAPUR, SATARA.
B. PHARM, M. PHARM

ARVIND GAVALI COLLEGE OF ENGINEERING, PANMALEWADI, SATARA.
POLYTECHNIC, B.E., M.E.

Edited by : Dr. Ravindra N. Bhosale
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

Published & Owned by : Dr. Ravindra N. Bhosale

Printed at : Yashwant Offset, 668 Mangalwar Peth, Dastagir Colony, Satara. (MAH)

Published at : Sawkar Homoeopathic Medical College, Satara.
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Madhavbaug Institute of Preventive Cardiology

TRUE COPY

Dear Subscribers

Hurry

Book your copy now....
New Subscription rates of
The Classical Science are as follows.

Single Copy -	Rs.	25/-
One Year Subscription -	Rs.	250/-
Three Year Subscription -	Rs.	750/-
Life Membership –	Rs.	2000/-

Send your D.D. in Favour of
'Chief Editor, The Classical Science'
Payable at Satara

Address

Chief Editor,
The Classical Science
Sawkar Homoeopathic Medical College
AM 1/1, Additional M.I.D.C.,
Degaon Road, Satara 415 004 (MS)
E.mail - hmcsatara@gmail.com

Director
Bhatia Institute of
Cardiology &
Research Center

TRUE COPY

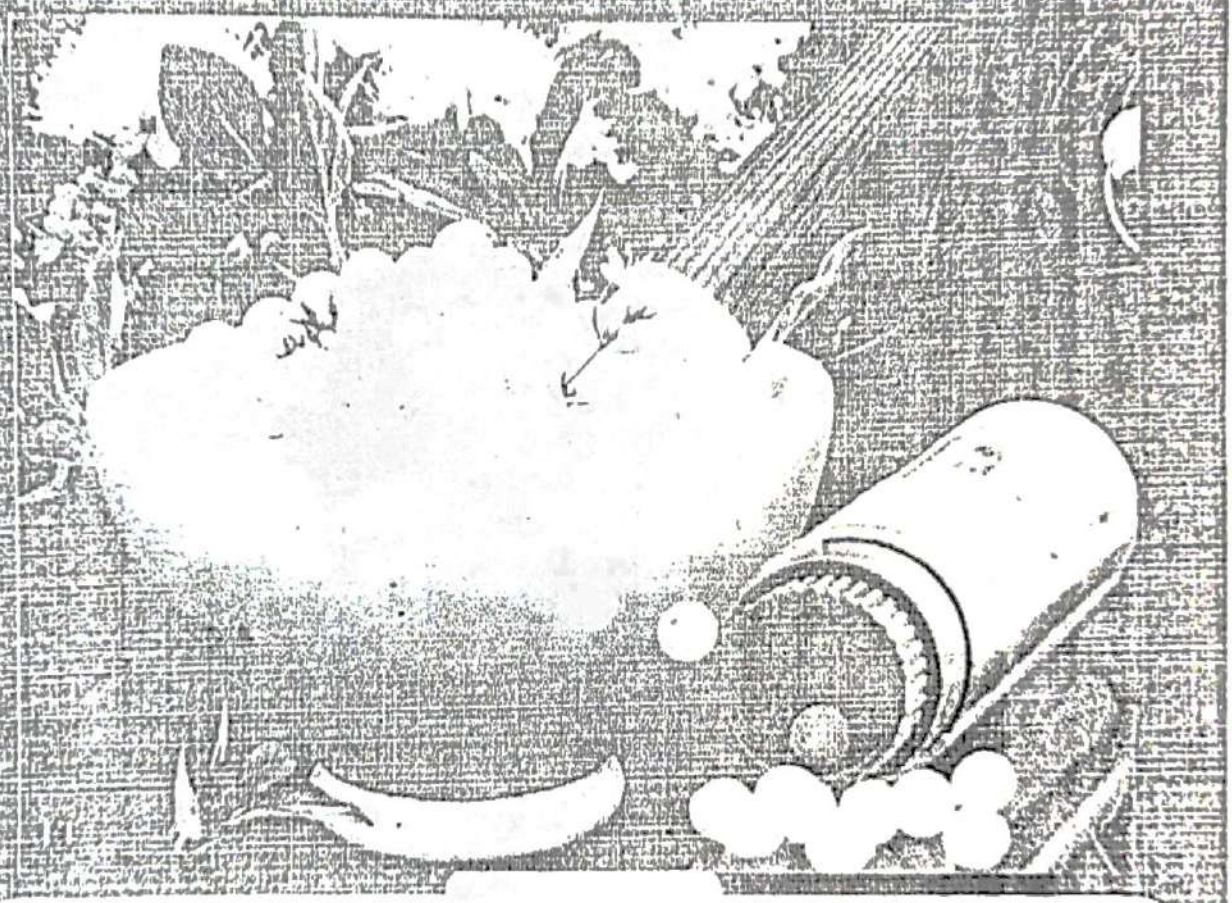
Postal Registration No
STR/038/2016-2018

ISSN 2278 - 8646
RNI. No. MAHMUL/2007/19492

THE CLASSICAL SCIENCE

A PEER REVIEWED MONTHLY MEDICAL JOURNAL

Vol.13 Issue No 10 OCTOBER 2019 Rs. 25/-



Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

Madhavbaug Institute of Preventive Cardiology MIPC

TRUE COPY

IMPACT OF COMPREHENSIVE DIABETES CARE (CDC) MANAGEMENT PROGRAM IN TYPE II DIABETIC OBESE PATIENTS: AN OBSERVATIONAL STUDY

Sane Rohit M[1], Sabir Imran A[2], Naik Minal S[3], Manisha Ghurde[6], ShinganTejaswini[4], Mandole Rahul S[5]

[1]Department of Research and Development, [2]Department of Medical Operations, [3]Clinic Head, [4]Fellowship (Cardiac Rehabilitation), Clinic Head, *[5]Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India, VRT's Madhavbaug Institute of Preventive Cardiology,Thane, India

ABSTRACT

Context: Diabetes mellitus (DM) contributes to a major chunk of morbidity, mortality, and healthcare cost on a global level. The prevalence of DM is rising alarmingly, worldwide and India Comprehensive Diabetes Care (CDC) is a combination of *Panchakarma* and diet management.

Aims: This study was conducted to evaluate the effect of CDC on Glycosylated hemoglobin (HbA1c), body mass index (BMI), body weight, abdominal girth and dependency on conventional therapy in DMPatients.

Setting and Design: This observational study was conducted in July 2017, wherein the data of obese Type II DM patients (HbA1c >6.5%) who attended out-patient departments (OPDs) at *Madhavbaug*clinics in Maharashtra, India were identified.

Materials and Methods: Data of patients who were administered CDC (60-75 minutes) with minimum 6 sittings over 90 days (± 15 days) were considered. Variables were compared between day 1 and day 90 of CDC.

Results: Out of 27 patients, 22 were included for analysis, out of which 10 were males while 12 females.CDCshowedsignificantimprovementinHbA1c1.1%(from8.80±0.93to6.98±1.73; p<0.001),BMIby2.66(from33.79±3.80to31.13±3.91,p<0.001),weightby6.56kg (from83.67 ± 11.28 to 77.11 ± 12.27, p<0.001). Abdominal girth (from 104.34 ± 9.74 to 96.97 ± 11.93; p<0.001), also showed significant reduction. Dependency on concomitant medicines was reduced, with the number of patients on no concomitant medicines increasing from 27% to 41%.

Conclusion: Comprehensive Diabetes Care Management Program found to be

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

efficacious; by reducing HbA1c, as well as reducing dependency on allopathic medications.

KEYWORDS: Comprehensive Diabetes Care, CDC, *Panchakarma*, Glycosylated HB, HbA1C, BMI, DM, Alternative Medicine.

INTRODUCTIONDiabetes mellitus (DM) contributes to a major chunk of morbidity, mortality, and health care cost on a global level. The prevalence of DM is rising alarmingly, worldwide.[1] India is only 2nd to China, in terms of prevalence of DM, with a prevalence rate of around 10%; i.e. every 10th adult in India is suffering from DM.[2] According to WHO report, about 30 people die per 1 Lac population in India, due to diabeticcomplications.[3]

Conventionally DM is diagnosed based on blood glucose/sugar levels (BSL), fasting levels more than or equal to 126 mg/dl and post prandial levels more than or equal to 140 mg/dl is considered as a DM. In recent decade diagnosis is also done by measuring glycosylated hemoglobin (HbA1c), since it reflects blood sugar control over the past 2-3 months.

HbA1c levels more than 6.5% is considered as DM, 5.7% to 6.4% as a borderline case/ predlabetes, and less than 5.7% as normal. Target HbA1c for treatment strategies are taken as below 6.5%.[4]

DM is dreaded due to its complications, which are short term and long term, macrovascular and microvascular. Macrovascular complications include myocardial infarction, coronary artery disease, stroke, cerebrovascular disease, peripheral vascular disease, etc. Microvascular complications include retinopathy, neuropathy, nephropathy. Out of these, cardiovascular complications are leading cause of morbidity and mortality in diabetic patients.[5] Diabetic neuropathy may manifest as foot ulcers, sexual dysfunction in young males, amputation, etc.[6,7] Amongst microvascular complications, nephropathy is leading cause of morbidityand of the disease, while herbal drugs are preferred inmortality in diabetic patients.[8] The prevalence of retinopathy in diabetics is also increasing these days.[9] It has been postulated from findings of various epidemiological studies that certain cancers are more common in diabetics like, cancers of breast, kidney, colo-rectal, bladder,etc.[10,11]

The current management plan includes lifestyle modification, including dietary modifications and physical exercise on a daily basis plus pharmacological management (oral antidiabetic drugs).

Antidiabetic drugs/oral hypoglycemic agents (OHA) should be initiated only if a lifestyle modification fails to reduce HbA1c below 6.5% after 2 months. Major class of OHAs includes Biguanides (Metformin), Thiazolidinediones (Pioglitazone), Sulphonylureas (Glimepiride), Dipeptidyl peptidase-4

(DPP-4) inhibitors like Teneligpiltin, Sodium glucose cotransporter-2 inhibitors (canagliflozin). All these drugs act either, by reducing blood glucose via increasing tissue uptake, decreasing endogenous glucose production, preventing breakdown of incretins, etc. Guidelines suggest that, if baseline HbA1c is > 9% or it remains >7.5% despite 1 OHA, then combination of 2 OHAs should begiven.[12]

But, these drugs are associated with a wide variety of adverse effects like hypoglycemia (almost all classes), megaloblastic anemia (biguanides), pancreatitis, upper respiratory tract infections (gliptins), ketoacidosis, bone fractures (SGLT2 inhibitors), lipodystrophy at injection site (insulin), C cell tumour of thyroid (GLP1 agonist), etc.[13]In a multicentric study on diabetic patients, it was found that adherence of patients to antidiabetic drugs was only 58%. The investigators of the study attributed this low adherence to cost of therapy, adverse effects of medications. Also, despite numerous guidelines for DM, its prevalence is rising continuously.[14] Thus, it is the need of the hour to explore alternate forms of antidiabetic therapy, which can ameliorate the factors associated with low adherence to allopathic anti diabetic drugs.

The therapeutic benefit of allopathic antidiabetic drugs in diabetes is due to their blood glucose lowering action. Several studies have shown similar effects, with significant reduction in Glycosylated Hemoglobin (HbA1c), Fasting and Post Prandial Blood Glucose (FBG, PPBG) levels and lipids, by using herbal drugs, which serve as interesting potential targets for newer therapeutic options for treatment of DM.[15,16,17]

Panchakarma is multi-step internal purification process. *Panchkarma*therapy in Ayurveda practice is administered in chronic phase

acute phase. Comprehensive Diabetes Care (CDC) combines *Panchakarma* and diet management. Under this management program, *Panchakarma* is advocated through threetechniques- *Snehana*i.e. oleation, *Swedana*i.e. passive heat therapy and *Basti* i.e. per rectal drug administration. *Panchakarma* techniques are already well established in literature, as detoxifying procedures.[18,19]DM is found to be linked with depression, reduction in quality of life, etc.[20]Hence, we planned an Observational study to investigate the efficacy of the CDC, as add-on therapy to standard anti-diabetic therapy in patients with DM. We evaluated the effect of CDC on HbA1c, weight, body mass index (BMI), abdominal girth, and dependency of these diabetic patients on standard conventional oral antidi abetic medications

Since, numerous factors play a role in causation, progression of DM, its

management should be multi-pronged. Given the fact that Ayurveda may serve as potent alternative therapy, its efficacy in DM should be tested.[15,17,21] Hence, we planned this observational study to investigate the effect of the CDC, as add on therapy to standard anti-diabetic therapy in obese patients with type II diabetes mellitus. We evaluated the effect of CDC on HbA1c, body mass index (BMI), body weight, dependency on oral hypoglycemic drugs/ agents, and abdominal girth.

MATERIALS AND METHODS

This was an Observational study conducted between July 2017, wherein we identified the data of obese patients suffering from type II DM (HbA1c ≥ 6.5%, BMI ≥ 30) [14,21] of either gender and any age, and who had attended the out-patient departments (OPDs) at multiple *Madhavbaug* clinics located in various cities of Maharashtra, India. The data of patients who had been administered CDC with minimum 6 sittings over a span of 90 days (± 15 days) were considered for the study, out of which 4 sittings were done in the 1st month, and 1 sitting per month for next 2 months. These patients were maintained on a diet plan of 800-1000 calories intake per day, according to patient medical records. The diet plan consisted of low carbohydrates, moderate proteins, and low fats. Cases were identified, and data were assessed from the records of *Madhavbaug* clinics in Maharashtra. The selection was based upon the availability of complete relevant baseline data (day 1 of CDC) and final day data (day 90 of CDC) of the patients. The information about prescribed concomitant medicines, if any, was also noted down.

The CDC is a 3-step procedure which was performed on the patients of type II DM after a light breakfast. One sitting of the procedure took 65-75 minutes, as described in table 1.[19,22]

Table 1: Study Treatment: Comprehensive Diabetes Care (CDC)

Step of CDC	Type of Therapy	Herbs used for therapy	Duration of Therapy
Snehana	Massage or external oleation (centripetal upper strokes on the body)	100 ml *Azadirechtaindica* (neem) extract processed in sesame oil	20 minutes
Swedana	Passive heat therapy to the body	*Dashamoola* (group of ten herbal roots) with steam at ≤40 degrees Celsius)	15-20 minutes + 3-4 minutes of relaxation after procedure
Basti kadha	Per-rectal drug administration should be in body for ≥ 15 minutes for maximum absorption	Mixture of 40% *Gudmar* (*Gymnemasylvestre*), 20% *Daruharidra* (*Berberis aristate*) and 40% *Yashtimadhu* (*Glycyrrhiza glabra*)	10 minutes

On day 1 of CDC, the patients had undergone HbA1c, weight, BMI, abdominal girth measurements as per guidelines.[4] This reading was considered as baseline reading. This process was repeated on day

90 of CDC to calculate the change from baseline reading. The BMI for day 1 and day 90 of the patients was calculated by checking the weight and the height from the medical data sheets of patients and using the formula: weight in kilograms/ (height in meters)^2. The dependency on standard medication was calculated both on day 1 and day 90 of CDC as the percentage of patients out of the total enrolled ones who required a conventional allopathic therapeutic agent during the study period of 90days.

Statistical analysis

Data were pooled and entered in Microsoft Excel spreadsheet. R Version 3.4.1 software was used to analyze the data. Categorical data were represented in the numeric form and continuous data were presented as the Mean ± SD. The Paired t-test was used to assess the difference between baseline values and 90thday after the treatment. Box plot, histograms and scatter plot were used to represent thegraphs.

RESULTS

Study population

A total of 27 patients' data was screened for inclusion in the study. However, based on the availability of data (Day 1 and Day 90) and the inclusion criteria, 22 patients were selected, and their data were considered for analysis.

Figure 1: Treatment Plan of Comprehensive Diabetes Care Management

The study comprised of 22 type II diabetic obese patients, among them10 (45.45 %) were men and 12 (54.55 %) were female. The mean age of the study patients was 48 ± 12.13 years. A significant improvement in weight, (77.11±12.27vs.83.67±11.28;P<0.001),BMI(31.13±3.91vs.33.79±3.80;P<0.001),HbA1c(6.98±1.73 vs. 8.80 ± 0.93; P = 0.0002) and abdomen girth (96.97 ± 11.93 vs. 104.34 ± 9.74; P < 0.001) were observed in diabetic obese patients after the treatment (90 days) than before treatment (baseline) (Table 2; Figure

2).Table 2: Comparison of clinical parameters between baseline values and 90th day of the treatment

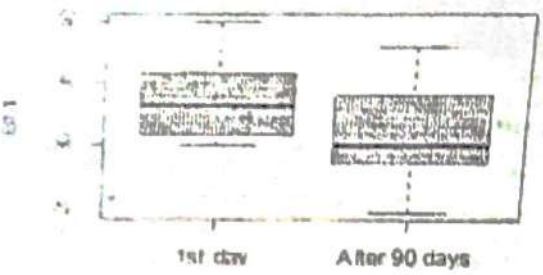
Variable	Baseline (Day 1)	After 90 days	Difference	P value
Weight	83.67 ± 11.28	77.11 ± 12.27	6.56	<0.001
BMI	33.79 ± 3.80	31.13 ± 3.91	2.66	<0.001
HbA1c	8.80 ± 0.93	6.98 ± 1.73	1.1	0.0002
Abdomen Girth (n=19)	104.34 ± 9.74	96.97 ± 11.93	7.37	<0.001

BMI, Body Mass Index; HbA1c, Glycosylated hemoglobin

Fig 2.1: Comparison of Weight

Weight on 1st day and after 90 days

Fig 2.2: Comparison of BMI



1st day and after 90 days

Fig 2.3: Comparison of HbA1c

HbA1c on 1st day and after 90 days

Fig 2.4. Comparison of Abdomen Grith

Abdomen Girth on 1st day and after 90 days

Figure 2: Comparison of clinical parameters between baseline values and 90th day (N=22)

Most of the type II diabetic obese patients were treated with beta blockers (13.64 %), nonsteroidal anti- inflammatory drugs (13.64 %), biguanides (54.55 %) and sulfonylureas (36.36). While, the patients depending only on biguanides (36.36 %) showed marked decrease after the treatment i.e., 90 days. The patients with the absence of medication history (40.91 %) were also improved after treatment (Table 3; Figure3).

Table 3: Consumption of allopathic medicines on days 1 and 90

Medicine	Baseline	After 90 days
Alpha-glucosidases inhibitors	1 (4.55)	1 (4.55)
DPP-4 inhibitor	3 (13.64)	1 (4.55)
Thiazolidinedione	1 (4.55)	1 (4.55)
Biguanide	12 (54.55)	8 (36.36)
Sulfonylurea	8 (36.36)	8 (36.36)
Antiplatelet	1 (4.55)	1 (4.55)
CCB	1 (4.55)	1 (4.55)
Beta blocker	3 (13.64)	3 (13.64)
ARB	2 (9.09)	1 (4.55)
Statin	1 (4.55)	1 (4.55)
NSAID	3 (13.64)	3 (13.64)
No medicine	6 (27.27)	9 (40.91)

NSAID, Nonsteroidal anti-inflammatory drugs; ARB, Angiotensin II receptor blockers; CCB, Calcium channel blockers; DPP-4 inhibitor, Dipeptidyl peptidase-4

Figure 3: Consumption of allopathy medicines at days 1 and 90 days (N = 22)

NSAID, Nonsteroidal anti-inflammatory drugs; ARB, Angiotensin II receptor blockers; CCB, Calcium channel blockers; DPP-4 inhibitor, Dipeptidyl peptidase-4

The levels of HbA1c were significantly correlated with the BMI after 90 days of treatment ($r = 0.504$; $P = 0.016$) when compared with baseline values ($r = 0.39$; $P = 0.071$). (Table 4; Figure 4).

Table 4: Correlation of BMI and abdominal girth with HbA1c at 1st day and after 90 days of treatment

Correlation between	Baseline		After 90 days	
	r	P value	r	P value
HbA1c & BMI	0.39	0.071	0.504	0.016

BMI, Body Mass Index; HbA1c, Glycosylated haemoglobin

Fig4.1: BMI&HbA1cat1stday

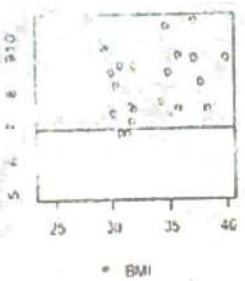
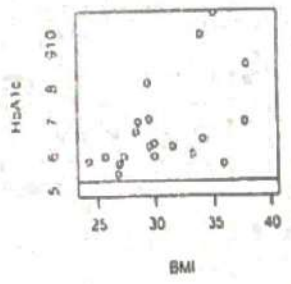


Fig4.2:BMI&HbA1cat90thday



BMI, Body Mass Index; HbA1c, Glycosylated hemoglobin

BMI, Body Mass Index; HbA1c, Glycosylated hemoglobin

Figure 4: Correlation of BMI and abdominal girth with HbA1c at 1st day and after 90 days of treatment

DISCUSSIONAlthough there are numerous treatment choices available for treatment of type II DM management, it is still one of the commonest culprits of morbidity and mortality globally. Thus, it is the need of the hour to explore novel therapeutic alternatives for the management of type II DM. Traditional class of antidiabetic drugs has

therapeutic benefit in DM of lowering bloodsugar levels. Similar property has been found in various herbal drugs, thus making Ayurveda a potent and viable alternative to standard therapy in the management of type II DM. Panchakarma is administered as add on therapy for DM management, by Ayurveda physicians.[123] C D C combines *Panchakarma* with Low carb moderate protein and low fat diet. CDC acts by reducing sympatheticstress , reduced sympathetic action lowers hepatic glucose production, which can be helpful to reduce blood sugar levels *Swedana*is helps by it inducing sweating and reduces excess of sodium and water, and this comprehensively helps to improve vascular health of DM patients to keep them away from probable vascular complications.[124]In pursuit of analyzing the efficacy of CDC in type II DM, we found that it showed significant (very high statistical significance) improvement in HbA1c, weight, BMI, abdominal girth at the 90thday of the whole procedure. Most importantly, we found that CDC noticeably reduced patient's dependency on standard allopathic medication at the end of 90 days, may be of therapy

The HbA1c levels are more important in diabetic patients since it reflects the average blood sugar control over the past 1-2 months.[125]Importance of HbA1c lies in the fact that, it is an independent predictor of mortality and morbidity in patients with type II DM. This has been corroborated in a prospective study done on diabetic patients, that cardiovascular complication like stroke was significantly lower in patients with an optimal reduction in HbA1c. It was found in large study- UKPDS study on diabetic patients, that reduction in HbA1c by 1% led to reduction of heart failure, heart attack, stroke, amputation and overall morbidity and mortality in diabetic patients.[125] Hence, significant reduction in HbA1c after CDC in our study indicates favorable prognosis in DM relatedmorbidity.

High BMI is considered to be one of the major risk factor for development of DM in normal subjects. It signifies sedentary lifestyle and obesity.[126] Also, it has been found that BMI is positively associated with type II diabetes mellitus, hypertension, cardiovascular diseases and other chronic diseases.[127] Uncontrolled DM frequently leads to the development of complications, hence various management plans across the globe have targeted sustained blood sugar control in patients with DM, to prevent the occurrence of such complications.[4] In the

present study, CDC significantly reduced HbA1c, BMI, abdominal girth, body weight. Thus CDC can play significant role in preventing the development of complications in patients with DM, thereby reducing morbidity andmortality. In developing economy like India, the dependency of diabetic patients on allopathic medicines escalates the cost of healthcare to troublesome levels. Plethora of adverse effects of these drugs complicates the scenario, furthermore.[20] Keeping this in mind, we analyzed changes in patient's dependency on allopathic medication by CDC. There was significant reduction in dependency on almost all the class of antidiabetic drugs (oral hypoglycemic agents), at the end of 90 days, with an increase in the number of patients who went off the allopathic drugs.

One limitation of the study was that, it had only one arm, thus we were not able to compare CDC findings with that of standard therapy alone. The findings of the present study can be generalized only after a comparison with the findings of other such studies with probably prospective design, larger sample size, and more follow up period. This will help in identifying long term outcomes of CDC in the management of type II DM.

CONCLUSION

There was significant improvement in HbA1c after CDC. Also, there was significant reduction in patient's dependency on allopathic medications. Significant reduction in HbA1c, coupled with reduction in BMI, body weight, abdominal girth after CDC indicates a better prognosis in patients with type II DM. Hence, CDC may serve as a potent and viable alternative to standard allopathic treatment of type II DM.

ACKNOWLEDGEMENT

The authors thank the study participants and their families, without whom this study would not have been accomplished.

REFERENCES

1. Wild S, Roglic G, Green A et al. Global Prevalence of Diabetes: Estimates for the Year 2000 and Projections for 2030.Diabetes Care. 2004; 27 (5): 1047-1053.

2 International Diabetes Federation (IDF). IDF Diabetes Atlas. 7th ed. 2015. Available from:http://www.idf.org/idf-diabetesatlas-seventh- edition. [Last accessed on 2016 May11].

3. World Health Organization. Global Health Observatory Data Repository. 2014 Available from: http://www. apps. who int [Last accessed on 2016 Jul20].

4. Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia. Retrived from http://www. who.int /diabetes /publications/Definition%20and%20diagnosis%20of%20diabetes_ne w.pdf [Last accessed on Dec 21st2017].

5. Chaturvedi N. The burden of diabetes and its complications: Trends and implications for intervention. Diabetes Res Clin Pract. 2007; 76(3): S3-S12.

6. Sanghera D, Blackett P. Type II diabetes genetics: beyond GWAS. J Diabetes Metab. 2012; 3(198): pii6948.

7. Zatalia S, Sanusi H. The role of antioxidants in the pathophysiology, complications, andmanagementof diabetes mellitus. Acta Med Indones. 2013; 45(2): 141-147.

8. Vigersky R. An overview of management issues in adult patients with type II diabetes mellitus. J Diabetes Sci Technol. 2011; 5(2):245-250.

9. Fong D, Aiello L, Gardner T, et al. Retinopathy in diabetes. Diabetes Care.2004; 27(1):S84-87.

10. Elwing J, Gao F, Davidson N, et al. Type II diabetes mellitus: the impact on colorectal adenoma risk in women. Am J Gastroenterol. 2006; 101(8): 1866- 1871.

11. Donadon V, Balbi M, Casarin P, et al. Association between hepatocellular carcinoma and type II diabetes mellitus in Italy: potential role of insulin. World J Gastroenterol. 2008; 14(37):5695-5700.

12. Garber A. AACE/ ACE comprehensive diabetes management algoritm. Endocrine Practice. 2016; 21 (4):e1-e10.

13. Chaudhury A, Duvoor C, Reddy V, et al. Clinical Review of Antidiabetic Drugs: Implications for Type II Diabetes Mellitus Management. Front Endocrinol. 2017;8(6):1-12.

14. Egede L, Axon R, Zhao Y, et al. Medications non- adherence in diabetics. Diabetes Care. 2012 35: 2533-9.

15. Elder C, Aickin M, Bauer V et al. Randomized Trial of a Whole-System Ayurvedic Protocol for Type II Diabetes. Alternative Therapies in Health and Medicine 2006; 12(5):24-30.

16. Ila T, ChandolaH, Joshi J. Clinical Efficacy of MehamudgaraVati in Type II Diabetes Mellitus. Ayu.2011;32(1):30-39.

17. Kumari J, Mehta C, Shukla V et al. A Comparative Clinical Study of Nyagrodhadi Ghanavatiand Virechana Karma in the Management of Madhumeha. Ayu, 2010; 31:300-304.

18. Choudhary K, Sharma P, Sharma V. Hypertension and its management through Panchakarma, J of Ayurveda and Hol Med.2015;3(3):28-31.

19. Uebaba K, Xu F, Ogawa H, et al.

Director
V. T's Madhavbaug Institute of Preventive Cardiology & Research Center

Madhavbaug Institute of Preventive Cardiology MIPC

TRUE COPY

Psychoneuro immunologic effects of Ayurvedic oildripping treatment. J Altern Complement Med. 2008;14:1189–1198.

20. Perwitasari D, Urbayatua S. Treatment adherence and quality of life in diabetes mellitus patients in Indonesia. SAGE Open. 2016:1-7.

21. Tiwari A, Rao J. Diabetes Mellitus and Multiple Therapeutic Approaches of Phytochemicals: Present Status and Future Prospects. Current Science. 2002;83(1):30-38.

22. Sane R, Aklujkar A, Patil A, Mandole R. Effect of heart failure reversal treatment as add-on therapy in patients with chronic heart failure: A randomized, open-label study. Indian Heart Journal.2017;69(3):299-304.

23. Barve V, Triapthi S, Patra S, et al. Effect of holistic module of yoga and Ayurvedic panchkarma in type-2 diabetes mellitus-a pilot study. Open Journal of Endocrine and Metabolic Diseases. 2013;3:90-8.

24. Giri S, Patnaik S, Kumar K, et al. Potential of Ayurvedic panchakarma in prevention and management of lifestyle disorders with special reference to Madhumeha, J of Ayurveda and Hol Med(JAHM).2015;3(5):82-91

25. "Clinical importance of Glycosylated hemoglobin (HbA1c) in diabetes mellitus patients". https://www. researchgate.net /publication/26575867_Clinical_Importance_Of_Glycosylated_Hemoglobin_HbA1c_In_ Diabetes_ Mellitus_ Patients. [Last accessed on march 11th2018].

26. Shihab H, Meoni L, Chu A, et al. Body Mass Index and Risk of Incident Hypertension Over the Life Course: The Johns Hopkins Precursors Study. Circulation. 2012;126:2983-2989.

27. Tesfaye F, Nawi N, Minh H, et al. Association between body mass index and blood pressure across three populations in Africa and Asia. Journal of Human Hypertension. 2007; 21:28–37.

Wu Y, Ding Y, Tanaka Y et a l. Risk Factors Contributing to Type II Diabetes and Recent Advances in th4e Treatment and Prevention. Int J Med Sci. 201; 11(11):1185-1200.

*Address for correspondence Dr Mandole Rahul S Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals. Mumbai, India, Email: cromilagro @gmail.comPhone: 7400407193

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

Impact of Comprehensive Diabetes Care on Glycaemic Control with Reduction in Dependency of Oral Hypoglycaemic Medicines in Diabetic Patients: A Retrospective Study

Rohit Sane[1], Minal Naik[2], Manisha Ghurde[1], Karishma Khair[2], Harsha Mahajan[2], Diwakar Pawar[3], Prabha Acharya[4], VaidehiRevandkar[1] and Rahul Mandole[1]*

[1]*Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India*

[2]*Madhavbaug Cardiac Care Clinics, Mumbai, India*

[3]*Madhavbaug Cardiac Care Clinics, Nagpur, India*

[4] *VRT's Madhavbaug Institute of Preventive Cardiology, Thane, India*

**Corresponding author*

Abstract

Although multiple new drugs are coming out in the market, India has the 2nd highest number of diabetics in the world. The aim of this study was to evaluate effects of Comprehensive Diabetes Care (CDC) on Glycosylated haemoglobin (HbA1c) and metabolic parameters in pre-obese diabetic patients. In this retrospective study, data of pre-obese DM patients who had received 6 CDC sittings over 90 days in the out-patient departments (OPDs) at *Madhavbaug*clinics was collected between May 2013 to April 2018. Demographic and co-morbidity details were noted. HbA1c, body mass index (BMI), abdominal girth, systolic and diastolic blood pressure (SBP, DBP), dependency on medications were assessed on days 1 and 90 of CDC. The patients followed a specific low-caloric diet plan during the study. 89 participants, (52 males; 37 females) were enrolled. Mean HbA1c measured at day 90 was significantly lower than that on day 1(6.86 ± 1.24 vs 9.02 ± 1.79, p<0.001). Mean BMI was significantly reduced on day 90 when compared to baseline (25.39 ± 1.53 vs 27.24 ± 1.33, p<0.001). Abdominal girth was significantly decreased on day 90 compared to baseline (91.64 ± 6.26 vs 97.12 ± 7.03, p<0.001). SBP (122.83 ± 13.56vs 131.60 ± 16.10, p<0.001) and DBP (77.02 ± 6.81 vs 81.75 ± 9.43, p<0.001) were also significantly decreased after 90 days. Dependency onconcomitant medicines wasreduced.

Glycaemic control and metabolic parameters significantly improved after 90-day CDC treatment. Reduction in blood pressure and intake of concomitant medications were also noted.

Keywords

Comprehensive diabetes care, CDC, Panchakarma, Diabetes mellitus, HbA1c, Body mass index, Ayurveda, Alternativemedicine

Introduction

Diabetes mellitus (DM) is a known global health-hazard, affecting millions of people worldwide. According to World Health Organization (WHO), the number of diabetic patients has increased from

108 million in 1980 to a staggering 422 million in 2014. (WHO, 2018) The International Diabetes Federation (IDF) has mentioned that about 1 in 11 adults belonging to the age group of 20 years to 79 years are suffering from DM worldwide. (International Diabetes Federation, 2018) It is interesting to note that 3/4th ofthe patients suffering from DM worldwide belong to the low-income and middle-income countries, and India is one of them. (Tripathy*et al.*, 2017) It is estimated that in 2015, India had more than 69 million DM patients, which is considered to bethesecond highest number in the world, next to only China. (International Diabetes Federation, 2018) The DM prevalence is expected to double after 20 years, because of the elevating age-expectancy, increasing obesity as well as the increased exposure of population to various risk factors. The patients suffering from DM also are at a risk of developing various dangerous complications like retinopathy, neuropathy and various microvascular and macrovascular diseases. Current management of DM aims to render a good glycaemic control and prevent the development or progression of complications. There are multiple treatment modalities for the management of DM which include parenteral insulin preparations and oral hypoglycaemic agents like metformin, sulfonylureas, sodium glucose transport inhibitors, thiazolidinediones. Despite the presence of these multiple classes of drugs, the prevalence of DM is on an upswing. Literature reveals glycated haemoglobin (HbA1c), the main indicator of long term diabetes control, is in the normal range in only 50% of the DM patients (Del Cañizo- Gómez and Moreira-Andrés, 2004) The various drugs used for the management of DM are also associated with multiple adverse effects. (Goodman *et al.*, 2011) Hence, there is a need for new or alternative therapeutic modalities for the treatment of DM

Ayurveda is a commonly practiced ancient art of alternative medicine in India, which simply means 'Science of Life' The main purpose of *Ayurveda* is to keep an equilibrium between the physiological and structural entities, which indicates good health. (AYUSH, 2007) The description of DM (*Madhumeha*) is present in the ancient Ayurvedic literature, indicating that the knowledge of the disease was present with the Ayurvedic physicians. (Upadhyay and Kamla, 1984) The Ayurvedic physicians are using a multi-faceted management approach to treat DM in India, which include the usage of *Panchakarma*, herbal preparations, yoga and breathing exercises along with diet modifications. Comprehensive diabetes care program (CDC) is one such alternative treatment modality, which includes a combination of herbal treatment with *Panchakarma* and allied therapies. The techniques used in *panchakarma* are *Snehana*(Centripetal oleation), *Swedana*(Thermal vasodilation) and *Basti* (per rectal drug administration), which are known to remove toxins from the body. (Mishra, 2003; Uebaba*et al.*, 2008) However, there is a paucityof literature which indicates that this alternative treatment modality is efficient in controllingDM.

Hence, a retrospective study was planned to assess the effect of CDC in the treatment of patients with DM

HbA1C, the main indicator of DM control, was the primary outcome measure in this study. The body mass index (BMI) appears to have a direct

relationship with the relative risk of several chronic conditions, including DM, hypertension, coronary heart disease, and cholelithiasis (Willett *et al.*, 1999) Therefore, those DM patients who had a pre-obese BMI range were enrolled to assess the effect of CDC onvarious metabolic parameters like BMI, weight and abdominal girth along with the effect onHbA1c.

Subjects and Methods

This was a retrospective study conducted between May 2013 to April 2018, wherein we identified the data of patients who had attended the out-patient departments (OPDs) at multiple *Madhavbaug*clinics located in various cities of Maharashtra in India and were suffering from DM. The data of patients having an HbA1c level above 7% were included in the study. The other main inclusion criterion was that the included patients must have a baseline BMI between 25 $kg/m^2$to 29.9 kg/m^2, as the study intended to include pre-obese patients with DM. The patients were administered CDC once a week in the 1stmonth, followed by once a month in the next two months. Data of only those patients were included who had received the scheduled 6 sitting in a span of 90 days. Cases were identified, and data were assessed from the records of *Madhavbaug*clinics in Maharashtra The selection was based upon the availability of complete relevant baseline data (day 1 of CDC) and final day data (day 90 of CDC) of the patients. The information about prescribed concomitant allopathic medicines was also noted down. The CDC is a 3-step procedure which lasts for about an hour per sitting. The details of the regimen have been mentioned in table 1. Various procedures of the CDC regimen were carried out on a single day for one singlepatient.

On day 1 of CDC, the fasting serum HbA1C of the patients was assessed along with the assessment the weight, height and the abdominal girth. The details of the concomitant anti-hyperglycaemic treatment were also noted down on day 1. These details were again noted down on day 90 of CDC, for comparison with the baseline (day 1) findings. The BMI for day 1 and day 90 of the patients was calculated by checking the weight and the height from the medical data sheets of patients and using the formula: *weight in kilograms/(height in meters)*^{2}. Diabetic diet plan, based on the principle of low-calorie and low-carbohydrate diet, was followed by the patients throughout the 90 days study period.Data were pooled and coded in Microsoft Excel spreadsheet. R Version 3.4.1 software was used to analyze the data. Categorical data were expressed in the form of frequency (%) and continuous data were expressed in the form of Mean ± SD. The paired t-test was used to assess the statistical difference between baseline and 90th day values. The correlation between abdominal girth and HbA1c as well as between abdominal girth and BMI was calculated using Pearson correlation coefficient. Scatter plot and bar graphs were used to represent the results.

Results and Discussion

The study comprised of 89 participants with striking male predominance (58.43%). Baseline characteristics of the study participants were as given in Table 2. Nearly three-fourth of the study participants had past-history of diabetes mellitus, while the second highest morbidity history

reported was hypertension (43.82%). The major baseline characteristics are mentioned in table2

The comparison of clinical parameters between baseline values and those noted at 90th day are given in Table 3. The BMI was significantly reduced ($P < 0.001$) along with the measured abdominal girth ($P < 0.001$). HbA1c ($P < 0.001$), systolic blood pressure ($P < 0.001$) and diastolic blood pressure ($P < 0.001$) were also found to be significantly reduced after 90 days of treatment as compared to the respective mean baseline values.Figures 2 to 5 represent the graphical representation of the comparison between baseline and 90th day mean parameters. The correlation between abdominal girth and HbA1c, abdominal girth and BMI as well as between HbA1c and BMI was calculated using Pearson correlation coefficient (table 4). There was a weak positive correlation between abdominal girth and HbA1c (r=0.018) on the 1st day of the treatment and it was not statistically significant (p=0.87), the same is shown in figure 5.1. After 90 days of treatment we found stronger positive relationship between abdominal girth and HbA1c which was approaching to statistical significance (r=0.18, p=0.084) as showed in figure5.2.

There was a positive correlation between abdominal girth and BMI (r=0.28) on the 1st day of the treatment and it was statistically significant (p=0.007), the same is shown in figure 5.3. After 90 days of treatment we found a highly significant positive relationship between abdominal girth and BMI (r=0.48, p<0.001) same is shown in figure 5.4.

The study participants were on various concomitant medications for DM as well as other co-morbidities. We compared the consumption of the allopathy medications by the participants, on day 90 and day 1, to check whether there was any reduction in the dependency on these standard medications by CDC. Table 5/Figure 6 gives the comparison between the consumption of allopathic medicines at day 1 and day90.

Ayurvedic practitioners have been treating DM using various preparations like *Chandraprabhavati*since a long time. It is hypothesized that Ayurvedic medicines may be acting via various potential pancreatic and extra-pancreatic effects. Comprehensive diabetes care (CDC) is one such Ayurvedic intervention which consists of 3 main components; *Snehana*(Centripetal oleation), *Swedana*(Thermal vasodilatation) and *Basti* (per rectal drugadministration).

We assessed the effects of this treatment technique on HbA1c, weight, BMI and abdominal girth. All these parameters were significantly reduced in the patients on CDC management, at the end of 90 days. HbA1c is a significant indicator of long-term glycaemic control in DM patients, with the capability to reflect the cumulative glycaemic control in the previous two to three months. (Sherwani *et al*., 2016) Therefore, HbA1c was our primary parameter and the reduction in HbA1c by CDC gives a good evidence. Literature search revealed that even a mildly increased BMI can increase the chances of developing complications in DM. (Gray *et al*., 2015) the positive effect of CDC in decreasing BMI can help prevent the potential complications too. Research articles have mentioned that abdominal girth is the best

parameter to assess adiposity and predict the outcome of DM. (Ghosh and Bandyopadhyay, 2012) Hence, we measured the effect of CDC over abdominal girth, which revealed positive outcome. We also found a strong positive correlation between BMI and HbA1c at the end of CDC treatment. This goes in sync with a research by Gummesson*et al.*, which mentioned that weight loss in the overweight population is consistently associated with HbA1c, in a dose dependent manner (Gummesson*et al.*, 2017) We also found a reduction in the patients who were on these allopathic drugs. This indicates that CDC may be one of the factors associated with the decrease in load of medications in DM patients, and also helps them in avoiding the potential adverse effects of the allopathic medications.

Table.1 Study Treatment: Comprehensive Diabetes Care (CDC)

Table.1 Study Treatment Comprehensive Diabetes Care (CDC)

Step of CDC	Type of Therapy	Herbs used for therapy	Durationof Therapy
Snehana	Massage or external oleation (centripetal upper strokes on the body)	100 ml *Azadirachtaindica*(neem) extract processed in sesame oil	20 minutes
Swedana	Passive heat therapy to the body	*Dashamoola*(group of ten herbal roots) with steam at <40 degrees Celsius)	15-20 minutes + 3-4 minutes of relaxation after procedure
Basti kadha	Per-rectal drug administration should be in body for ≥ 15 minutes for maximum absorption	Mixture of 40% *Gudmar*(*Gymnemasylvestre*), 20% *Daruharidra* (*Berberis aristata*) and 40% *Yashtimadhu* (*Glycerrhiza glabra*)	10 minutes

Table.2 Baseline characteristics of the study participants

Variable	N=89
Age (Years)	56.19 ± 10.98
Gender n (%)	
Male	52 (58.4)
Female	37 (41.6)
Co morbidities n (%)	
Hypertension	39 (43.82)
Obesity	15 (16.85)
Dyslipidemia	10 (11.24)
Ischemic heart disease	8 (8.99)
Coronary artery disease	5 (5.62)
Chronic heart failure	3 (3.37)
Hypothyroidism	3 (3.37)
Chronic kidney disease	1 (1.12)
H/O Coronary angioplasty	1 (1.12)

Age is expressed in mean ± SD and N (%)

Table.3 Comparison of various body parameters at the baseline and after 90 days of the treatment

Variable	Baseline	After 90 days	t-statistic	p-value
HbA1c	9.02 ± 1.79	6.86 ± 1.24	12.78	<0.001***
BMI (Kg/m^2)	27.24 ± 1.33	25.39 ± 1.53	15.242	<0.001***
Abdominal girth	97.12 ± 7.03	91.64 ± 6.26	10.68	<0.001***
SBP (mmHg)	131.60 ± 16.10	122.83 ± 13.56	5.65	<0.001***
DBP (mmHg)	81.75 ± 9.43	77.02 ± 6.81	5.23	<0.001***

****Highly significant; BMI: Body Mass Index, HbA1c: Haemoglobin A1c, SBP: Systolic blood pressure, DBP: Diastolic blood pressure*

Table.4 Correlation between Abdominal Girth, HbA1c & Abdominal Girth, BMI

Correlation between	Baseline		After 90 days	
	r	p-value	r	p-value
Abdominal girth and HbA1c	0.018	0.87	0.183	0.084
Abdomen girth and BMI	0.28	0.007	0.48	<0.001
HbA1c and BMI	-0.008	0.94	0.12	0.26

Table.5 Consumption of medicines at baseline and after 90 days

Medicine	Day 1	After 90 days
Sulfonylurea	39 (43.82)	22 (24.72)
Biguanide	54 (60.67)	33 (37.08)
Alpha-glucosidase inhibitor	13 (14.61)	7 (7.87)
DPP -4 inhibitor	17 (19.1)	2 (2.25)
Thiazolidinedione	2 (2.25)	9 (10.11)
Insulin	7 (7.87)	1 (1.12)
Beta blocker	11 (12.36)	6 (6.74)
ACE inhibitor	2 (2.25)	0 (0)
ARB	20 (22.47)	14 (15.73)
CCB	14 (15.73)	7 (7.87)
Diuretic	9 (10.11)	4 (4.49)
Statin	26 (29.21)	10 (11.24)
NSAID	14 (15.73)	8 (8.99)
No medicine	13 (14.61)	40 (44.94)

Fig.3 Comparison of abdominal girth of the patients at baseline and after 90 days

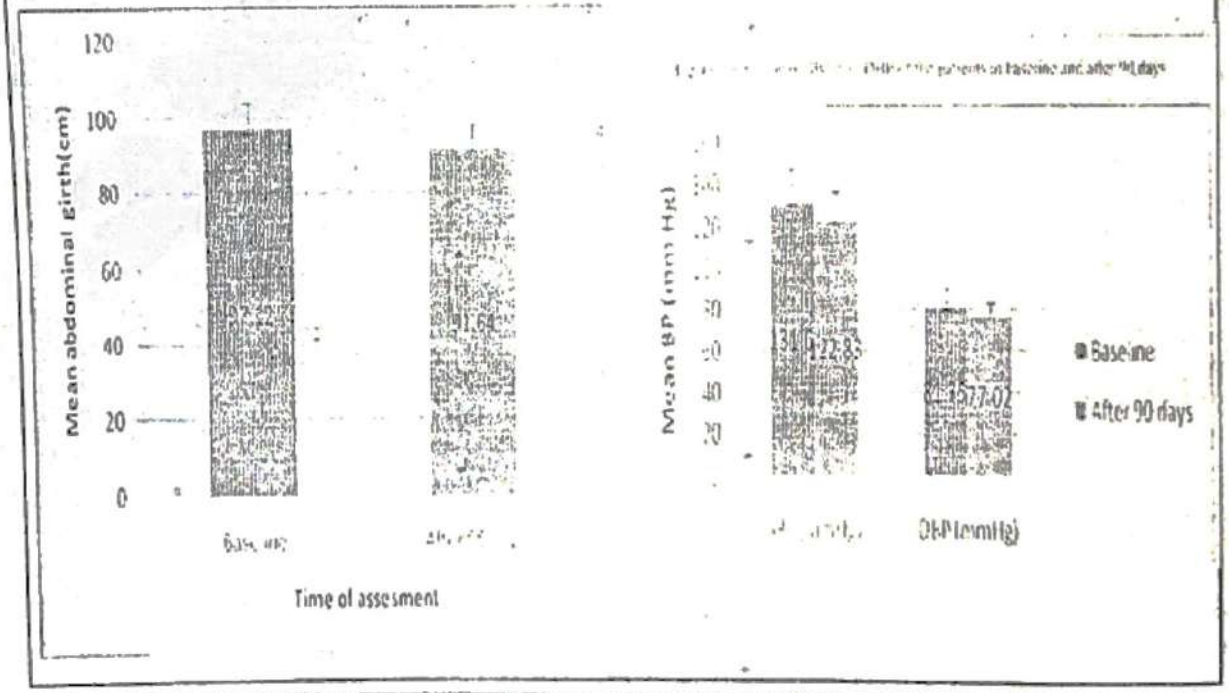


Fig.5 Correlation between Abdominal Girth, HbA1c & Abdominal Girth, BMI

Fig 5.1: Abdominal girth & HbA1c at1stday

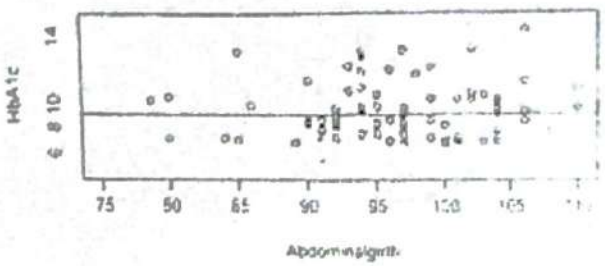


Fig 5.2. Abdominal girth & HbA1c at 90thday

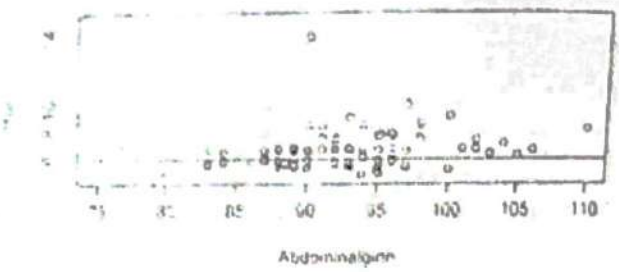


Fig 5.3: Abdominal girth &BMI at1stday

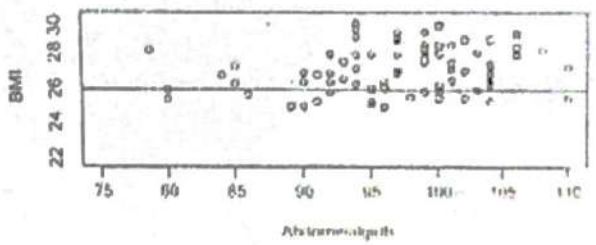


Fig 5.4. Abdominal girth &BMI at 90thday

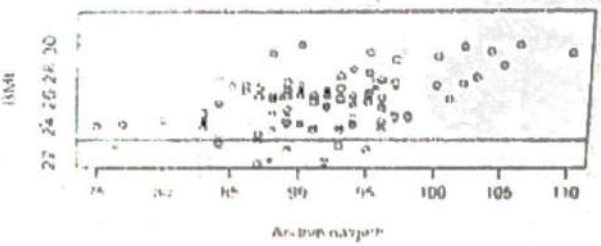


Fig 5.5: HbA1c &BMI at1stday

Fig 5.6 HbA1c &BMI at 90th day

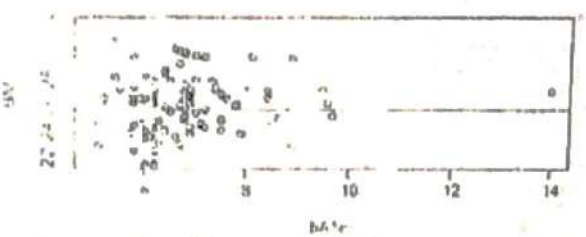
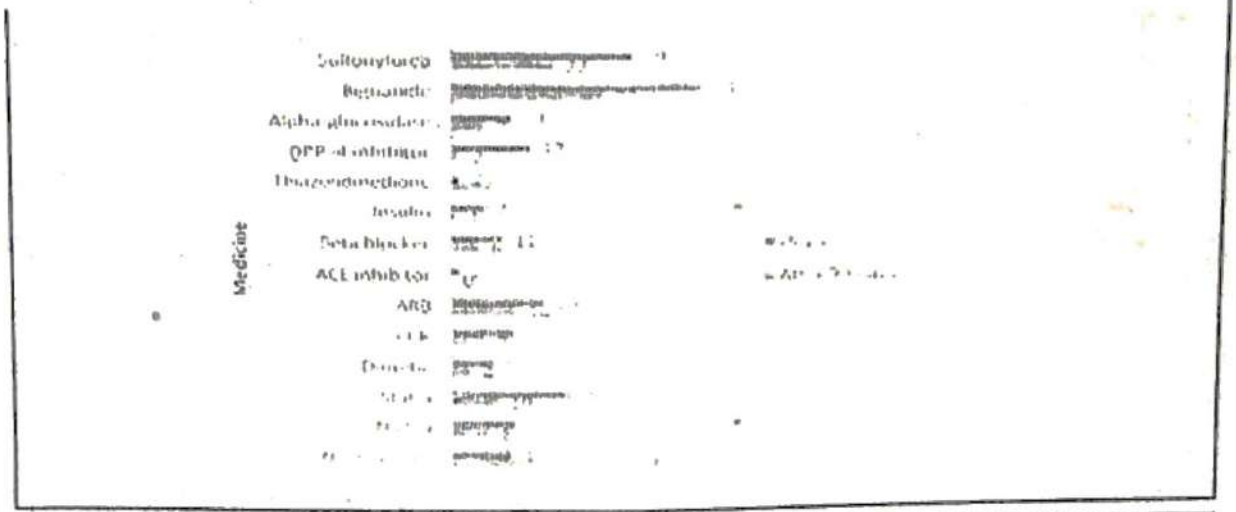


Fig.6 Consumption of medicines at baseline and after 90 days



Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC Madhavbaug Institute of Preventive Cardiology

TRUE COPY

*Snehana*is provided using *Neem* (*Azadiractaindica*) oil all over the body. Oleation is an anxiolytic procedure which decreases the sympathetic stress. The reduced sympathetic action decreases the hepatic glucose production, which can be helpful to reduce blood sugar levels. *Azadiractaindica*has antibacterial and antifungal action that can also help to reduce skin infections in DM patients (Subapriya and Nagini, 2005) *Swedana*is a process wherein diabetic patients get sleep inside a wooden box full of steam with head and neck outside the box, temperature being maintained around 40-45-degree Celsius. After 15-20 min patient is asked to come outside the box. It is hypothesized that hot fomentation, which is a relaxing process, induces sweating and decreases the excess of sodium and water which comprehensively helps to improve vascular health of DM patient to keep them away from probable vascular complications. *Basti* involves per rectal administration of ayurvedic herbal extracts like *Gudmar*(*Gymnemasylvestre*), *Daruharidra*(*Berberis aristate*) and *Yashtimadhu*(*Glycyrrhiza glabra*). *Gymnemasylvestre*has been found to stimulate insulin release, which may be responsible for its possible anti-hyperglycaemic action. (Persaud, 1999) The insulin release may be due to the possible regeneration of islet of Langerhans, as mentioned in a study conducted on streptozotocin -diabetic rats. (Shanmugasundaram*et al.*, 1990) An animal study assessed the anti-hyperglycaemic action of *Berberis aristate* and found strong potential in regulating homeostasis. (Singh and Kakkar, 2009) A clinical study conducted in type 2 DM patients found that *Berberis aristate* can reduce HbA1c efficiently. (Di Pierro*et al.*, 2013) In a pre-clinical study, *Glycyrrhiza glabra* has been found to prevent the deleterious effects of DM on learning and memory. (Hasanein, 2011) It is, however, important to note that low carbohydrate diet of 800 calories/day was advised to these patients throughout the 90 days period that could have add on benefit to this intervention.

Diabetes is known to be associated with poor dietary choices. Dietary choices is a key driver for insulin resistance, especially in an aging and sedentary population. Increased consumption of calorie-dense foods like fast food, meats and other animal fats, highly refined grains, and sugar-sweetened beverages, are thought to play a critical role in the rising rates of type 2 diabetes worldwide. Dietary changes like intake of low calories & high consumption of complex carbohydrates like high intake of fruits and vegetables, legumes, nuts, good quality fat can help in reducing insulin resistance. As per one of the studies, beta cell failure & insulin resistance can be alleviated by acute negativeenergy balance. Fasting blood glucose and hepatic insulin sensitivity reduced to normal & intrahepatic lipid decreased by 30% over 8 weeks and beta cell function elevated towards normality. (Lim, 2011; Yancy, 2005; Sami, 2017; McMacken and Shah, 2017)

For weight loss one should reduce to around

1000kcal/day which will help reduce 1 kg of body weightper week & 4kg per month Low calorie and low carbohydrate diet helps in utilization of intra organ fat and reduces insulin resistance which will help in the reversal of diabetes. Diet plan recommended to the patients was based on this principle of low-calorie and low-carbohydrate diet, which is to be followed for 12 weeks. It is based on pulse protein, complex carbohydrates, consumption of fruits and vegetables as well as good quality fats. As the diet plan is low in calories, it can lead to normalise insulin secretion and controldiabetes.

This study had a few limitations. It was a single-arm, retrospective study due to which the results were not compared with the standard care. However, this study was a proof-of-concept research, and future cohort studies with larger sample size and longer duration follow-up may be conducted, to generate a stronger evidence.

Treatment with CDC showed a significant decrease in the HbA1c levels of diabetic patients. CDC also showed significant reduction in the metabolic parameters of weight, BMI and abdominal girth of the diabetic patients. Moreover, CDC also decreased the dependency of the diabetic patients on the standard allopathicmedications.

Acknowledgment

The authors thank the study participants and their families, without whom this study would not have been accomplished

References

Del Cañizo-Gómez FJ, and Moreira-Andres MN. Cardiovascular risk factors in patients with type 2 diabetes. Do we follow the guidelines? Diabetes Res Clin Pract 2004; 65:125-33

Department of Ayurveda, Siddha, Unani and Homeopathy (AYUSH) Ayush in India. Department of Ayurveda, Siddha, Unani and Homeopathy (AYUSH), Ministry of Health & Family Welfare, Govt of India;2007.Di Pierro F, Putignano P, Montesi L, Moscatiello S, Marchesini Reggiani G, Villanova N. Preliminary study about the possible glycemic clinical advantage in using a fixed combination of Berberis aristata and Silybummarianum standardized extracts versus only Berberis aristata in patients with type 2 diabetes. Clinical Pharmacology: Advances and Applications. 2013;5 167-74.

Ghosh JR, and Bandyopadhyay AR. Abdominal circumference as a screening measure for Type 2 Diabetes. Kathmandu Univ Med J (KUMJ) 2012; 10(40):12-5

Goodman L, Brunton L, Chabner B, Knollmann B. Goodman & Gilman's pharmacological basis of therapeutics. New York: McGraw-Hill; 2011.

Gray N, Picone G, Sloan F, Yashkin A. Relation between BMI and Diabetes Mellitus and Its Complications among US Older Adults. Southern Medical Journal. 2015; 108(1):29-36.

Gummesson A, Nyman E, Knutsson M, Karlsson M. Effect of weight reduction on glycated haemoglobin in weight loss trials in patients with type 2 diabetes. Diabetes, Obesity and Metabolism. 2017; 19(9):1295-1305.

Hasanein P. Glabridin as a major active

isoflavan from *Glycyrrhiza glabra* (licorice) reverses learning and memory deficits in diabetic rats. Acta PhysiologicaHungarica. 2011;98(2):221-30.

International Diabetes Federation. IDF Diabetes Atlas — 7th Edition. Diabetes Atlas Accessed from http://www.diabetesatlas.org/ on 16th May, 2018.

Lim EL. Reversal of type 2 diabetes: normalisation of beta cell function in association with decreased pancreas and liver triacylglycerol. Diabetologia 2011; 54(10):2506–14.

McMacken M, and Shah S. A plant-based diet for the prevention and treatment of type 2 diabetes. J GeriatrCardiol. 2017; 14(5):342-54.

Mishra LC, ed. In: Scientific basis for ayurvedic therapies, September. CRC Press; 2003

Persaud S. Gymnemasylvestre stimulates insulin release in vitro by increased membrane permeability. Journal of Endocrinology. 1999; 163(2):207-12.

Sami W. Effect of diet on type 2 diabetes mellitus: A review. Int J Health Sci (Qassim). 2017; 11(2):65–71.

Shanmugasundaram E, Gopinath K, Shanmugasundaram K, Rajendran V. Possible regeneration of the islets of langerhans in streptozotocin-diabetic rats given ,gymnemasylvestre leaf extracts. Journal of Ethnopharmacology. 1990;30(3):265-79.

Sherwani S, Khan H, Ekhzaimy A, Masood A, Sakharkar

M. Significance of HbA1c Test in Diagnosis and Prognosis of Diabetic Patients. Biomarker Insights. 2016; 11:95-104.

Singh J, and Kakkar P. Antihyperglycemic and antioxidant effect of Berberis aristata root extract and its role in regulating carbohydrate metabolism in diabetic rats. Journal of Ethnopharmacology. 2009;123(1):22-6.

Subapriya R, and Nagini S. Medicinal properties of neem leaves: a review. Curr. Med. Chem. Anticancer Agents. 2005;5(2):149-160.

Tripathy J, Thakur J, Jeet G, Chawla S, Jain S, Pal A *et al*., Prevalence and risk factors of diabetes in a large community-based study in North India: results from a STEPS survey in Punjab, India. Diabetology & Metabolic Syndrome 2017; 9(1):1-8.

Uebaba K, Xu FH, Ogawa H. Psychoneuroimmunologic effects of ayurvedic oil dripping treatment. J Altern Complement Med. 2008; 14:1189-98.

Upadhyay, V.P. and Kamla, P. Ayurvedic approach to diabetes mellitus and its management by indigenous resources. In: Bajaj, J.S., editor. Diabetes Mellitus in developing countries. Interprint; New Delhi: 1984. p 375-7.

WHO. Diabetes Factsheet. Accessed fromhttp://www. who.int /en/ news- room/fact- sheets/detail/diabetes on 15th May, 2018

Willett WC, Dietz WH, Colditz GA. Guidelines for healthy weight. N Engl J Med 1999, 341:427-33.

Yancy WS Jr. A low-carbohydrate, ketogenic diet to treat type 2 diabetes. NutrMetab(Lond). 2005;2:34

Efficacy of a polyherbal oral formulation in the management of essential hypertension: an open label, pilot clinical study

Pranit Ambulkar1 ,SuhasDawkhar2, Manisha Ghurde3, Rahul Mandole1*

1Department of Research and Development, 2Department of Patient Engagement, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, 3VRT's Madhavbaug Institute of Preventive Cardiology, Thane Maharashtra, India

*Correspondence to:
Dr. Rahul Mandole,
Email:cromilagro@gmail.com

ABSTRACT

Background: Effective control of blood pressure in patients with hypertension decreases cardiovascular mortality. However, many hypertensives are unresponsive to standard antihypertensive treatment. Research has found anti- hypertensive potential in the Ayurvedic drugs Brahmi (Bacopa monnieri) and Shunthi (Zingiberofficinale). Hence, a pilot study was conducted to evaluate the efficacy and safety of Capsule Artyl (the oral formulation of Brahmi and Shunthi) as a treatment option in hypertensive subjects.

Methods:Therewere30hypertensivesubjects attendingout-patientdepartments ofclinicsinMaharashtra,Indiawereenrolledinthisf our-week,openlabel,single arm study All subjects received capsule Artyl(500mg) twice a day orally daily. The mean systolic (SBP) and diastolic blood pressure (DBP) on days 1 and 28 of the study were compared along with the mean arterial pressure(MAP).

Results: The mean SBP was significantly lesser on day 28 (141.86±12.54mm Hg) as compared to the mean SBP recorded on day 1 (155.48±19.37mm Hg) (p<0.001) The mean DBP on day 28 (89.66±6.8mm Hg) was lesser than that on day 1 (90.34±7.44mm Hg) but this difference was not statistically significant (p>0.05). There was a significant decrease in the mean value of MAP on day 28 (107.06±7.03mm Hg) as compared to that on day 1 (112.06±10.75mm Hg) (p<0.01).

Conclusions: Capsule Artyl significantly decreased the BP in hypertensive patients, without any adverse effects. Controlled trials are needed to confirm the positive outcome of this promising herbal formulation in hypertensive patients

Keywords: Capsule artyl, Essential hypertension, Systolic blood pressure

INTRODUCTION

Hypertension has become a crucial health issue to tackle worldwide not only due to its increasing prevalence but also because of the severe complications associated with it. About 10-15% of the rural and 25% of the urban population are estimated to be affected by hypertension in India. Also, Government of India has estimated that by 2020, 159.46/1000 Indians will be suffering from hypertension.1,2 Moreover, multiple complications associated with hypertension is a cause of high mortality due to the disease. According to the World Health Organization (WHO) data released in 2014, 26% of the

deaths in India are due to cardiovascular disease Another striking data is that 29% of strokes 21% of acute myocardial infarction and 16% of ischemic heart disease in India are all attributed to hypertension 3

Thecurrentmanagementofhypertensioninvolv esilifestyle modifications along with pharmacotherapy. The pharmacological agents used for the treatment include angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), calcium channel blockers (CCBs), diuretics and alpha blockers. However, these agents are not enough to control the blood pressure of patients. It has been

estimated that in more than two- third hypertensive patients on treatment, theblood pressure cannot be controlled with a single pharmacological agent and they require multipledrugs.4 A recent Indian study has revealed that the control rates of blood pressureinhypertensivecasesareaslowas1/10thi n rural and 1/5thin the urban population.5 Other pitfalls of the pharmacological agents for hypertension include the plethora of adverse effects as well as the high costs associated with their use. Hence, there is a strong need to search safe and cost-effective options for the management of hypertension inIndia.

Ayurveda, the Indian traditional discipline of medicine, has been usedby various physicianstotreatmultipletypes of disorders. However, many of the herbal extracts have not been investigated thoroughly for their possible beneficial effects in the treatment of hypertension. Two of such herbal drugs are Brahmi (Bacopa monnieri) and Shunthi (Zingiberofficinale). In Ayurveda, Brahmi is considered to be a powerful Medhya (brain tonic) and has been widely studied for its nootropic effect. However, it has also shown promiseasananti -stressaswell asananti-oxidative agent.6 There have been very few studies which have tried to evaluate the effect of Brahmi as an anti- hypertensive agent.7,8 Shunthi, the processed dry ginger is a popular herb used extensively in the Indiansubcontinent as a food additive. The beneficial effect of Shunthi in cardiovascular disease has been known for long.9 According to a systematic review published by the British Medical Journal, manyanimalstudieshaveestablishedthe beneficial effect of Shunthi as a dietary supplement to conventional anti-hypertensive drugs. However, the same review has stated the need for more clinical studies to assess the possible effect of Shunthi in hypertensive patients.10

Capsule Artylis a polyherbal Ayurvedic oral formulation which is made from the aqueous extracts of Brahmi (Bacoside 30%) and Shunthi (Gingerol 2.5%). Considering the beneficial anti-hypertensive effect of both these extracts individually, this combination looks like a promising agent that can help physicians, as well as the patients, tackle the grave problem of uncontrolled hypertension. Hence, we planned to conduct an open label pilot study to assess the efficacy and the safety of this promising herbal combination in patients suffering from essential hypertension at various health care centers in Maharashtra, India

METHODS

This study was a four-week, open label, single arm, multicentric, pilot study which was conducted to evaluate the effect of capsule Artyl on blood pressure in hypertensive patients.

There were 30 patients belonging to the age group of 30 years to 70 years having pre-diagnosed essential hypertension with systolic blood pressure (SBP) between 140-170mm Hg were included in this study. These subjects were attending the out-patient departments

(OPDs) at different Madhavbaug clinics located invarious cities of Maharashtra, India. The subjects enrolled in the study had to be willing to follow the protocol strictly over the four weeks of study period. Patients who were suffering from cardiovascular co-morbidities (left ventricular hypertrophy, heart block, congestive heart failure or coronary artery disease) were excluded from the study. Patients having deranged liver function tests or renal function tests, pregnant women or women planning pregnancy in the next 6 months were also excluded from the study. If the subjects failed to adhere to the protocolor decided to drop out of the study themselves or developed some complication due to increase in SBP and diastolic blood pressure (DBP) which would have required urgent treatment, then they were to be withdrawn from thestudy.

The study was initiated in November 2017 and completed in February 2018. The patients were prescribed capsule Artyl 500mg, to be taken twice daily for a period of 28 days, along with the conventional treatment, if it was ongoing for the

patient.All the patients were motivated to modifytheirlifestyleanddietaryhabits.Theassessmentof SBP and DBP was done with the help of a sphygmomanometer after enrolment of the subject in the study,whichwasconsideredthebaselineor day1reading. The follow up reading of SBP and DBP was taken at day 7,day14,day21 and day28.Theweight.height.BMIand the concomitant medication data was noted down on day1 and again on day 28. The mean arterial pressure (MAP) was also calculatedforall the patientson day1 andday28 using the formula: 2/3rdDBP + 1/3rdSBP.

Data were analyzed using MS excel and GraphpadInstatsoftwares. The data were represented as mean±SD. The variablesonday 1andday28werecomparedtoeachother using paired student's t test. P value of less than 0.05 was considered significant for all thevariables.

Table 1: Constituents of capsule Artyl.

Composition of Cap Artyl	Percentage (%)
Brahmi (*Bacopa monnieri*)	62.5
Shunthi (*Zingiberofficinale*)	34
Excipient	3.5

RESULTS

A total of 90 hypertensive patients were screened for participation in the study. Out of these 90 patients,30were included in the study based on the selection criteria. 29 of the30enrolledpatientscompletedthefullstudyperiodand the data collected from these 29 patients were analyzed at the end of the study.(Figure 1). The demographic details of the patients have been mentioned in Table2.

Many of the patients (n=11) were found to have hypertension for the first time on their visit to the Madhavbaug Clinic OPDs. These 11 patients were started on Capsule Artyl with the advice of lifestyle and dietary modifications. The remaining 18 patients were on

concomitant allopathic medications, the details of which have been mentioned in Figure 2

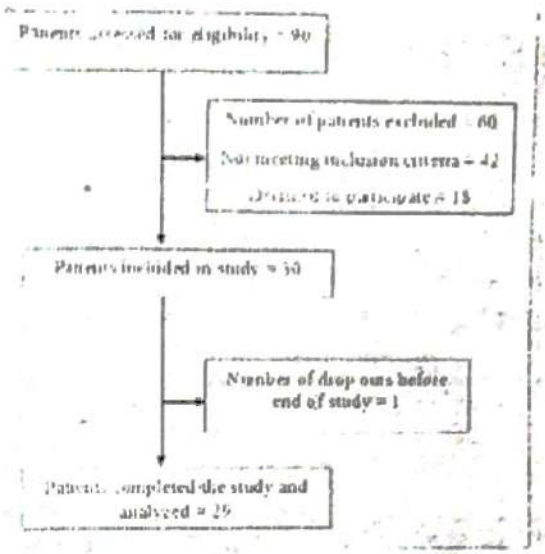


Figure 1: Patient enrolment flow chart.

Table 2: Demographic details of patients enrolled in the study (n= 29).

Demographic details of the study participants
Mean age of patients = 51.68±14.02 years
Mean weight of patients (Day 1) = 70.29±10.65 kilograms
Mean weight of patients (Day 28) = 70.12±10.80 kilograms
Mean BMI of patients (Day 1) = 27.08±3.21kg/m^2
Mean BMI of patients (Day 28) = 26.53±3.02kg/m^2

Table 3: Effect of artyl treatment on improvement of Systolic Blood Pressure (SBP) from baseline to day 28.

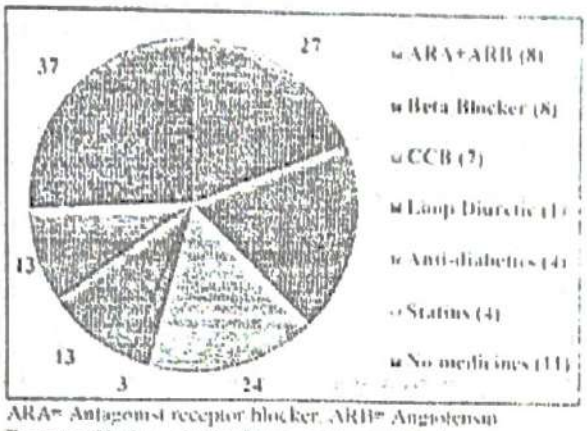
SBP	No. of Patients	Baseline	Day 28	Changes	P value
1 All					
Mean	29	155.48	141.86	13.62	8.76
Standard deviation		10.61	12.54		
P value	P < 0.001				

Table 4: Effect of artyl treatment on improvement of Diastolic Blood Pressure (DBP) from baseline to day 28.

DBP	No. of Patients	Baseline	Day 28	Changes	P value
1 All					
Mean	29	90.34	89.66	0.69	0.76
Standard deviation		6.68	6.80		
P value	P = 0.05				

Table 5: Effect of Artyl treatment on improvement of Mean Arterial Pressure (MAP) from baseline to day 28.

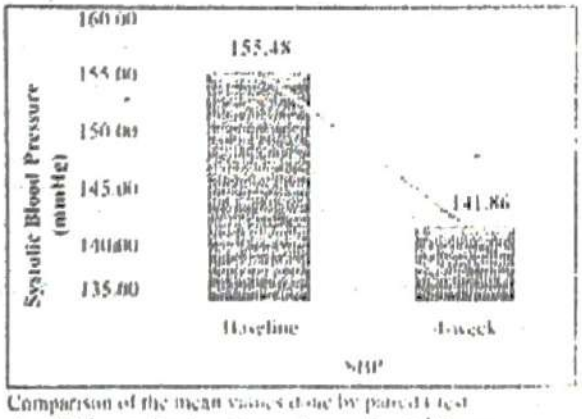
DBP	No. of patients	Baseline	Day 28	Change	%
All					
Mean	29	112.06	107.06	5.00	4.46
Standard deviation		6.29	7.03		
P value	P<0.01				



ARA= Antagonist receptor blocker, ARB= Angiotensin Receptor Blockers, CCB= Calcium ChannelBlockers

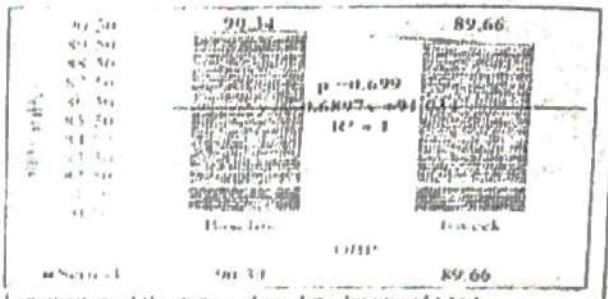
Figure 2: Percentage of subjects using allopathy medicines (n=29).

The mean SBP on day 28 was compared with that at baseline using Paired t-test; P<0.05 considered significant (Table 3). The efficacy parameters were analyzed at baseline (day 1) and on the last day of the study (day 28). It was found that the mean SBP was significantly lesser on day 28 (141.86±12.54mm Hg) as compared to the mean baseline SBP of the patients recorded on day 1 (155.48±19.37mm Hg) (p<0.001). The decrease in the mean SBP was by a margin of 8.76% (Figure 3).



Comparison of the mean values done by paired t-test
* p<0.05 considered a statistically significant difference

The mean DBP on day 28 (107.06±7.03mm Hg) was lesser than that on day 1 (112.06±10.75mm Hg) but this difference was not statistically significant (p>0.05). The decrease in mean DBP was by a margin of 4.46% (Figure 4).



Comparison of the mean values done by paired t-test
There is no statistically significant difference between each other (p>0.05)

Figure 4: Comparison of mean Diastolic Blood Pressure at baseline and at 4 weeks (n=29).

Comparison of the mean values done by paired t-test.
* p<0.05 considered a statistically significant difference

Figure 5: Comparison of mean values of mean arterial pressure at baseline and at 4 weeks (n=29).

There was asignificant decreasein the mean value of MAP on day 28 (107.06±7.03mm Hg) as compared to that on day 1 (112.06±10.75mm Hg) (p<0.01). The difference in the mean values of MAP was 4.46% (Figure 5). None of the participants in the study developed any kind of adverse event over the study period.

DISCUSSION

Hypertension is one of the most common and dangerous non-communicable diseases affecting the world population. The complications associated with the disease is a grave concern, especially because of the high rates of uncontrolled BP in the patients with hypertension, despite being on the standard pharmacological treatment. An Indian study published in 2014 concluded that the control rates of blood pressure in hypertensive cases on medication are just about 10% in rural and 20% in the urban population.5 Current drugs used for

hypertension are not only associated with adverse effects but are also not cost-effective.11 Hence, it is important to look to alternative medicine for more efficacious, safe and cost-effective options to treat hypertension. This search took us to Ayurveda, the Indian discipline of traditional medicine. Two herbal drugs, namely Brahmi (Bacopa monnieri) and Shunthi (Zingiberofficinale) have been studied by researchers for their possible anti-hypertensive effect individually. However, none of them has studied a combination of these herbal medicines for the treatment of hypertension. Capsule Artylis a herbal drug made by combining the extracts of Brahmi and Shunthi. Considering the surrounding evidence and the need for new medicines to control hypertension, we conducted this study.

On analyzing the collected data from the 29 participating hypertensive patients, we found that there was a statistically significant decrease in the mean SBP and the mean values of MAP on day 28 as compared to the baseline reading. The mean DBP was also found to be lower on day 28 as compared to the baseline reading, however this difference was not statistically significant. None of the patients on capsule'Artyl showed any adverse effect in the study, and thus the formulation can be considered safe. These results were in sync with many of the studies conducted using Brahmi and Shunthi individually.

In a preclinical study conducted in Thailand, it was found that Brahmi reduces the blood pressure significantly in Wistar rats.7 In a clinical study conducted in India,Brahmi was found to decrease SBP, DBP and MAPsignificantly at 4 weeks of treatment, similar to the findings in this study.8

Shunthi, the processed dry ginger, has shown promising results individually in various studies as an anti- hypertensive agent. In a study conducted in China, daily consumption of ginger was associated with decreased risk of hypertension in adults (OR = 0.92 CI 0.87-0.99).12 A clinical study conducted in hypertensive patients of Egypt showedastatisticallysignificantdecreaseinSBPandDBP at the end of 4 weeks of taking ginger with the prescribed medication.13 A systematic review on ginger published in the British Medical Journal concluded that animal studies have found ginger to have the potential to offer natural anti-hypertensive effect when taken as a supplement to conventional anti-hypertensivedrugs.10

Preclinical studies have assessed the possible mechanism of actions behind the antihypertensive effects of Brahmi and Shunthi. The study conducted by Kamkaew et al. found that the fall in blood pressure caused by Brahmi is because of its vasodilatory effects on the resistance arteries. The researchers also found that this vasodilation is through the nitric oxide pathway. At high concentrations, Brahmi was found to decrease the contractions generated by the voltage gated calcium

channels and reduce the action of calcium release fromthe sarcoplasmic reticulum.7 Brahmi has also shown anti- stress as well as anti-oxidant property, which may also play a role in its anti-hypertensive action. A pre-clinical study in Nigeria found that Shunthi (ginger) showed ACE inhibitory activity in vivo which could be the reason behind its BP lowering action.14 A study conducted by Ghayur et al found that ginger exhibited a vasodilator action through the blockage of the voltage gated calcium channels, which may be another possible mechanism behind its anti-hypertensiveaction.9

Our study had a few limitations. It was a one arm pilot study which was done mainly as a proof of concept research with low sample size and without a control arm. Sphygmomanometer was used to assess the SBP and the DBP, which is a subjective tool to measure BP in comparison to ambulatory BP monitoring. The study duration was just 28 days, due to which long term efficacy and safety of capsule Artylwas not assessed.

CONCLUSION

Our preliminary studyhas found that capsule Artyl, which is a herbal drug produced by

combining Brahmi and Shunthi, is successful in significantly decreasing the BP in hypertensive patients, without any adverse effects Considering that this wasapilotone-armstudy. controlled trials with larger sample size are needed to confirm the positive outcome of this promising herbal drug in hypertensive patients

ACKNOWLEDGEMENTS

Theauthorsthankthestudyparticipantsandtheirfamilies, without whom this study would not have been accomplished. Special thanks to the clinical research coordinators Snehal Patil, Reshma Thavai and Chandankumari Dubey for the management and completion of the study and Dr. KritarthNamanSingh for medicalwriting.

Funding: Funding sources from Vaidya Sane Ayurvedic Education and Agricultural Research Trusts

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Tiwaskar M. Hypertension Control in India: Are we there Yet? OR Uncontrolled and Resistant Hypertension: The Indian Perspective. JAssoc Physicians India. 2016;64(7):11-2.

2. Indian Guidelines on Hypertension-III J Clin PrevCardiol 2013;3:128-61.

3. Mohan S, Campbell N, Chockalingam A, Time to eüective lyaddresshy pertensionin India.IndianJMed Res.2013;137:627-31

4. Black HR, Elliott WJ, GranditsG, Grambsch P, Lucente T, White, WB, et al. Principal results of the controlled onset verapamil investigation of cardiovascular end points (CONVINCE) trial. JAMA. 2003;289:2073-82

5. AnchalaR, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, et al Hypertension in India: a systematic review and meta-analysis of prevalence, awareness, and control of hypertension. J Hypertens 2014;32:1170-7.

6. Hussain GM, Mishra D, Singh PN, Rao ChV,Kumar

V. Ethnopharmacological review of native traditional medicinal plants for brain disorders. Pharmacognosy review. 2007;1(1):19-29.

7 KamkaewN, ScholfieldC, Ingkaninan K,ManeesaiP, ParkingtonH, Tare M, et al. Bacopa monnieri and its constituents is hypotensive in anaesthetized rats and vasodilator in various artery types. J of Ethnopharm. 2011;137(1):790-5

8. Mishra D, TubakiB. The effect of Brahmi vati and Sarpagandha Ghana vati in management of essential hypertension - Arandomized, double blind, controlled clinical study. Journal of Ayurveda and Integrative Medicine:2017

9. Ghayur M, Gilani A. Ginger Lowers Blood Pressure Through Blockade of Voltage-Dependent Calcium Channels. J of Cardio Pharmac.2005;45(1):74-80.

10 TorabiM, Naeemzadeh F, Ebrahimi V, Taleschian- Tabrizi N, Pashazadeh F, NazemieH. The Effect of ZingiberOfficinale (Ginger) On Hypertension: A Systematic Review of Randomised Controlled Trials BMJ Open 2017;7(0):A1-A78.

11 Kapoor A, Kumar A, Mahapatra AK, Chauhan G. Open clinical trial of a polyherbal compound M- Sarpagandhamishran in essential hypertension: a pilot study Int J Res Ayurveda Pharm 2014;5(5):594-9.

12 Wang Y, Yu H, Zhang X, Feng Q, Guo X, Li S, et al Evaluation of daily ginger consumption for the prevention of chronic diseases in adults: a cross- section study. Nutrition;2016.

13 Shaban MI, El-Gahsh NFA, El-Said A, El-Sol H Ginger: It's Effect on Blood Pressure among Hypertensive Patients. IOSR Journal of Nursing and Health Science.2017;6(5):79-86.

14 Akinyemi A, AdemiluyiA, ObohG. Inhibition of Angiotensin-1-Converting Enzyme Activity by Two Varieties of Ginger (Zingiberofficinale) in Rats Fed a High Cholesterol Diet. Journal of Medicinal Food. 2014;17(3):317-23

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC Madhavbaug Institute of Preventive Cardiology

TRUE COPY

Dear Subscribers

Hurry

Book your copy now....
New Subscription rates of
The Classical Science are as follows.

Single Copy -	Rs.	25/-
One Year Subscription -	Rs.	250/-
Three Year Subscription -	Rs.	750/-
Life Membership -	Rs.	2000/-

Send your D.D. in Favour of
'Chief Editor, The Classical Science'
Payable at Satara

Address

Chief Editor,
The Classical Science
Sawkar Homoeopathic Medical College
AM 1/1, Additional M.I.D.C.,
Degaon Road, Satara 415 004 (MS)
E mail - hmcsatara@gmail.com

Director
...ng Institute of

TRUE COPY

Published on : 10th of every month
posted on : 15th of every month

SAWKAR INSTITUTES

A.M. 1/1 : Additional M.I.D.C., Degaon Road Satara - 415 004
Ph.: (02162) 240036, 240063
web site : www.samaratheducationaltrust.com

SAWKAR HOMOEOPATHIC MEDICAL COLLEGE, SATARA.
B.H.M.S.

SAWKAR PHARMACY COLLEGE, JAITAPUR, SATARA.
D. PHARM

ARVIND GAVALI COLLEGE OF PHARMACY, JAITAPUR, SATARA.
B. PHARM, M. PHARM

ARVIND GAVALI COLLEGE OF ENGINEERING, PANMALEWADI, SATARA.
POLYTECHNIC, B.E., M.E.

Edited by : Dr. Ravindra N. Bhosale
A.M. 1/1 Addi. M.I.D.C , Degaon Road, Satara - 415004. (MAH)

Published & Owned by : Dr. Ravindra N. Bhosale

Printed at : Yashwant Offset, 668 Mangalwar Peth, Dastagir Colony, Satara. (MAH)

Director

VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

Published at : Sawkar Homoeopathic Medical College, Satara.
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

TRUE COPY

ANNEXURE – "F"

Information of Mentor of Training Centre

It shall be verified by the Head of the concerned Training Center,

Sr. No.	Particular	-	Information to be filled
01.	Name of the Mentor	:	Dr. Jagdish Shantaveeraya Hiremath
02.	Date of Birth	:	31/10/1956
03.	Address	:	Om Residency, Bhandarkar Road, Near TVS Showroom Erandvane ,Pune 411004
04.	Tel. No./ Mob. No.	:	9822022441
05.	E-mail id	:	drjagdishhiremath@gmail.com
06.	Nationality	:	Indian
07.	Qualification in details : (attach documentary proof)	:	MBBS, DM (Cardiology)
08.	Teaching Experience / Health Sciences: Profession Experience (Attached document proof with signature of Head of the Institute. Also it is mandatory to attach self-attested Photocopy of the Experience Certificate of each Mentor in the Subject of concerned Fellowship/Certificate Course)		Teaching Experience 18 Years 5 Months Clinical Experience 33 Years
09.	Present Appointment	:	Chair Professor
10.	Publications (List & Proof)	:	Attached
11.	Post Graduate Teaching experience(Attach documentary evidence)	:	Attached
12.	Any other relevant information	:	-

Dr. Jagdish Shantaveeraya Hiremath
Name & Sign. of Mentor

Date: - 23.05.22

For the use of affiliated Training Center:

I have verified the eligibility of the above Mentor as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended) and UniversityCircular No. MUHS/UDC/FCCC/736/2019 dated 30/09/2019.

Sign & Stamp
Head of the Department
Date: 23.05.22

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center
Sign & Stamp
Dean/ Principal/ Director of Training Centre
Date: 23.05.22

Madhavbaug Institute of Preventive Cardiology MIPC

Training Centre Round Seal

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Jagdish S. Hiremath is working with us as a Mentor, since 17th Dec 2015 till date.

Dr. Vilas D. Potnis
Trustee
Vd' Sane's Ayurvedic Education
& Agricultural Research Trust

VD SANE'S AYURVEDIC EDUCATION & AGRICULTURAL RESEARCH TRUST
Reg No E 20159 Mumbai

Director
(VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Madhavbaug Institute of Preventive Cardiology
MIPC

TRUE COPY

Office : Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No.- 022-41235315/16 / 7722088789
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

Bharati Vidyapeeth
(Deemed to be University)
Pune, India.
Founder Chancellor : Dr. Patangrao Kadam
MEDICAL COLLEGE, PUNE
★ Accredited with 'A+' Grade (2017) by NAAC ★
★ Category-I University Status by UGC ★
★ NIRF Ranking - 62 ★
"Social Transformation Through Dynamic Education"

Prof. Dr. Shivajirao Kadam
M.Sc., Ph.D.
Chancellor

Prof. Dr. M. M. Salunkhe
M.Sc., Ph.D., F.R.S.C.
Vice Chancellor

Celebrating 50 and Beyond
BHARATI VIDYAPEETH

Dr. Vishwajeet Kadam
B.Tech., M.B.A., Ph.D.
Pro Vice Chancellor

Brig. (Retd) Dr. N. S. Mani
M.D. (Pathology)
Principal

Ref. No. : BVDU/MC/3198/19-20
Date : 11/11/2019

CERTIFICATE

This is to certify that **Dr. Jagdish Hiremath** has been working in this institution as Professor & Head in the Department of Cardiology. His appointment in this institution are as under...

Designation	From	To
Assistant Professor	01/02/2007	31/01/2011
Associate Professor	01/02/2011	31/12/2014
Professor	01/01/2015	Till Date

During this period his work has been satisfactory.

N S Mani
PRINCIPAL
PRINCIPAL
Bharati Vidyapeeth
(Deemed to be University)
Medical College
Pune - 43

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Pune-Satara Road, Pune - 411 043 (INDIA)
Tel. : +91-20-24373226, 24364561 | Fax : +91-20-24372175 | E-mail : bvumedicalpune@gmail.com | Web : www.mcpune.bharatividyapeeth.edu

Rajasthani & Gujarati Charitable Foundation's
POONA HOSPITAL AND
RESEARCH CENTRE

28th October 2019

To Whom It May Concern

Dr. Jagdish Hiremath is attached as a Consultant Cardiologist with Poona Hospital & Research Centre since 30th May 1989.He was Head of the Department of Cardiology from 10th February 2003 to 30th December 2013.

Poona Hospital & Research Centre is recognised for DNB Cardiology since January 2006. Dr. Jagdish Hiremath was involved in DNB teaching and was P.G guide for two students. During his tenure as HOD of cardiology seven students successfully completed their cardiology training.

POONA HOSPITAL & RESEARCH CENTRE

Dr. (Ms.) J Ravindranath
Director

DR. (MS.) J. RAVINDRANATH
DIRECTOR
POONA HOSPITAL & RESEARCH CENTRE

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

TRUE COPY

27, SADASHIV PETH, PUNE - 411 030
PHONES : 91 20 24331705, 66096000
Fax : 91 20 24338477 Email : pinc@vsnl.com
Website : www.poonahospital.org
ISO 9001:2015 Certified Hospital

NABH

Experience Certificate

Dr. Jagdish S. Hiremath

EDUCATION

YEAR	DEGREE	COLLEGE/UNIVERSITY/INSTITUTION
1975 – 1980	MBBS	BJ M College, Pune, SG Hospitals
1981 – 1983	MD (Medicine)	BJ M College, Pune, SG Hospitals
1983 – 1984	Fellowship	Nanavati hospitals, Mumbai
1984 – 1986	DM (Cardiology)	GM College, Mumbai University, J J Hospital
1986 – 1987	DNB (Cardiology)	National Board, Delhi
1987 – 1988	Fellowship (Cardiology)	Epworth Hospital, Melbourne, Australia

PROFESSIONAL WORK AND TEACHING POSITION

YEAR	DESIGNATION	UNIVERSITY/INSTITUTION/HOSPITAL
1989 - 2004	Consultant cardiologist	Inlaks Budhrani Hospital, Pune, India
1989 -- 2006	Consultant Cardiologist	Ruby Hall Clinic, Pune, India
2003 – 2013	Chief of Cardiology	Poona Hospital, India
2006 – 2009	Director Non Invasive Cardiology	Ruby Hall Clinic, Pune, India
2009 – Date	Director Cath Lab,	Ruby Hall Clinic, Pune, India

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

TRUE COPY

Maharashtra University of Health Sciences

(An ISO 9001:2008 Certified University)

Prof. Dr. Arun Jamkar, Vice-Chancellor

MUHS M.S., Ph.D. (SURGICAL ONCOLOGY), F.I.C.S., F.M.A.S., F.I.A.G.E.S., FAIMER Fellow

NO. MUHS/PB/1447/2015 Date:17/12/2015

To,
Dr.Jagdish Hiremath
Interventional Cardiologist
Ruby Hall Clinic, Cath Lab,
40, Sasoon Road,
Pune - 411001

APPOINTMENT ORDER

Ref : Management Council Resolution No.287/2015 dtd.16/12/2015

With reference to your application, to facilitate establishment of a Chair "Madhavbaug Institute of Preventive Cardiology" at Maharashtra University of Health Sciences, Nashik and considering your interest, experience, expertise and desire to develop the highly essential culture of Preventive Cardiology in all the wakes of the fields of Health Sciences Research & education, I am pleased to inform you that, you are hereby appointed on the post of "**Chair Professor**" of "Madhavbaug Institute of Preventive Cardiology", Chair for the period of 5 years **OR** closure / termination of MoU with Vd. Sane's Ayurvedic Education & Agricultural Research Trust's, Madhavbaug whichever is earlier subject to terms and conditions of Direction No.03/2013 (Amended 10-02-2015) as amended from time to time.

VICE-CHANCELLOR

Copy to:
1. Dr.Rohit Sane, Trustee, Vd. Sane's Ayurvedic Education & Agricultural Research Trust, Mumbai
2. Chairman, Local Management Committee, Madhavbaug Institute of Preventive Cardiology

Copy for Information (Internal):-
1. P.S.to Vice-Chancellor
2. Registrar
3. Finance & Accounts Officer.
4. Director, Planning Board (Offg.)
5. Law Officer

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

TRUE COPY

Dindori Road Mhasrul Nashik - 422 004

National Board of Examinations

herewith certifies that

Hiremath Jagdish Shantaveeraya

has pursued the prescribed course of postgraduate training and demonstrated his proficiency at an examination held in May 1987 to the satisfaction of the Board.

Accordingly, on this Fifteenth day of June in the year One Thousand Nine Hundred and Eighty Seven, the Board admits him as a

Diplomate of the National Board

for the practice of

Cardiology

Executive Director

President

New Delhi

We, the Chancellor, Vice-Chancellor, and Members of the Executive Council of the University of Bombay certify that the withinsigned

Jagdish Shantaveeraya Hiremath of Grant Medical College

having been examined in the month of November in the year 1986, for the Degree of Doctor of Medicine (D.M.) (Branch - II Cardiology) and having passed the Examination, the Degree of

Doctor of Medicine

(D.M.)

has been conferred on him at Bombay, on the eighteenth day of the month of January in the year one thousand nine hundred and eighty-eight.

In Testimony whereof are set the Seal of the said University and the Signature of the said Chancellor.

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

TRUE COPY

Maharashtra Medical Council, Mumbai

189-A, Anand Complex, 2nd Floor, Sane Guruji Marg, Arthur Road Naka,
Chinchpokali(W), Mumbai 400011. Tel 23010668
http : // www.maharashtramedicalcouncil.in

No : MMC/RENW/44915/2017 Date : 16/02/2017

To,
Dr. HIREMATH JAGDISH SHANTAVIRAYYA
850/7, OM ERANDAVAN P PUNE

411004 ,MAHARASHTRA .

Sub : Renewal of Registration No : 44915

Sir/Madam,

I have to inform you that your name has been continued up to 28/02/2022 on the medical register of this Council, maintained under the provision of Maharashtra Medical Council Act 1965.

It is stated that the Medical Graduates / Practitioners registered with this Council will be required to approach this Council two months in advance before expiry of the above period for next renewal of registration as per section 23(C) of the Maharashtra Medical Council (Amendment) Act 2003.

Your's Truly

(Dr. Dilip Wange)
Registrar
Maharashtra Medical Council

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Maharashtra Medical Council, Bombay

CERTIFICATE OF REGISTRATION

Registration No. 44915

This is to certify that the within-signed J.S. Hiremath Doctor Shri/~~Shrimati~~/ Kumari HIREMATH JAGDISH SHANTAVIRAYYA possessing the qualifications of M.B.B.S.(POONA),1980;

has been duly registered under the Maharashtra Medical Council Act, 1965 (Mah. XLVI of 1965), in Part I of the register.

In witness whereof are herewith affixed the seal of the Maharashtra Medical Council, Bombay and the signature of the Registrar.

Dated the 10TH DECEMBER 1980.

Registrar

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

SUPPLEMENT TO JAPI - ISSUE DECEMBER 2011 • 58 PAGES • VOL. 59 • PRICE ₹ 3/-

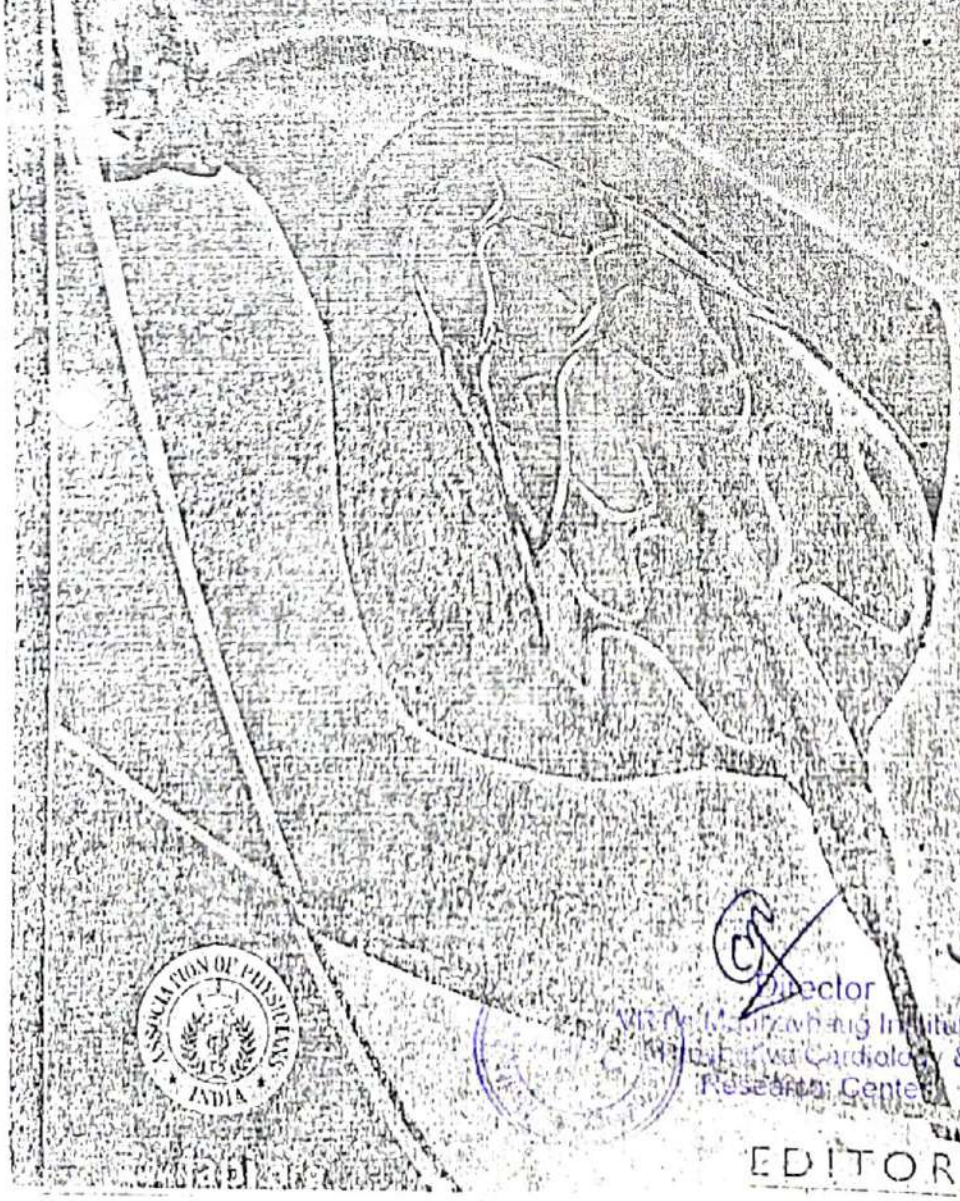
JAPI

JOURNAL OF THE ASSOCIATION OF PHYSICIANS OF INDIA

Special Issue on Acute Myocardial Infarction

Guest Editors: Aspi R Billimoria, Siddharth [illegible]

CONTENTS



ISSN 0004-5772

Future of Thrombolytic Therapy - An Indian Context

S Hiremath*

Abstract

Acute myocardial infarction has two main treatment modalities in the form of direct angioplasty (PAMI) and intravenous thrombolysis. PAMI is statistically clearly superior to intravenous thrombolysis. However, as ground reality in Indian conditions PAMI remains a distant ideal option for many ST elevation MI patients. In order to bridge the gap between IV thrombolysis and PAMI, early / pre-hospital IV thrombolysis to all and early angiography within 3 to 24 hours is the treatment modality, which needs to be exercised in India. Because of the encouraging results of pharmaco-invasive treatment in acute and long term morbidity and mortality, it should be the prime treatment of management of ST elevation myocardial infarction in India. The future of IV thrombolysis will remarkably be based on whether Indian physicians switch to direct Fibrin Inhibitors like Tenectaplase and Reteplase and whether every patient of ST elevation MI undergoes early angiography or not. If these two changes are accepted for treatment of ST elevation MI, remarkably successful and effective treatment could be offered in a place like India, which is too vast and too diversioned and too socio-economically irrelevant for the ideal treatment of PAMI. In conclusion, early / pre-hospital thrombolysis with Tenectaplase / Retelase and angiography within 3 to 24 hours is the way to go in future in India.

Future of acute myocardial infarction management in India is in "Early thrombolysis to all and early angiography (3 to 24 hours) in all" ST elevation MI (STEMI) patients – with or without successful thrombolysis.

After a ginger start in early eighties, thrombolysis with STK reached nooks and corners of India. Urokinase shared "not a small" percentage. In the last 3 years TNK and Reteplase have made an appearance. The future of thrombolysis in India rests in these two agents, especially TNK.

Primary angioplasty in acute myocardial infarction (PAMI) is proven the world over as the gold standard of treatment by way of establishing high percentage of reperfusion and complete reperfusion (TIMI III, good TMP and TFC score). But this treatment modality is available to less than 10% STEMI in India as of today. In USA, 28% of STEMI get PAMI and this percentage is higher in European countries with good transfer facilities.

In Indian conditions, even small towns have population above 1,00,000. Traffic congestions and transfer to hospitals take a long time. Initial delay is by the patient due to lack of awareness. Next delay is due to lack of transfer facilities. (In small towns where reaching a hospital quickly is possible, hospital with PAMI capabilities are not available). The third delay is at tertiary care hospital where reaching from casualty to establishing TIMI III flow has its own delay of formalities, finances, round the clock man power and availability of cath lab in busy hours. All these situations are expected to get worse in India in the future!

Public awareness can be increased about early detection (symptoms) of AMI, early treatment, golden hour and recognising AMI. Physician-based smaller hospital whether in villages, smaller towns or suburbs of cities will play a crucial role. Such hospitals should thrombolyse these patients on first contact with agents like TNK (easy administration, no anaphylactic reactions, no infusions). The relatives and patient then get a breathing period of moving to a cath lab facility in next 24 hours. The breathing space allows them to choose the doctor of their choice, arrange finances, gather manpower, complete insurance formalities (All very important in Indian context). In addition, this breathing period has not done the myocardium any harm, due to early thrombolysis and recanalised culprit artery.

*Interventional Cardiologist, Chief of Cardiology, Poona Hospital; Director : Cath Lab, Ruby Hall Clinic

Advantages of IV Thrombolysis (Indian Context)

1. Easy availability.
2. Less expertise required.
3. Cost effective – considering treatment of a life-threatening disease.
4. Ease of administration (peripheral venous line).
5. Acceptable complication rates.
6. More than 75% infarction-related arteries would be patent when taken on cath table.
7. Hemodynamically and electrically stable patient for PCI.
8. Well-defined lesions rather than total occlusions.

Ideal Adjuvant Protocol for IV Thrombolysis

a. S/L nitrate, sedation, O_2.
b. Soluble Aspirin 325mg, Clopidogrel 300mg.
c. Weight-adjusted TNK or Reteplase or STK.
d. High dose Atorvastatin, Ramipril.
e. Betablockers as indicated.
f. Avoid Nikorandil, Trimetazidine, Ranolazine, Ivabradine.
g. Enoxaparin or Raviparin SC for 7 days.

Failed IV Thrombolysis

Diagnosis : (After 90 min to 2 hrs of completion of IV thrombolysis).

1. Persistent chest pain.
2. New onset heart failure.
3. Non resolution of ST segments.
4. Hemodynamic instability.
5. Electrical instability.

Treatment

1. Intervention of culprit artery at least at the earliest.

Reprint from

ISSN 0019 - 6169

The Indian Practitioner

A Monthly Journal Devoted to Medicine, Surgery and Public Health

Vol. 62 September 2009 No. 9

Original Article

The SUPREME study: A Postmarketing Surveillance of Tolerability and Effectiveness of Amlodipine-Nebivolol Combination in Indian Patients with Hypertension

Lopez M, Namjoshi R, Khare A, Gogtay J A

Aspirin resistance

UPDATED

Dr. Jagdish Hiremath
MD, DM, DNB (Cardiology)
Poona Hospital & Research Centre
Pune, Maharastra

Patients suffer serious cardiovascular events despite aspirin.

Why?

Cardiovascular diseases contributes to a major cause of morbidity and mortality all over the world. Antiplatelet drugs are indicated in the primary and secondary prevention of acute coronary syndrome (ACS), stroke and peripheral artery disease (PAD). Aspirin or acetyl salicylic acid (ASA) is a potent and cost effective drug prescribed most commonly to prevent these events.

Aspirin's use took off in...

Although introduced in 1832, it was not until 1948 that ASA's effect in decreasing the incidence of MI was noted. In 1967, the antiplatelet properties of ASA were recognized. In 1976, the mechanism of action of ASA was discovered to be inhibition of the production of prostaglandins. In 1982, Nobel Prize for Medicine was awarded to Sir John Vane for this discovery. In the 1990s, several large-scale clinical trials were initiated to know the effectiveness of different anti-thrombotic agents including ASA. The major results of the Anti-thrombotic Trialists' Colloboration was that ASA reduced the risk of serious vascular events by an average of 25% in patients with acute or previous myocardial infarct, ischaemic stroke, angina, or atrial fibrillation.

How does aspirin bring about these effects?

Normal haemostasis is a balance between both a platelet release reaction and platelet aggregation. This balance requires an intact arachidonic acid (AA) pathway for the generation of thromboxane A2 (TXA2). A critical enzyme is platelet prostaglandin G/H synthase-1, also known as cyclooxygenase-1 (COX-1). AA is generated from phospholipids within the cytoplasm of platelets. The enzyme COX-1 acts on AA to produce endoperoxidases that inturn produces TXA2 through the action of the enzyme thromboxane synthetase. TXA2 is a very potent platelet-aggregating agent located in the alpha granules of the platelet. ASA interferes with the generation of TXA2 by blocking the access of AA to the catalytic site of COX-1 in platelets. The COX-1 enzyme is irreversibly acetylated. Because platelets are anucleate, they cannot generate additional COX-1. Platelets do not aggregate in the absence of TXA2.

Aspirin resistance was proposed in 1990s

Since some patients taking ASA suffered untoward clinical events such as a second MI, the concept of ASA resistance was proposed in the 1990s. Till date, although many proposed definitions exist, there is no single agreement over the definition of aspirin resistance. It could be either patients not responding to aspirin's antiplatelet effect (patients suffer serious CV events despite the use of aspirin) or it could be the inability of aspirin to inhibit platelet thromboxane formation.

How does aspirin resistance occur? What are the mechanisms?

COX-1 and COX-2 are 90% homologous. The 10% structural difference renders COX-2 relatively insensitive

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Treatment and outcomes of acute coronary syndromes in India (CREATE): a prospective analysis of registry data

Denis Xavier, Prem Pais, P J Devereaux, Changchun Xie, D Prabhakaran, K Srinath Reddy, Rajeev Gupta, Prashant Joshi, Prafulla Kerkar, S Thanikachalam, K K Haridas, T M Jaison, Sudhir Naik, A K Maity, Salim Yusuf; on behalf of the CREATE registry investigators*

Summary

Background India has the highest burden of acute coronary syndromes in the world, yet little is known about the treatments and outcomes of these diseases. We aimed to document the characteristics, treatments, and outcomes of patients with acute coronary syndromes who were admitted to hospitals in India.

Methods We did a prospective registry study in 89 centres from 10 regions and 50 cities in India. Eligible patients had suspected acute myocardial infarction with definite electrocardiograph changes (whether elevated ST [STEMI] or non-STEMI or unstable angina), or had suspected myocardial infarction without ECG changes but with prior evidence of ischaemic heart disease. We recorded a range of clinical outcomes, and all-cause mortality at 30 days.

Findings We enrolled 20937 patients. Of the 20468 patients who were given a definite diagnosis, 12405 (60·6%) had STEMI. The mean age of these patients was 57·5 (SD 12·1) years; patients with STEMI were younger (56·3 [12·1] years) than were those with non-STEMI or unstable angina (59·3 [11·8] years). Most patients were from lower middle 10737 (52·5%) and poor 3999 (19·6%) social classes. The median time from symptoms to hospital was 360 (IQR 123–1317) min, with 50 (25–68) min from hospital to thrombolysis. 6226 (30·4%) patients had diabetes; 7720 (37·7%) had hypertension; and 8242 (40·2%) were smokers. Treatments for STEMI differed from those for non-STEMI or unstable angina. More patients with STEMI than with non-STEMI were given anti-platelet drugs (98·2% *vs* 97·4%); angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB) (60·5% *vs* 51·2%); and percutaneous coronary interventions (8·0% *vs* 6·7%, p<0·0001 for all comparisons). Thrombolytics (96·3% streptokinase) were used for 58·5% of patients with STEMI. Conversely, fewer patients with STEMI than those with non-STEMI or unstable angina were given β blockers (57·5% *vs* 61·9%); lipid-lowering drugs (50·8% *vs* 53·9%); and coronary bypass graft surgery (1·9% *vs* 4·4%, p<0·0001 for all comparisons). The 30-day outcomes for patients with STEMI were death (8·6%), reinfarction (2·3%), and stroke (0·7%). Outcomes for those with non-STEMI or unstable angina were better: death (3·7%), reinfarction (1·2%), and stroke (0·3%, p<0·0001 for all comparisons). Use of key treatments also differed by socioeconomic status: more rich patients than poor patients were given thrombolytics (60·6% *vs* 52·3%), β blockers (58·8% *vs* 49·6%), lipid-lowering drugs (61·2% *vs* 36·0%), ACE inhibitors or ARB (63·2% *vs* 54·1%), percutaneous coronary intervention (15·3% *vs* 2·0%), and coronary artery bypass graft surgery (7·5% *vs* 0·7%, p<0·0001 for all comparisons). Mortality was higher for poor patients than for rich patients (8·2% *vs* 5·5%, p<0·0001). Adjustment for treatments (but not risk factors and baseline characteristics) eliminated this difference in mortality.

Interpretation Patients in India who have acute coronary syndromes have a higher rate of STEMI than do patients in developed countries. Since most of these patients were poor, less likely to get evidence-based treatments, and had greater 30-day mortality, reduction of delays in access to hospital and provision of affordable treatments could reduce morbidity and mortality.

Funding Division of Clinical Trials, St John's Research Institute, Bangalore, India; Population Health Research Institute (PHRI), McMaster University, Canada; Sanofi-Aventis India.

Lancet 2008; 371: 1435–42

See Comment page 1394

*Investigators listed at end of paper

St John's Medical College and St John's Research Institute, Bangalore, India (D Xavier MD, Prof P Pais MD); Population Health Research Institute, McMaster University and Hamilton Health Sciences, Hamilton, Canada (Prof S Yusuf DPhil, P J Devereaux MD, C Xie PhD); All India Institute of Health Sciences, New Delhi, India (D Prabhakaran DM, Prof K S Reddy DM); Moolchand Hospital and Research Centre, Jaipur, India (Prof R Gupta MD); Government Medical College, Nagpur, India (P Joshi MD); KEM Hospital, Mumbai, India (Prof P Kerkar DM); Sri Ramachandra Medical College, Chennai, India (Prof S Thanikachalam DM); Amrita Institute of Medical Sciences, Kochi, India (Prof K K Haridas DM); Christian Medical College, Ludhiana, India (Prof T M Jaison DM); Medicity Hospital, Hyderabad, India (Prof S Naik DM); and SSKM Hospital, Kolkata, India (Prof A K Maity DM)

Correspondence to
Prof Salim Yusuf, Population Health Research Institute, McMaster University, Hamilton General Hospital, 237 Barton Street East, Hamilton, Ontario L8L 2X2, Canada
yusufs@mcmaster.ca

Introduction

Ischaemic heart disease is the leading cause of death globally.[1] In 2001, ischaemic heart disease accounted for 7·1 million deaths worldwide,[1] 5·7 million (80%) of which were in low-income countries.[2,3] Between 1990 and 2020, these diseases are expected to increase by 120% for women and 137% for men in developing countries, compared with 30–60% in developed countries.[4] By 2010, 60% of the world's heart disease is expected to occur in India.[5] Furthermore, South Asians have a high prevalence of risk factors, and have ischaemic heart disease at an earlier age than do people in developed countries.[6,7]

Most data for patients with acute coronary syndromes are from several large registries[8–10] with data on demography, treatments, and outcomes of patients in middle-income and high-income countries. The few studies in India are small and restricted to a few hospitals.[11–13] We established a collaborative national registry of more than 20000 patients with acute coronary syndromes (defined as myocardial infarction with ST elevation [STEMI] or non-STEMI or unstable angina). We aimed to document the characteristics, treatments, and outcomes of patients with acute coronary syndromes who were admitted to hospitals in India.

S Chandra, S C Govind, S S Iyengar, P R Nayak, P Pais, G G Shetty, P K Shetty, R Keshava, M J Santhosh, S S Ramesh, K Varghese, D Xavier); Bapatla, India (B V Sudheer); Bhopal, India (S K Trivedi); Bikaner, India (A Kalla, R B Panwar, S K Paul); Chandigarh, India (H K Bali); Chennai, India (D Bhargavi, A Dhanasekhar, S Elangovan, A Kalanidhi, T Pradeep, M Ramesh, S S Sundaram, S Thamikachalam); Coimbatore, India (J S Bhuvaneswaran); Delhi, India (B Singh, A Roy, S Das); Erode, India (C B K Murthy); Ghaziabad, India (A Mittal); Gulbarga, India (M S Rao); Guntur, India (N G Mohanarjun, M B Rao); Hyderabad, India (B Anand, B R Babu, R K Jain, P A Jiwani, T N C Padmanabhan, S Naik, C V R Prasad, P S Rao, V D Rao, V S P Rao, B K S Sastry, S Sinha, S J Shankar); Indore, India (A Bharani, R Wadia); Jaipur, India (R Gupta, M Jain, A Khondia, K Kothari, R K Tongia); Jodhpur, India (R Mehrotra, S Sanghvi); Kanpur, India (R P S Bhardwaj); Kochi, India (K K Haridas, K N Pradeep, V Shankar); Kolkata, India (M K Das, A K Maity, H Pandey, S K Paul, S K Rana); Kollam, India (D Kannan); Kottayam, India (A Chandrasekher, J Joseph, B Mathew); Kozhikode, India (K G Alexander, A V Bindu, C A Nambiar, K Venugopal); Lucknow, India (S Kumar, A Puri, V K Puri, N Sinha); Ludhiana, India (R K Calton, J Das, C Itty, T M Jaison, S G Kaur, M Singh); Meerut, India (A K Aneja); Mumbai, India (P G Kerkar, M V Reddy); Nagpur, India (M Holay, A Jain, P P Joshi, A Khan, U K Mahorkar, R Mundle, L S Patil, A Vidhalaj); Nanded, India (V E Shegokar); Nashik, India (M B Chopda, V M Vijan); Pallakkad, India (P B Jayagopal); Patiala, India (S Verma); Patna, India (R K Agrawal); [redacted] Rothak, India (V K Katyal, S B Siwach); Shimoga, India (J Narendra); Thrissur, India (S Alappatt, P P Mohanan, V Panjikkaran); Tirunelveli, India (S Chandra); Tiruppur, India (P Kumar); Trichy, India (M Chenniappan, Gayathri, B S V Raj, R Udayashankar); Udaipur, India (S K Kaushik); Vellore, India (K T Babu, G Bharani); Vijayawada, India (P R Babu, S Prasad); Vishakapatnam, India (M B Rao); Wardha, India (S P Kulantri, M Kapoor).

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgments

S Yusuf is supported through a chair of the Heart and Stroke Foundation of Ontario. We thank Janice Pogue from the Population Health Research Institute, McMaster University, Canada for advice on statistical issues; Vlad Gasic from the same institution for help with the map; Freeda Xavier, Alben Sigamani, Nandini Mathur, Seena George, Rajan Chellom, Mary SD, Lidwin Sequira, and Sudha Kumaresh from the National Coordinating Office, St John's Research Institute, Bangalore, India for data management; and Aventis Pharma, India (now Sanofi-Aventis India) for an unrestricted educational grant.

References

1 Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet* 2006; 367: 1747–57.

2 Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. *Circulation* 2001; 104: 2746–53.

3 Reddy KS. Cardiovascular disease in non-Western countries. *N Engl J Med* 2004; 350 (24): 2438–40.

4 Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: Part II: variations in cardiovascular disease by specific ethnic groups and geographic regions and prevention strategies. *Circulation* 2001; 104: 2855–64.

5 Ghaffar A, Reddy KS, Singhi M. Burden of non-communicable diseases in South Asia. *BMJ* 2004; 328: 807–10.

6 Mohan V, Deepa R, Rani SS, Premalatha G. Prevalence of coronary artery disease and its relationship to lipids in a selected population in South India: The Chennai Urban Population Study (CUPS No. 5). *J Am Coll Cardiol* 2001; 38: 682–87.

7 Joshi P, Islam S, Pais P, et al. Risk factors for early myocardial infarction in South Asians compared with individuals in other countries. *JAMA* 2007; 297: 286–94.

8 Budaj A, Brieger D, Steg PG, et al. Global patterns of use of antithrombotic and antiplatelet therapies in patients with acute coronary syndromes: insights from the Global Registry of Acute Coronary Events (GRACE). *Am Heart J* 2003; 146: 999–1006.

9 Fox KA, Goodman SG, Klein W, et al. Management of acute coronary syndromes. Variations in practice and outcome; findings from the Global Registry of Acute Coronary Events (GRACE). *Eur Heart J* 2002; 23: 1177–89.

10 Steg PG, Goldberg RJ, Gore JM, et al. Baseline characteristics, management practices, and in-hospital outcomes of patients hospitalized with acute coronary syndromes in the Global Registry of Acute Coronary Events (GRACE). *Am J Cardiol* 2002; 90: 358–63.

11 Gibson CM. NRMI and current treatment patterns for ST-elevation myocardial infarction 5. *Am Heart J* 2004; 148: 29–33.

12 Rogers WJ, Canto JG, Barron HV, Boscarino JA, Shoultz DA, Every NR. Treatment and outcome of myocardial infarction in hospitals with and without invasive capability. Investigators in the National Registry of Myocardial Infarction. *J Am Coll Cardiol* 2000; 35: 371–79.

13 Rogers WJ, Canto JG, Lambrew CT, et al. Temporal trends in the treatment of over 1.5 million patients with myocardial infarction in the US from 1990 through 1999: the National Registry of Myocardial Infarction 1, 2 and 3. *J Am Coll Cardiol* 2000; 36: 2056–63.

14 Yusuf S, Flather M, Pogue J, et al. Variations between countries in invasive cardiac procedures and outcomes in patients with suspected unstable angina or myocardial infarction without initial ST elevation. OASIS (Organisation to Assess Strategies for Ischaemic Syndromes) Registry Investigators. *Lancet* 1998; 352: 507–14.

15 Hasdai D, Behar S, Wallentin L, et al. A prospective survey of the characteristics, treatments and outcomes of patients with acute coronary syndromes in Europe and the Mediterranean basin: the Euro Heart Survey of Acute Coronary Syndromes (Euro Heart Survey ACS). *Eur Heart J* 2002; 23: 1190–201.

16 Mandelzweig L, Battler A, Boyko V, et al. The second Euro Heart Survey on acute coronary syndromes: Characteristics, treatment, and outcome of patients with ACS in Europe and the Mediterranean Basin in 2004. *Eur Heart J* 2006; 27: 2285–93.

17 George E, Savitha D, Pais P. Pre hospital issues in acute myocardial infarction. *J Assoc Physicians India* 2001; 49: 320–23.

18 George E, Hunsberger S, Savitha D, Pais P. Treatment of acute myocardial infarction: does the type of hospital make a difference? PPAMI Study Group. *Indian Heart J* 1999; 51: 161–66.

19 Jose VJ, Gupta SN. Mortality and morbidity of acute ST segment elevation myocardial infarction in the current era. *Indian Heart J* 2004; 56: 210–14.

20 Government of India. Census of India 2001. Provisional Population Totals. Delhi, India: Government of India, 2001. http://www.censusindia.gov.in/Data_Products/Library/Provisional_Population_Total_link/PDF_Links/chapter1.pdf (accessed March 10, 2008).

21 Fox KA, Dabbous OH, Goldberg RJ, et al. Prediction of risk of death and myocardial infarction in the six months after presentation with acute coronary syndrome: prospective multinational observational study (GRACE). *BMJ* 2006; 333: 1091.

22 Prabhakaran D, Yusuf S, Mehta S, et al. Two-year outcomes in patients admitted with non-ST elevation acute coronary syndrome: results of the OASIS registry 1 and 2. *Indian Heart J* 2005; 57: 217–25.

23 Canto JG, Rogers WJ, French WJ, Gore JM, Chandra NC, Barron HV. Payer status and the utilization of hospital resources in acute myocardial infarction: a report from the National Registry of Myocardial Infarction 2. *Arch Intern Med* 2000; 160: 817–23.

24 Alter DA, Iron K, Austin PC, Naylor CD. Socioeconomic status, service patterns, and perceptions of care among survivors of acute myocardial infarction in Canada. *JAMA* 2004; 291: 1100–07.

25 Salomaa V, Miettinen H, Niemela M, et al. Relation of socioeconomic position to the case fatality, prognosis and treatment of myocardial infarction events; the FINMONICA MI Register Study. *J Epidemiol Community Health* 2001; 55: 475–82.

26 Alter DA, Naylor CD, Austin P, Tu JV. Effects of socioeconomic status on access to invasive cardiac procedures and on mortality after acute myocardial infarction. *N Engl J Med* 1999; 341: 1359–67.

European Heart Journal – Cardiovascular Imaging (2013) 14, 464–470
doi:10.1093/ehjci/jes192

Non-invasive detection of tako-tsubo cardiomyopathy vs. acute anterior myocardial infarction by transthoracic Doppler echocardiography

Patrick Meimoun*, Jerome Clerc, Charles Vincent, Florent Flahaut, Anne Laure Germain, Frederic Elmkies, Hamdane Zemir, and Anne Luycx-Bore

Department of Cardiology, Centre Hospitalier De Compiegne, 8 Rue Henri Adnot, Compiegne 60200, France

Received 24 July 2012; accepted after revision 29 August 2012; online publish-ahead-of-print 21 September 2012

Aims Typical tako-tsubo cardiomyopathy (TTC) mimics acute anterior myocardial infarction (AMI) and the differential diagnosis is challenging before coronary angiography (CA) is performed; it demonstrates reduced or absent antegrade flow in the left anterior descending artery (LAD) in AMI, whereas there is no such flow limiting in TTC. At the acute phase, we tested the usefulness of the distal LAD flow visualization by transthoracic Doppler echocardiography (TDE) to distinguish between these two diseases. For this purpose, we prospectively enrolled 28 consecutive patients with TTC (75 ± 10 years, 93% females) who were compared with 28 consecutive patients with AMI treated successfully by primary angioplasty (66 ± 12 years, 79% females). All the patients underwent the assessment of the distal LAD flow just before CA, using colour and pulsed-wave TDE. In addition, the symmetric involvement of wall motion abnormalities (WMAs) based on the extent of the disease far beyond one coronary territory in TTC was searched by TDE. Non-invasive coronary flow reserve (CFR) by TDE, in the distal LAD, was also performed within 1 day after admission.

Results Before CA, the distal LAD flow was visible in 38 of 56 cases (68%) in the whole population, in all cases with TTC and in 10 cases with AMI (36%). The sensitivity (Se) and specificity (Sp) of the LAD flow visualization for the diagnosis of TTC were 100 and 64%, respectively, with a diagnostic accuracy of 82%. In comparison, the pattern of WMA yielded a Se of 75% and Sp of 86%, and a diagnostic accuracy of 80%. With the combination of both tools, the Se and Sp to detect TTC were 75 and 96% respectively, with a diagnostic accuracy of 86%. After CA, the acute CFR was less severely impaired in the TTC group when compared with the AMI group (2.2 ± 0.5 vs. 1.7 ± 0.6, $P < 0.01$) despite a worse LV systolic dysfunction.

Conclusion Non-invasive evaluation of the distal LAD flow could be helpful to differentiate TTC from AMI, and its combination with the pattern of WMA improved slightly its diagnostic accuracy. Furthermore, the acute CFR is less severely impaired in TTC compared with AMI despite poorer LV systolic dysfunction, suggesting that other mechanisms than direct microcirculatory damage are also involved in the pathogenesis of WMAs in TTC.

Keywords Tako-tsubo • Myocardial Infarction • Coronary flow • Doppler

Introduction

The differential diagnosis between typical tako-tsubo cardiomyopathy (TTC)[1–4] and acute coronary syndrome involving the left anterior descending coronary artery (LAD) is challenging before coronary angiography (CA). However, the therapeutic implications are of paramount importance in this setting. The assessment of coronary flow velocity (CFV) and coronary flow reserve (CFR)

*Corresponding author. Tel: +33 3 44 23 62 39, Email: patrickmeimoun.md@gmail.com

The SESA- Angina Study:
Safety and Efficacy of S-Amlodipine in Angina

Dr. Jagdish S Hiremath *

Abstract

Background: Cardioprotective and vasculoprotective effects of amlodipine are the class effects attributable principally to the basic calcium channel blocking (CCB) actions of amlodipine. Amlodipine is a racemate with an equal proportion of two enantiomers S and R. S-Amlodipine is responsible for all of CCB- mediated pharmacodynamic actions of Amlodipine including anti-anginal activity. **Objective:** To evaluate the efficacy and safety of S-Amlodipine in the treatment of angina in normotensive patients. **Design:** open label, non-comparative, prospective clinical study. **Patients:** Total 23 patients (8 females and 15 males) of schemic heart disease (IHD), with history of angina pectoris and positive stress test, were enrolled. Mean age of the patients was 63.26 ± 7.49 (Mean ± SD) years. At baseline, mean systolic blood pressure was 130.87 ± 7.93 mm Hg, mean diastolic blood pressure was 81.65 ± 5.48 mm Hg and mean heart rate was 75.39 ± 8.79/ min. **Outcome measures:** Patients were evaluated for reduction in anginal attacks and improvement in exercise stress test parameters. Adverse events, clinical and biochemical parameters were monitored to evaluate safety of the product. **Results:** After 8 weeks of S-Amlodipine therapy, there was a significant (p= 0.0027) reduction in average number of attacks per 15 days from 1.17 to 0.04 (difference between means = 1.13; 95% confidence interval (CI) = 0.44 - 1.82). There was a significant relative improvement (reduction) in anginal symptoms by 93.33%. The numbers needed to treat (NNT) were 1.6 patients. After treatment with S-Amlodipine for 8 weeks, the mean exercise capacity increased significantly (p= 0.0041) from 329.62 ± 110.65 seconds to 365 ± 122.73 seconds (difference between means = 35.38; 95% CI = 12.62- 58.15). Time to 1.5 mm ST segment depression increased from the baseline of 273.84 ± 98.44 seconds to 277.21 ± 122.05 seconds and the maximum workload achieved increased from 6.93 ± 2.53 METs (Metabolic Equivalent Terms) to 7.29 ± 2.24 METs. None of the patients reported any adverse effect related to treatment with S-Amlodipine. The product was well tolerated. Blood pressure, heart rate, ECG and biochemical parameters were not affected significantly. **Conclusion:** This study shows that S-Amlodipine is effective, safe and well tolerated in the treatment of angina. Keywords: S-Amlodipine, angina

* **Dr. Jagdish S. Hiremath. DM (Cardiology), DNB (Cardiology)**
Interventional Cardiologist and Chief of Cardiology
Poona Hospital and Research Centre
27, Sadashiv Peth, Pune- 411030 INDIA

Emcure®

SCIENTIFIC PUBLICATIONS

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Up to Dec 2011

LIST OF PUBLICATIONS

AS ON DECEMBER 2011

1. **Efficacy and safety of Tenecteplase in high-risk subgroups of Indian patients with ST-segment elevation myocardial infarction.** S. S. Iyengar, T. Nair, J. S. Hiremath, U. Jadhav, V. K. Katyal, D. Kumbla, I. Sathyamurthy, R. K. Jain, M. Srinivasan, P. K. Sahoo, K. Chawla. Indian Heart J. 2011, 63(5SB), 65-68.

2. **Bioequivalence and pharmacokinetics evaluation of two formulation of Febuxostat 80 mg tablets in healthy Indian adult subjects.** Menon S., Kandari K., Kadam P. International Journal of Current Pharmaceutical Review and Research, May-June 2011, Volume 2, Issue 2, 92-100.

3. **Efficacy and tolerability of Dexketoprofen extended release tablets in osteoarthritis.** N. J. Karne, R. Khalre, S. S. Erram, M. Dave, C. M. Azhar Almas, S. K. Singh, I. Basu, A. Datta, V. Potdar, A. Agarwal. Journal of Therapeutic Advances, Jul-Sep 2011, Issue No.2, 2-5.

4. **Ferrous Ascorbate: The most bioavailable oral iron.** S. Gupte. Journal of Therapeutic Advances, Jul-Sep 2011, Issue No.2, 6-11.

5. **Hyponatremia and anti-epileptic drugs.** R. Lakshmi Narasimhan. Journal of Therapeutic Advances, Jul-Sep 2011, Issue No.2, 12-15.

6. **Rilpivirine: A novel NNRTI.** M. Kubal. Journal of Therapeutic Advances, Jul-Sep 2011, Issue No.2, 16-21.

7. **S-Etodolac: The chirally pure NSAID.** A. Babhulkar. Journal of Therapeutic Advances, Jul-Sep 2011, Issue No.2, 22-26.

8. **Efficacy and safety of Tenecteplase in Indian elderly STEMI patients from the Elaxim registry.** I. Sathyamurthy, C.G. Bahuleyan, Arun Srinivas, Milind Gadkari, Soumitra Kumar, G. Ratnaparkhi, Uday Mahurkar. Indian Heart Journal, 2011, 63, 234-236.

9. **A concise synthesis of two β-adrenergic blocking agents in high stereoselectivity using readily available chiral building block (2S, 2'S, 2''S)-Tris-(2, 3-epoxypropyl)-isocyanurate (S-TGT).** Swapnil Sonawane, Gulabrao D. Patil, Mukund K.Gurjar. Organic Process Research & Development, 2011, 15(6), 1365-1370.

10. **Bioequivalence study of chirally pure S-Metoprolol IR 50 mg tablet: A randomized, open label, single dose, crossover study in healthy adult Indian subjects.** Menon. S, Khairnar B, Palekar A, Kandari K, Joshi N. International Journal of Current Pharmaceutical Research, 2011, Volume 3, Issue 3, 33-35.

11. **A randomized, crossover study to determine bioequivalence of Eslicarbazepine acetate in healthy Indian subjects.** Menon S., Palekar A., Mhatre M. International Journal of Current Pharmaceutical Research, 2011, Volume 3, Issue 3, 81-84.

12. **Why am I so tired?** Anon. Emcurean, April-June 2011, Volume 17, 4-5.

13. **Efficacy & safety of tenecteplase in diabetic patients with ST-elevation myocardial infarction.** S.S. Iyengar, T. Nair, J.S. Hiremath, U. Jadhav, V.K. Katyal, D. Kumbla, I. Sathyamurthy, R.K. Jain, M. Srinivasan. Journal of Therapeutic Advances, April-June 2011, Issue 1, 2-9.

14. **Efficacy and tolerability of two chirally pure NSAIDs in combination with paracetamol: results of two multi-centric, randomized, parallel-group studies in Indian patients.** N. Karne, I. Basu, N.K. Dhanwala, C.M. Azhar Almas, R. Khaire, A. Datta, P.Shirure. Journal of Therapeutic Advances, April-June 2011, Issue 1, 10-15.

15. **Pharmacoinvasive strategy in the treatment of STEMI.** T. Nair. Journal of Therapeutic Advances, April-June 2011, Issue 1, 16-21.

16. **Pleiotropic effects of Sevelamer in chronic kidney disease.** S. Varughese. Journal of Therapeutic Advances, April-June 2011, Issue 1, 22-25.

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 SEPTEMBER 17, 2009 VOL. 361 NO. 12

Dabigatran versus Warfarin in Patients with Atrial Fibrillation

Stuart J. Connolly, M.D., Michael D. Ezekowitz, M.B., Ch.B., D.Phil., Salim Yusuf, F.R.C.P.C., D.Phil., John Eikelboom, M.D., Jonas Oldgren, M.D., Ph.D., Amit Parekh, M.D., Janice Pogue, M.Sc., Paul A. Reilly, Ph.D., Ellison Themeles, B.A., Jeanne Varrone, M.D., Susan Wang, Ph.D., Marco Alings, M.D., Ph.D., Denis Xavier, M.D., Jun Zhu, M.D., Rafael Diaz, M.D., Basil S. Lewis, M.D., Harald Darius, M.D., Hans-Christoph Diener, M.D., Ph.D., Campbell D. Joyner, M.D., Lars Wallentin, M.D., Ph.D., and the RE-LY Steering Committee and Investigators

ABSTRACT

BACKGROUND

Warfarin reduces the risk of stroke in patients with atrial fibrillation but increases the risk of hemorrhage and is difficult to use. Dabigatran is a new oral direct thrombin inhibitor.

METHODS

In this noninferiority trial, we randomly assigned 18,113 patients who had atrial fibrillation and a risk of stroke to receive, in a blinded fashion, fixed doses of dabigatran — 110 mg or 150 mg twice daily — or, in an unblinded fashion, adjusted-dose warfarin. The median duration of the follow-up period was 2.0 years. The primary outcome was stroke or systemic embolism.

RESULTS

Rates of the primary outcome were 1.69% per year in the warfarin group, as compared with 1.53% per year in the group that received 110 mg of dabigatran (relative risk with dabigatran, 0.91; 95% confidence interval [CI], 0.74 to 1.11; P<0.001 for noninferiority) and 1.11% per year in the group that received 150 mg of dabigatran (relative risk, 0.66; 95% CI, 0.53 to 0.82; P<0.001 for superiority). The rate of major bleeding was 3.36% per year in the warfarin group, as compared with 2.71% per year in the group receiving 110 mg of dabigatran (P=0.003) and 3.11% per year in the group receiving 150 mg of dabigatran (P=0.31). The rate of hemorrhagic stroke was 0.38% per year in the warfarin group, as compared with 0.12% per year with 110 mg of dabigatran (P<0.001) and 0.10% per year with 150 mg of dabigatran (P<0.001). The mortality rate was 4.13% per year in the warfarin group, as compared with 3.75% per year with 110 mg of dabigatran (P=0.13) and 3.64% per year with 150 mg of dabigatran (P=0.051).

CONCLUSIONS

In patients with atrial fibrillation, dabigatran given at a dose of 110 mg was associated with rates of stroke and systemic embolism that were similar to those associated with warfarin, as well as lower rates of major hemorrhage. Dabigatran administered at a dose of 150 mg, as compared with warfarin, was associated with lower rates of stroke and systemic embolism but similar rates of major hemorrhage. (ClinicalTrials.gov number, NCT00262600.)

From the Population Health Research Institute, McMaster University and Hamilton Health Sciences, Hamilton, ON, Canada (S.J.C., S.Y., J.E., J.P., E.T.); Lankenau Institute for Medical Research and the Heart Center, Wynnewood, PA (M.D.E., A.P.); Uppsala Clinical Research Center, Uppsala, Sweden (J.O., L.W.); Boehringer Ingelheim Pharmaceuticals, Ridgefield, CT (P.A.R., J.V., S.W.); Working Group on Cardiovascular Research the Netherlands, Utrecht, the Netherlands (M.A.); St. John's National Academy of Health Sciences, Bangalore, India (D.X.); FuWai Hospital, Beijing (J.Z.); Estudios Clinicos Latinoamérica, Rosario, Argentina (R.D.); Lady Davis Carmel Medical Center, Haifa, Israel (B.S.L.); Vivantes Klinikum Neukölln, Berlin (H.D.); University Duisburg-Essen, Essen, Germany (H.-C.D.); and Sunnybrook Health Sciences Centre, Toronto (C.D.J.). Address reprint requests to Dr. Connolly at the Population Health Research Institute, 237 Barton St. E., Hamilton, ON L8L 2X2, Canada, or at connolsj@phri.ca.

*Members of the Randomized Evaluation of Long-Term Anticoagulation Therapy (RE-LY) Study Group are listed in the Appendix and the Supplementary Appendix, available with the full text of this article at NEJM.org.

Drs. Connolly, Ezekowitz, Yusuf, and Wallentin contributed equally to this article.

This article (10.1056/NEJMoa0905561) was published on August 30, 2009, and updated on September 16, 2009, at NEJM.org.

N Engl J Med 2009;361:1139-51.

hemorrhage; the 150-mg dose of dabigatran was associated with lower rates of stroke and systemic embolism but with a similar rate of major hemorrhage.

Supported by a grant from Boehringer Ingelheim.

Dr. Connolly reports receiving consulting fees, lecture fees, and grant support from Boehringer Ingelheim; Dr. Ezekowitz, consulting fees, lecture fees, and grant support from Boehringer Ingelheim and Aryx Therapeutics, consulting fees from Sanofi-Aventis, and lecture fees and grant support from Portola Pharmaceuticals; Dr. Yusuf, consulting fees, lecture fees and grant support from Boehringer Ingelheim and consulting fees from AstraZeneca, Bristol-Myers Squibb, and Sanofi-Aventis; Dr. Eikelboom, consulting fees, lecture fees, and grant support from Boehringer Ingelheim, AstraZeneca, Sanofi-Aventis, and GlaxoSmithKline, consulting fees and lecture fees from Eisai Pharmaceuticals, Eli Lilly, and McNeil, and consulting fees from Bristol-Myers Squibb, Corgenix Medical Corporation, and Daiichi-Sankyo; Dr. Oldgren, consulting fees, lecture fees, and grant support from Boehringer Ingelheim and lecture fees from AstraZeneca; and Drs. Parekh and Xavier, grant support from Boehringer Ingelheim. Drs. Reilly, Varrone, and Wang report being employees of Boehringer Ingelheim. Drs. Alings and Zhu report receiving consulting fees and grant support from Boehringer Ingelheim; Dr. Diaz, consulting fees from GlaxoSmithKline, lecture fees from Sanofi-Aventis, GlaxoSmithKline, and Boehringer Ingelheim, and grant support from Boehringer Ingelheim; Dr. Lewis, consulting fees from Sanofi-Aventis, Bristol-Myers Squibb, and Boehringer Ingelheim and grant support from Boehringer Ingelheim; Dr. Darius, consulting fees, lecture fees, and grant support from Boehringer Ingelheim, consulting fees from Sanofi-Aventis and Bayer Schering Pharma, and lecture fees from the Medicines Company and Eli Lilly; Dr. Diener, consulting fees and lecture fees from Boehringer Ingelheim, Abbott, AstraZeneca, Bayer, Bristol-Myers Squibb, CoAxia, D-Pharm, Fresenius, GlaxoSmithKline, Janssen Cilag, Merck Sharp and Dohme, MindFrame, Neurobiological Technologies, Novartis, Novo-Nordisk, Paion, Parke-Davis, Pfizer, Sanofi-Aventis, Sankyo, Servier, Solvay, Thrombogenics, Wyeth and Yamaguchi and grant support from Boehringer Ingelheim, AstraZeneca, GlaxoSmithKline, Novartis, Janssen-Cilag, and Sanofi-Aventis; Dr. Joyner, grant support from Boehringer Ingelheim, AstraZeneca, Sanofi-Aventis, and Bristol-Myers Squibb; and Dr. Wallentin, consulting fees, lecture fees, and grant support from Boehringer Ingelheim, consulting fees from Regado and Athera, lecture fees from Boehringer Ingelheim, AstraZeneca, and Eli Lilly, and grant support from AstraZeneca, Bristol-Myers Squibb, GlaxoSmithKline, and Schering Plough. No other potential conflict of interest relevant to this article was reported.

APPENDIX

Members of the Randomized Evaluation of Long-Term Anticoagulation Therapy (RE-LY) Study Group are as follows (a full list of investigators is included in the Supplementary Appendix): **Operations Committee:** S.J. Connolly (principal investigator), M.D. Ezekowitz (principal investigator), S. Yusuf (chair, steering committee), J. Eikelboom, J. Oldgren, A. Parekh, P.A. Reilly, E. Themeles, J. Varrone, S. Wang, E. Palmerantz-Graf, M. Haehl, L. Wallentin (chair, steering committee). **Steering Committee:** A.M.W. Alings, J.V. Amerena, A. Avezum, J. Baumgartner, J. Brugada, A. Budaj, V. Caicedo, L. Ceremuzynski, J.H. Chen, P.J. Commerford, S.J. Connolly, A.L. Dans, H. Darius, G. Di Pasquale, R. Diaz, C. Erol, M.D. Ezekowitz, J. Ferreira, G.C. Flaker, M.D. Flather, M.G. Franzosi, R. Gamboa, S.P. Golitsyn, J.A. Gonzalez Hermosillo, D. Halon, H. Heidbuchel, S.H. Hohnloser, M. Hori, K. Huber, P. Jansky, G. Kamensky, M. Keltai, S. Kim, C.P. Lau, J.Y.F. Le Heuzey, B.S. Lewis, L.S. Liu, J. Nanas, J. Oldgren, P.S. Pais, A.N. Parkhomenko, K.E. Pedersen, L.S. Piegas, D. Raev, O. Razali, T.A. Simmers, P.J. Smith, M. Talajic, R.S. Tan, S. Tanomsup, L. Toivonen, D. Vinereanu, L. Wallentin, D. Xavier, S. Yusuf, J. Zhu. **Core Adjudication–Stroke Advisory Committee:** H.C. Diener (cochair), C.D. Joyner (cochair), A. Diehl, G. Ford, M. Robinson (core adjudication only), J. Silva. **Data Safety Monitoring Board:** P. Sleight (cochair), D.G. Wyse (cochair), J. Collier, D. De Mets, J. Hirsh, E. Lesaffre, L. Ryden, P. Sandercock. Investigators who recruited at least 12 patients: *Argentina:* A. Caccavo, L. Cartasegna, C.A. Cuneo, M.V. Elizari, A.J. Gabito, M.A. Hominal, A.D. Hrabar, L.J. Mackinnon, M.A. Rodriguez, A.S. Sanchez, D.R. Vogel; *Australia:* D.M. Colquhoun, R.G. Lehman, B.B. Singh, J.H. Waites; *Austria:* F. Gazo, A. Podczeck, P. Siostrzonek; *Belgium:* J.L. Boland, A. de Meester, L. De Wolf, D. Dilling-Boer, M. Goethals, P. Goethals, O. Gurne, S. Hellemans, B. Ivan, M. Jottrand, I. Kersschot, F. Provenier, W. van Mieghem, Y. Vandekerckhove; *Brazil:* J.C.F. Braga, J.F. Kerr Saraiva, A.M. Lorga-Filho, L.N. Maia, C.S. Melo, D.B. Precoma, S. Rassi, P.R. Rossi; *Bulgaria:* E.S. Baldjiev, I.G. Filibev, N.N. Gotcheva, A.R. Gouder, D.T. Guenova, E.I. Manov, A.L. Radoslavov, D.A. Spirova, V.M. Tsanova, M.L. Tzekova; *Canada:* A.I. Bakbak, J.C. Berlingieri, K. Blackburn, A.W. Booth, S. Bose, P. Boucher, C. Constance, P. Costi, B. Coutu, M.S. Green, J. Habot, S. Kouz, A.V. Lalani, A.S. Lam, P.T.S. Ma, L.B. Mitchell, C.A. Morillo, G. O'Hara, A.S. Pandey, Y. Pesant, C.N. Powell, T.M. Rebane, D. Savard, S. Schulman, M.J. Schl, D. Shu, L.D. Sterns, R. St-Hilaire, G.S. Syan, P. Talbot, I. Teitelbaum, S.A. Vizel; *China:* X.J. Bai, W. Gao, Z.S. He, Q. Hua, L. Li, W.M. Li, G.P. Lu, S. Lv, N.L. Sun, N.F. Wang, Y.M. Yang, F. Zhang, L. Zhang; *Czech Republic:* J. Belohlavek, M. Cernohous, M. Choura, V. Dedek, B. Filipensky, K. Kovarova, Z. Poizlopova, H. Skalicka, J. Spinar; *Denmark:* K.K. Dodt, K. Egstrup, S. Husted, K.K. Klarlund, S. Lind Rasmussen, T.M. Melchior, M.E. Olsen, N. Ralfkiaer, L.H. Rasmussen, K. Skagen; *Finland:* K.E. Airaksinen, H.V. Huikuri, M. Mänttäri, J.H. Melin, K. Peuhkurinen, V.K. Virtanen, A. Ylitalo; *France:* L. Boucher, A. Boye, P. Igigabel, C. Magnani, M. Martelet, J.E. Poulard; *Germany:* K.F. Appel, C.E.H. Dempfle, A. Dormann, J. Harenberg, W.L. Haverkamp, T. Horacek, D. Koudonas, J. Kreuzer, A. Müegge, T.F. Munzel, P.B. Salbach, W. Schoels, R. Veltkamp, E. Von Hodenberg; *Greece:* M.I. Anastasiou-Nana, K. Karamitsos, C. Lappas, A. Manolis; *Hong Kong (China):* W.K. Chan, H.F. Tse, P.T. Tsui, C.M. Yu; *Hungary:* A. Jánosi, A. Kadar, P. Karpati, K. Keltai, J. Rapi, L.I. Rejtos, I. Szakal; *India:* R.K. Aggarwal, A. Bharani, J.S. Bhuvaneswaran, R.B. Byrapaneni, J.B. Gupta, K.K. Haridas, J. Hiremath, A.S. Jain, J. Joseph, A.M. Naik, R.B. Panwar, J.P.S. Sawhney, N. Sinha, A. Srinivas, P.S. Vadagenalli; *Israel:* J. Benhorin, N.M. Bornstein, B. Brenner, A. Butnaru, A. Caspi, M. Elias, E. Grossman, S. Hamoud, R. Ilia, E.I. Klainman, M. Lishner, C. Lotan, A. Marmor, M. Motro, L.H. Reisen, E. Schwammenthal, M. Shochat, B. Strasberg, Y. Turgeman, A.T. Weiss, D.H. Wexler, R. Wolff, D. Zeltser, R. Zimlichman; *Italy:* G. Argiolas, M. Barbiero, A. Fraticelli, M. Mennuni, L. Moretti, L. Mos, S. Pirelli; *Japan:* J. Puroya, S. Hara, M. Hiroe, S. Kakinoki, N. Miyamoto, M. Yokuchi; *Malaysia:* K.H. Chee, A.F.Y. Fong, O. Ismail, S. Jeyaindran; *Mexico:* J. Carrillo, P.A. Fernandez Bonetti; *the Netherlands:* C.L. Bartels, T.A. Bruning, R. Ciampricotti, L. Cozijnsen, H.J. Crijns, M.C.G. Daniels, D.E.P. de Waard, F.R. den Hartog, W.F. Heesen, P.A. Hoogslag, A. Huizenga, J.A. Kragten, G.C. Linssen, D.J. Lok, H.R. Michels, J. Plomp, L. Pos, P.G. Postema, R. Salomonsz, I. Stoel, J.G. Tans, H.J. Thijssen, A.J.M. Timmermans, H.A. van de Klippe, C. van der Zwaan, I.C. van Gelder, L.H. van Kempen, H.A. van Kesteren, P. van Rossum; *Norway:* O. Breder, P.A. Sirnes, A. Tveit; *Peru:* W. Cabrera, J.M. Heredia, M.E. Horna, P.M. Salazar; *Philippines:* M.T.B. Abola, J.C. Anonuevo, D.D. Morales, G.G. Rogelio, A.A. Roxas, Jr.; *Poland:* B. Bacior, J. Grodecki, Z.F. Kalarus, P. Miekus, F. Monies, J. Rekosz, M. Szpajer, A. Wasilewska-Piepiorka, B. Zaborska; *Portugal:* L. Cunha, L.A. Providencia; *Romania:* M.A. Cinteza; *Russia:* I.G. Gordeev, A.Y. Ivleva, T.N. Novikova, E.P. Panchenko, E.V. Shlyakhto, S.B. Shustov, B.A. Sidorenko, V. Sulimov, A.L. Syrkin, D.A. Zateyshchikov; *Singapore:* D. Foo; *Slovak Republic:* V. Bugan, J. Dúbrava, G. Kaliska, M. Masirovicova, D. Pella, J. Sedlak, R. Uhliar; *South Africa:* J.M. Engelbrecht, D. Jankelow,

Merck Serono

Moving science, transforming lives

MERCK SERONO

25 Years of Bisoprolol : A Reappraisal

Dr. Jagdish Hiremath, DM (Cardio.), DNB (Cardio.)
Interventional Cardiologist,
Director, CCU and Cath. Lab., Ruby Hall Clinic,
Chief of Cardiology, Poona Hospital and Research Center, Pune

1) **Could you please comment on the usefulness of bisoprolol in 24-h blood pressure control?**

24-h blood pressure control is an important aspect of hypertension management. Mortality, morbidity and other outcomes depend crucially on this parameter. In this context, the longer half-life of bisoprolol ushers in the specific advantage of a truly once-a-day anti-hypertensive. Furthermore, bisoprolol also achieves a good blood pressure control. I use it as a number one β-blocker.

2) **How does the anti-hypertensive efficacy of bisoprolol compare with less-selective β-blockers such as metoprolol and atenolol?**

Non-selective agents cannot stand in comparison with bisoprolol. The entire advantage of β-blockers in hypertension management lies in β_1-selectivity. Therefore, bisoprolol being a selective β_1-blocker has a better and stronger anti-hypertensive effect. Furthermore, the longer half-life, zero sympathetic activity, and lesser chances of causing side-effects such as bronchospasm makes it a better drug. I use bisoprolol also in peri-operative patients and patients with heart failure.

3) **Could you please share with us your experience with bisoprolol and amlodipine combination in the management of hypertension and in patients with a risk of coronary artery disease?**

In these set of patients, bisoprolol and amlodipine is a wonderful combination. Both these drugs have excellent anti-anginal action and offer excellent hypertension control. With these agents, we are offering a nearly ideal combination to patients with coronary artery disease.

4) **Could you tell us the place of bisoprolol and diuretic combinations in the management of hypertension in today's context?**

The combination of bisoprolol with a diuretic is not only additive but also synergistic. This synergism scores over other combinations which are additive and not synergistic.

Director
VRT's Maharashtra Institute of
Preventive Cardiology &
Research Center

MIPC

TRUE COPY

Journal of Therapeutic Advances

Apr-Jun, 2012 Issue No. 5

Review Article

Importance of ambulatory blood pressure monitoring (ABPM)

J.S. Hiremath[1], D. Duggal[1]

[1]Ruby Hall Clinic, Pune.

Correspondence: Dr. J.S. Hiremath. Interventional cardiologist, Director- CCU and Cath-lab, Ruby Hall Clinic, Pune – 411001; Email: drjagdishhiremath@gmail.com

Abstract

There is increasing evidence that the traditional office BP measurement may not always yield estimate of a patient's true BP. Ambulatory blood pressure monitoring (ABPM) has been shown to be a useful and noninvasive tool for round-the-clock measurement of BP outside medical environment. It has been shown to be a strong and independent predictor of cardiovascular morbidity and mortality, and is more closely associated than office measurement of BP. Use of ABPM helps in diagnosis of white coat hypertension, masked hypertension and can provide information regarding control of blood pressure with antihypertensive medication throughout 24 hours. Data derived from ABPM allow the identification of high-risk patients, independent from the BP obtained in the clinic or office setting. The recent guidelines on hypertension have recommended the use of ABPM in hypertension diagnosis and treatment.

Keywords: Ambulatory blood pressure, ABPM, hypertension

Introduction

There has been a rapid increase in the prevalence of hypertension in all ages in recent years. In addition to genetic predispositions, environmental and lifestyle factors, particularly excessive weight, seem to play important role.[1] Diagnosis of hypertension so far relied only on series of blood pressure (BP) measurement in the physician's clinic room. However, this may not always represent the actual systolic and diastolic BP during routine daily activities. It is difficult to diagnose hypertension and monitor optimal response to treatment based on office measurements of blood pressure. During last two decades, ambulatory blood pressure monitoring (ABPM) has come up as noninvasive, but powerful tool for examining the variability in blood pressure and physiological as well as environmental factors affecting blood pressure. It can provide information regarding 24 hours variations in blood pressure including nighttime BP, diurnal variation in BP or extent of BP control with an antihypertensive medication. Hence, ABPM combined with routine office BP measurements may have to play an important role in the diagnosis of hypertension and optimal control of BP.[1-4]

ABPM vs. office BP[2]

ABPM offers several advantages over conventional office measurements of BP:

1. ABPM provides a measurement of blood pressure away from medical environment.
2. ABPM provides the behaviour of blood pressure over 24 hours period rather than just one time measurement of blood pressure.
3. It may show certain patterns of blood pressure which may be relevant for the treating physician. E.g. blood pressure that does not reduce at night.
4. Recent studies have shown that ABPM is a much stronger predictor of cardiovascular morbidity and mortality than [illegible]

monitoring (ABPM)

Patients undergoing ABPM need to [illegible]

Effects of Reviparin, a Low-Molecular-Weight Heparin, on Mortality, Reinfarction, and Strokes in Patients With Acute Myocardial Infarction Presenting With ST-Segment Elevation

The CREATE Trial Group Investigators*

Context Although reperfusion therapy, aspirin, β-blockers, and angiotensin-converting enzyme inhibitors reduce mortality when used early in patients with acute myocardial infarction (MI), mortality and morbidity remain high. No antithrombotic or newer antiplatelet drug has been shown to reduce mortality in acute MI.

Objective To evaluate the effects of reviparin, a low-molecular-weight heparin, when initiated early and given for 7 days in addition to usual therapy on the primary composite outcome of death, myocardial reinfarction, or strokes at 7 and 30 days.

Design, Setting, and Patients A randomized, double-blind, placebo-controlled trial (Clinical Trial of Reviparin and Metabolic Modulation in Acute Myocardial Infarction Treatment Evaluation [CREATE]) of 15 570 patients with ST-segment elevation or new left bundle-branch block, presenting within 12 hours of symptom onset at 341 hospitals in India and China from July 2001 through July 2004.

Intervention Reviparin or placebo subcutaneously twice daily for 7 days.

Main Outcome Measure Primary composite outcome of death, myocardial reinfarction, or stroke at 7 and 30 days.

Results The primary composite outcome was significantly reduced from 854 (11.0%) of 7790 patients in the placebo group to 745 (9.6%) of 7780 in the reviparin group (hazard ratio [HR], 0.87; 95% CI, 0.79-0.96; $P=.005$). These benefits persisted at 30 days (1056 [13.6%] vs 921 [11.8%] patients; HR, 0.87; 95% CI, 0.79-0.95; $P=.001$) with significant reductions in 30-day mortality (877 [11.3%] vs 766 [9.8%]; HR, 0.87; 95% CI, 0.79-0.96; $P=.005$) and reinfarction (199 [2.6%] vs 154 [2.0%]; HR, 0.77; 95% CI, 0.62-0.95; $P=.01$), and no significant differences in strokes (64 [0.8%] vs 80 [1.0%]; $P=.19$). Reviparin treatment was significantly better when it was initiated very early after symptom onset at 7 days (<2 hours: HR, 0.70; 95% CI, 0.52-0.96; $P=.03$; 30/1000 events prevented; 2 to <4 hours: HR, 0.81; 95% CI, 0.67-0.98; $P=.03$; 21/1000 events prevented; 4 to <8 hours: HR, 0.85; 95% CI, 0.73-0.99; $P=.05$; 16/1000 events prevented; and ≥8 hours: HR, 1.06; 95% CI, 0.86-1.30; $P=.58$; $P=.04$ for trend). There was an increase in life-threatening bleeding at 7 days with reviparin and placebo (17 [0.2%] vs 7 [0.1%], respectively; $P=.07$), but the absolute excess was small (1 more per 1000) vs reductions in the primary outcome (18 fewer per 1000) or mortality (15 fewer per 1000).

Conclusions In patients with acute ST-segment elevation or new left bundle-branch block MI, reviparin reduces mortality and reinfarction, without a substantive increase in overall stroke rates. There is a small absolute excess of life-threatening bleeding but the benefits outweigh the risks.

JAMA 2005;293:427-436

www.jama.com

APPROXIMATELY 15.5 MILLION cardiovascular deaths occur every year.[1] Of these, about half are likely to be due to acute myocardial infarction (MI), with the majority occurring in low- and middle-income countries. Aspirin,[2] thrombolytic therapy,[3] β-blockers,[4] and angiotensin-converting enzyme (ACE) inhibitors[5] improve prognosis in acute MI. Primary percutaneous coronary angioplasty (PCI) offers benefits over thrombolytic therapy,[6] but access to primary PCI is limited and not affordable to the majority of patients in the world.

Combinations of newer antiplatelet regimens,[7,8] or direct thrombin inhibitors,[9,10] appear to reduce reinfarction but do not reduce mortality.[7-10] Moreover, these agents are expensive and increase bleeding. Although intravenous unfractionated heparin is commonly used after acute MI, especially in patients receiving fibrin-specific thrombolytic agents, this practice is based on a few trials that indicated modest improvements in coronary patency.[11-14] However, no reduction in mortality or reinfarction has been documented and there appears to be an increase in bleeding. In the Third International Study of Infarct Survival (ISIS-3)[15] and Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto

See also pp 437 and 489.

*Authors/Writing Committee Members and Financial Disclosure are listed at the end of this article. CREATE Trial Group Investigators are also listed at the end of this article.

Corresponding Author: Salim Yusuf, DPhil, FRCPC, Population Health Research Institute, Hamilton General Hospital and McMaster University, 237 Barton St E, Hamilton, Ontario, Canada L8L 2X2 (yusuf@mcmaster.ca).

F. Zhangfang; *Qinyuang:* X. Ma; *Ruyang:* C. Shen; *Sanhe:* Q. Li; *Shangdong:* Z. Hou; *Shanghai:* N. F. Zho, *Shangqiu:* G. Huang; *Shanxi:* P. Guo, J. Lou, Q.P. Wang, Z. Wang; *Shenyang:* X. Jiang, Z. Li, D. Tian, S. Wang, Z. D. Wu, M. G. Yang; *Shi Jiazhuang:* Z. C. Li; *Taian:* S. G. Yang; *Tangshan:* Y. Tu; *Taonan:* C. He; *Tianjin:* Y. Cao, Y. Han; *Wangdu:* J. H. Yang; *Wangrong:* S. Dong; *Wuxiang:* D. F. Li; *Xiang Cheng:* Q. F. Zhang; *Xianxian:* Z. Fan; *Xinjiang:* D. Q. An; *Xinxiang:* J. Liu; *Xiping:* G. Yang; *Xiuwu:* X. C. Xu; *Xuzhou:* Y. Xia; *Yantai:* H. Xu; *Yanzhou:* T. Wang, *Yichun:* D. Li; *Yingkou:* J. Wei; *Yongji:* P. Yang; *Yuci:* C. Y. Liu; *Zhengzhou:* S. Shang; *Zhumadian:* Y. G. Zhang; **India:** *Adoni:* J. Srinivas, B. Srinivasulu; *Ahmedabad:* S. Dani, J. Prajapati; *Alappuzha:* G. Deepak, J. F. Shallam; *Ambur:* K. J. Nesaraj; *Amritsar:* A. Kumar, R. K. Sharma; *Annamalainagar:* S. Balasubramaniyan, N. Chidambaram, R. Rani; *Bangalore:* S. Chandra, S. Dwivedi, B. Isaac, R. Kishore, B. J. Kumar, Y. Kumble, S. Mehrotra, P. R. Nayak, S. S. Ramesh, M. J. Santhosh, P. K. Shetty, K. Varghese; *Bhopal:* S. K. Trivedi; *Bikaner:* R. Beniwal, A. Kalla, R. B. Panwar; *Calicut:* K. G. Alexander, A. V. Bindu, A. Nambiar; *Chennai:* D. Barkavi, A. Kalanidhi, T. Pradeep, J. Rajesh, M. Ramesh, S. Shanmugasundaram, S. Thanikachalam; *Cochin:* K. K. Haridas, P. Kumar; *Doraha:* G. Sidhu, R. Singh; *Ernakulam:* K. N. Pradeep; *Ghaziabad:* A. Kumar, A. Mittal; *Gulbarga:* I. B. Bijapure, M. S. Rao, *Guntur:* N. G. Mohanarjun, M.B. Rao, *Hyderabad:* B. R. Babu, N. Dinesh, R. K. Jain, P. A. Jiwani, S. R. Naik, T.N.C. Padmanabhan, B. S. Raju, R. Rajaram, A. S. V. N. Rao, D. Rao, V. S. P. Rao, B. K. S. Sastry, S. Sinha, *Indore:* A. Bharani, G. Verma; *Jaipur:* R. Gupta, R. K. Tongia, S. Kalra, S. Sharma; *Jodhpur:* R. Mehrotra, S. Sanghvi, O. P. Soni, *Kolkata:* A. D. Biswas, A. K. Maity, S. K. Paul; *Kottayam:* J. Boben, G. Jacob, J. Joseph; *Lucknow:* A. Puri, V. K. Puri, H. Singh, *Ludhiana:* R. Calton, T. M. Jaison; *Meerut:* G. K. Aneja; *Mumbai:* P. G. Kerkar, P. Nyayadhish, P. J. Nathani, S. K. Rane; *Nagpur:* M. Fulwani, A. S. Jain, P. P. Joshi, A. Khan, U. K. Mahorkar, R. G. Salkar, A. Somani, R. Wadhwani, S. D. Zawar; *Nanded:* V. E. Shegokar, S. L. Tungikar; *Nashik:* V. Vijan, *New Delhi:* B. Singh, R. Trehan; *Patiala:* A. Garg, H. Singh, S. Verma; *Pune:* S. Borade, D. Duggal, J. Hiremath; *Rohtak:* Jagdish, V. K. Katyal, S. B. Siwach; *Shimoga:* H. R. Devendrappa, J. Narendra, Ratnakar; *Thrissur:* P. B. Latha, E. B. Manoj, P. P. Mohanan; *Trichy:* M. Chenniappan, P. Gandhimadhinathan, K. Jeremaiah, B. S. V. Raj, R. Udaysankar; *Udaipur:* J. K. Chhaparwal, S. K. Kaushik; *Vellore:* S. T. Chandy, O. George, B. John, *Vijayawada:* P. Ramesh, V. S. Reddy, P. Srinivas; *Vishakapatnam:* K. D. Rao, B. R Malipeddi, G. S. R. Murthy, *Wardha:* R. Joshi, S. P. Kalantri, S. Patil.

Authors/Writing Committee: Salim Yusuf, DPhil, Shamir R. Mehta, MD, MSc, Changchun Xie, PhD, Rashid J. Ahmed, BScH (Population Health Research Institute, Hamilton Health Sciences, and McMaster University, Hamilton, Ontario); Denis Xavier, MD, Prem Pais, MD (Institute of Population Health and Clinical Research, St John's National Academy of Health Sciences, Bangalore, India); Jun Zhu, MD, Lisheng Liu, MD (Cardiovascular Institute and Fu Wai Hospital, Chinese Hypertension League Institute, Beijing, China).

Financial Disclosure: Dr Yusuf has received research grants and honoraria for lectures from Knoll and Abbott Laboratories.

Funding/Support: The study had no external funding. Reviparin and placebo were donated by Abbott Laboratories.

Role of the Sponsor: Abbott Laboratories did not participate in the design and conduct of the study; in the collection, analysis, and interpretation of the data; or in the preparation, review, or approval of the manuscript.

Additional Information: Slides are available at: http://www.phri.ca.

Acknowledgment: We thank the numerous patients who volunteered to participate in this trial, Judy Lindeman, for expert secretarial assistance, and Susan Chrolavicius and Colette Easton, for organizational assistance.

REFERENCES

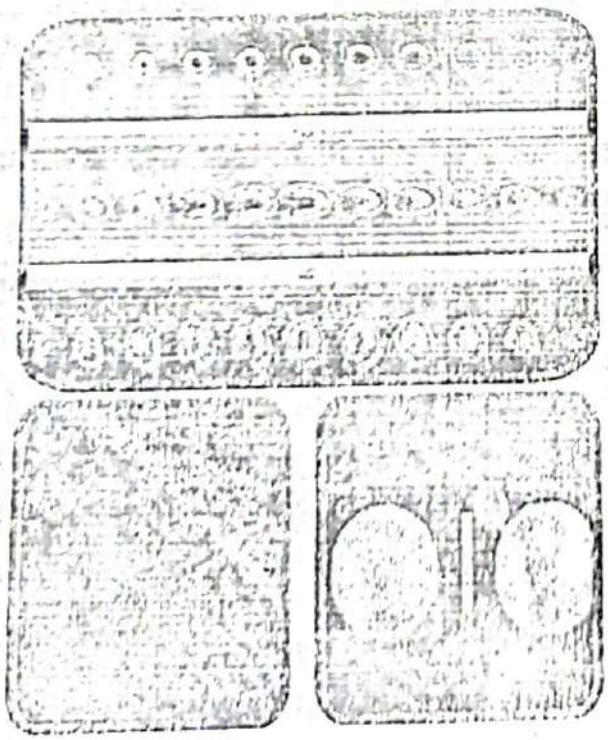
1. Yusuf S, Reddy S, Ôunpuu S, Anand S. Global burden of cardiovascular diseases, part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. *Circulation*. 2001;104:2746-2753.
2. ISIS-2 (Second International Study of Infarct Survival) Collaborative Group. Randomised trial of intravenous streptokinase, oral aspirin, both, or neither among 17,187 cases of suspected acute myocardial infarction: ISIS-2. *Lancet*. 1988;2:349-360.
3. Fibrinolytic Therapy Trialists' (FTT) Collaborative Group. Indications for fibrinolytic therapy in suspected acute myocardial infarction: collaborative overview of early mortality and major morbidity results from all randomised trials of more than 1000 patients. *Lancet*. 1994;343:311-322.
4. ISIS-1 (First International Study of Infarct Survival) Collaborative Group. Randomised trial of intravenous atenolol among 16,027 cases of suspected acute myocardial infarction: ISIS-1. *Lancet*. 1986;2:57-66.
5. ISIS-4 (Fourth International Study of Infarct Survival) Collaborative Group. ISIS-4: a randomised factorial trial assessing early oral captopril, oral mononitrate, and intravenous magnesium sulphate in 58,050 patients with suspected acute myocardial infarction. *Lancet*. 1995;345:669-685.
6. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. *Lancet*. 2003;361:13-20.
7. The GUSTO V Investigators. Reperfusion therapy for acute myocardial infarction with fibrinolytic therapy or combination reduced fibrinolytic therapy and platelet glycoprotein IIb/IIIa inhibition: the GUSTO V randomised trial. *Lancet*. 2001;357:1905-1914.
8. The Assessment of the Safety and Efficacy of a New Thrombolytic Regimen (ASSENT)-3 Investigators. Efficacy and safety of tenecteplase in combination with enoxaparin, abciximab, or unfractionated heparin: the ASSENT-3 randomised trial in acute myocardial infarction. *Lancet*. 2001;358:605-613.
9. Direct Thrombin Inhibitor Trialists' Collaborative Group. Direct thrombin inhibitors in acute coronary syndromes: principal results of a meta-analysis based on individual patients' data. *Lancet*. 2002;359:294-302.
10. The Hirulog and Early Reperfusion or Occlusion (HERO)-2 Trial Investigators. Thrombin-specific anticoagulation with bivalirudin versus heparin in patients receiving fibrinolytic therapy for acute myocardial infarction: the HERO-2 randomised trial. *Lancet*. 2001;358:1855-1863.
11. De Bono DP, Simoons ML, Tijssen J, et al. Effect of early intravenous heparin on coronary patency, infarct size and bleeding complications after altepase thrombolysis: results of a randomised double blind European Cooperative Study Group. *Br Heart J*. 1992;67:122-128.
12. Hsia J, Hamilton WP, Kleiman N, Roberts R, Chaitman BR, Ross AM. A comparison between heparin and low-dose aspirin as adjunctive therapy with tissue plasminogen activator for acute myocardial infarction. Heparin-Aspirin Reperfusion Trial (HART) Investigators. *N Engl J Med*. 1990;323:1433-1437.
13. Bleich SD, Nichols T, Schumacher R, et al. Effect of heparin on coronary arterial patency after thrombolysis with tissue plasminogen activator in acute myocardial infarction. *Am J Cardiol*. 1990;66:1412-1417.
14. Collins R, Peto R, Baigent C, Sleight P. Aspirin, heparin and fibrinolytic therapy in suspected acute myocardial infarction. *N Engl J Med*. 1997;336:847-860.
15. ISIS-3 (Third International Study of Infarct Survival) Collaborative Group. ISIS-3: a randomised comparison of streptokinase vs tissue plasminogen activator vs anistreplase and of aspirin plus heparin vs aspirin alone among 41 299 cases of suspected acute myocardial infarction. *Lancet*. 1992;339:1-18.
16. Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto Miocardico. GISSI-2: a factorial randomised trial of alteplase versus streptokinase and heparin versus no heparin among 12,490 patients with acute myocardial infarction. *Lancet*. 1990;336:65-71.
17. GUSTO Investigators. An international randomized trial comparing four thrombolytic strategies for acute myocardial infarction. *N Engl J Med*. 1993;329:673-682.
18. Yusuf S, Mehta SR, Diaz R, et al. CREATE-ECLA Investigators and Steering Committee. Challenges in the conduct of large simple trials of important generic questions in resource-poor settings: the CREATE and ECLA trial program evaluating GIK (glucose insulin and potassium) and low-molecular-weight heparin in acute myocardial infarction. *Am Heart J*. 2004;148:1068-1078.
19. Wallentin L, Goldstein P, Armstrong PW, et al. Efficacy and safety of tenecteplase in combination with the low-molecular-weight heparin enoxaparin or unfractionated heparin in the prehospital setting: the Assessment of the Safety and Efficacy of a New Thrombolytic Regimen (ASSENT)-3 PLUS randomized trial in acute myocardial infarction. *Circulation*. 2003;108:135-142.
20. The CREATE-ECLA Trial Group Investigators. Effect of glucose-insulin-potassium infusion on mortality in patients with acute ST-segment elevation myocardial infarction: the CREATE-ECLA randomized controlled trial. *JAMA*. 2005;293:437-446.
21. Mahaffey KW, Granger CB, Collins R, et al. Overview of randomized trials of intravenous heparin in patients with acute myocardial infarction treated with thrombolytic therapy. *Am J Cardiol*. 1996;77:551-556.
22. Breddin HK, Hach-Wunderle V, Nakov R, Kakkar VV; The CORTES Investigators. Effects of a low molecular weight heparin on thrombus regression and recurrent thromboembolism in patients with deep-vein thrombosis. *N Engl J Med*. 2001;344:626-631.
23. Fareed J, Jeske W, Hoppensteadt D, Clarizio R, Walenga JM. Low-molecular-weight heparins: pharmacologic profile and product differentiation. *Am J Cardiol*. 1998;82:3L-10L.
24. Low-molecular-weight heparin during instability in coronary artery disease, Fragmin during Instability in Coronary Artery Disease (FRISC) study group. *Lancet*. 1996;347:561-568.
25. Wong GC, Giugliano RP, Antman EM. Use of low-molecular-weight heparins in the management of acute coronary syndromes and percutaneous coronary intervention. *JAMA*. 2003;289:331-342.
26. Antman EM, Morrow DA, McCabe CH, et al; The EXTRACT-TIMI 25 Investigators. Enoxaparin versus unfractionated heparin as antithrombin therapy in patients receiving fibrinolysis for ST elevation MI: design and rationale for the Enoxaparin and Thrombolysis Reperfusion for Acute Myocardial Infarction Treatment Thrombolysis in Myocardial Infarction–Study 25. *Am Heart J*. In press.

F-79

Volume 63 Number 5SB September-October 2011

Indian Heart Journal

Official publication of
CARDIOLOGICAL SOCIETY OF INDIA



Pharmaco-Invasive Therapy in AMI: A Strategy

Index No.: ISSN 0019-4832

Honorary Editor
Dr. H. K. Chopra
Department of Cardiology
Moolchand Medcity, New Delhi-110025, India
E-mail: drhkchopra@yahoo.co.in

Thrombolytic Therapy in STEMI- Its Role in the Era of Intervention.

Jagdish Hiremath

Department of Cardiology, Poona Hospital & Research Centre, Pune, Maharastra

Thrombolysis, as the word indicates is dissolution of a clot. Acute myocardial infarction (STEMI) constitutes two pathological processes. One is slow growing atherosclerosis with lipid rich fibro-fatty plaque in the vessel wall and the other a soft blood clot which occludes the vessel lumen completely. The dissolution of the clot thus stands to logic as one of the treatment strategies for STEMI. In India, thrombolysis with Urokinase and Streptokinase started in the mid 80's and Streptokinase has been the most widely used thrombolytic agent for all these years[1]. Though Urokinase is not recongnised by the USA FDA for the treatment of thrombolysis, many Indian practitioners have used Urokinase with good results in their patients. When coronary angioplasty came on the scene, salvage angioplasties and pre- discharge angioplasties became popular. Then primary PTCA/stenting (PAMI) emerged as the preferred reperfusion strategy in patients with STEMI[2,3]. Many centres started offering PAMI as the treatment of choice for ST elevation MI. After the advent of pharmaco-invasive therapy, there is some shift towards IV thrombolytic therapyt (IVT). In Indian socio-economic conditions IV thrombolytic therapy continues to be the most frequently practised reperfusion strategy even today.

INDICATIONS OF IV THROMBOLYSIS

1) STEMI : less than 3 hours of chest pain and, PCI (Door to balloon time) more than 90 minutes awayu .
2) STEMI, 3 to 12 hours of chest pain and PCI not possible.
3) STEMI, more than 12 hours of onset of pain, ongoing chest pain, ST elevations, reciprocal ST changes and PCI not feasible in 90 minutes / not feasible at all[6,7].

Note:

- STEMI is diagnosed when there is more than 1mm ST↑ in at least 2 contiguous chest leads or 2 adjacent limb leads or ST↓ in V1V2V3 (True posterior MI) or presumed new onset LBBB is present
- Age is not a contraindication for IV thrombolysis.

CONTRAINDICATIONS OF IV THROMBOLYSIS

Following are the absolute contraindications to thrombolytic therapy

1) Bleeding diathesis, Gastro-intestinal ulcers and active bleeding sites.
2) Known allergy or sensitivity to agents.
3) Major head injury within 3 months.
4) Known intracranial malignant tumour, AV malformation.
5) Any prior intracranial hemorrhage.
6) Any neuro surgery in the past.
7) Ischemic cerebro-vascular accident within the past 3 months (except for acute stroke within 3 hours).
8) Suspected aortic dissection

Note:

Pregnancy (one would rarely require IVT) is not an absolute contraindication.

PROTOCOLS TO BE FOLLOWED FOR IVT

All patients should receive loading dose of aspirinx and if age is <75 years, loading dose of clopidogrel. Unfractionated heparin . should be administered for 24-48 hours or low molecular weight heparin or fondaparinux should be administered for maximum 8 days(or the index period of hospitalization) as adjunctive therapy.

1) STK (Streptokinase) : 150000 units of STK as IV infusion over 60 minutes.
   Note : Avoid reuse of STK .
2) UK (Urokinase) : 20000 units / kg IV infusion over 30 min
3) TPA (Tissue Plasmogen Activator): 100 mg infused in 90 minutes.
4) TNK (Tenectaplase): 30 to 50 mg IV bolus.(weight adjusted)
5) RTP (Reteplase) : 10 units 2 boluses IV, 30 minutes apart.

Note :

- *One may avoid using loading dose of Clopidogrel and decide on loading dose of Prasugrel after angiography.*

CRITERIA OF SUCCESSFUL THROMBOLYSIS

1) Relief of chest pain.
2) More than 50% resolution of ST segments.
3) Occurrence of accelerated idioventricular rhythm (AIVR).
4) Hemodynamic stability.

Correspondence: Dr. Jagdish Hiremath, Department of Cardiology, Poona Hospital & Research Centre, 27, Sadashiv Peth, Pune-411030, Maharastra, India E-mail: drjagdishhiremath@gmail.com

UNISEARCH

european CME·CPD academy

HYPERTENSION & BEYOND

ARB UPDATE 2011

A Scientific Update from UNISEARCH the makers of OLSAR

'All in the family'—familial dyslipidaemia in clinical practice

Dr Hiremath Jagdish S, MBBS, DM, DNB (Cardiology), is an interventional cardiologist practicing in Pune, India. He received his training in angioplasty in Melbourne, Australia. He runs a lifestyle modification course for ischaemic heart disease patients. He delivers over 150 lectures in a year on various topics.

Dr Hiremath began the session on familial dyslipidaemia by highlighting the burden of dyslipidaemia in India. Approximately 38% of men and 23% women have increased total cholesterol level, 64% men and 34% women have reduced high-density lipoproteins. High prevalence of hypertriglyceridaemia and hypercholesterolaemia is present in patients aged between 31 and 40 years.

Familial dyslipidaemia can either be primary or secondary; classification is detailed in Figure 7.

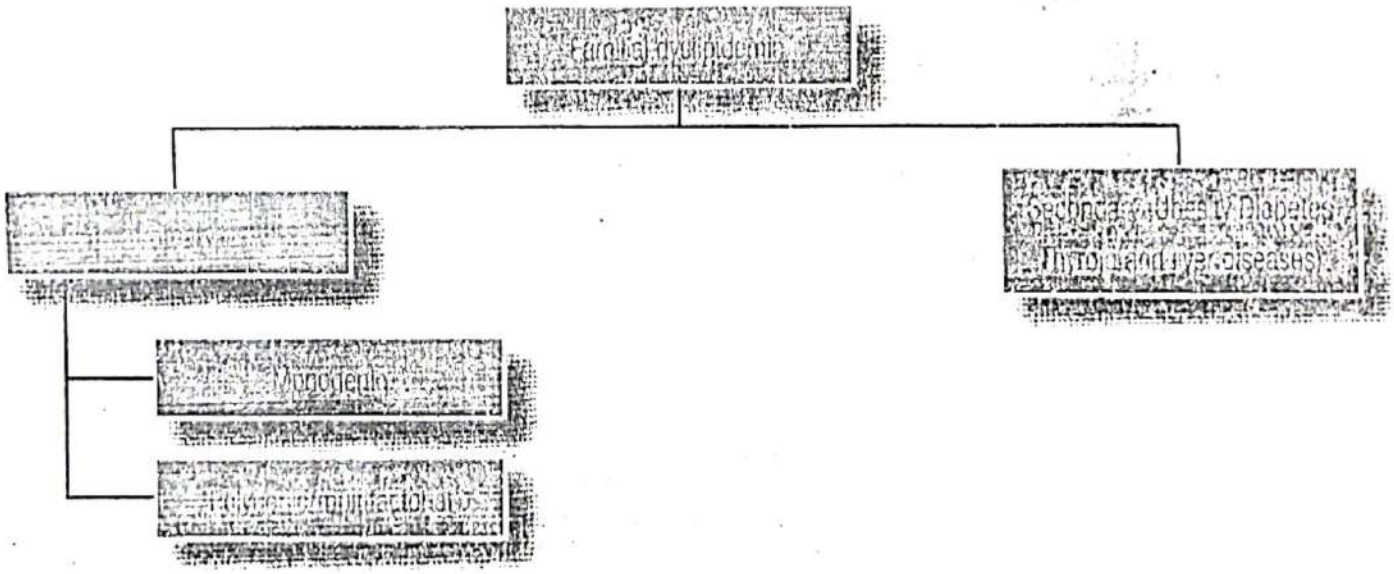


Figure 7. Classification of familial dyslipidaemia.

The most common forms of familial dyslipidaemia include familial hypercholesterolaemia (FH), familial hypertriglycerdaemia (FHTG), familial abetalipoproteinaemia and familial-combined hyperlipidaemia (FCHL).

Physical signs of familial dyslipidaemia include:

- Arcus juvenilis
- Tuberous xanthoma
- Eruptive xanthoma
- Xanthines mass

Echocardiographic Algorithm for Cardiac Resynchronization

Dr. J. S. Hiremath.
Dm (Cardiology), DNB (Cardiology)
Chief of cardiology, Poona Hospital
Director – Cath Lab, Ruby Hall Clinic, Pune, India

Mailing Address:
Pooña Hospital & Research Centre
27, Sadashiv Peth
Pune – 411030
Tel No. Clinic: 020 - 24336444

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Efficacy and Safety of Tenecteplase in Diabetic and Non-Diabetic Patients of STEMI

Authors:

Dr. I. Sathyamurthy
Director–Department of Cardiology, Apollo Hospitals Chennai
No. 21, Greams Lane, Off. Greams Road
Chennai – 600 006

Dr. K. N. Srinivasan
Department of Cardiology, Apollo Hospitals Chennai
No. 21, Greams Lane, Off. Greams Road
Chennai – 600 006

Dr. K. Jayanthi
Department of Cardiology, Apollo Hospitals Chennai
No. 21, Greams Lane, Off. Greams Road
Chennai – 600 006

Dr. S. S. Iyengar
Professor and Head, Department of Cardiology
St. Johns Medical College and Hospital
Bangalore- 560 034

Dr. Jagdish S. Hiremath
Interventional Cardiologist and Chief of Cardiology
Poona Hospital and Research Centre, 27, Sadashiv Peth
Pune- 411 030

Dr. Dayanand Kumbla
Interventional Cardiologist
Jay Anand Hospital and ICCU
Mild Red Apt, Opp Dagdi School No. 2
Charai, Thane (W)- 400 602

Dr. Binu Ramesh
Chief Consultant Cardiologist
Upasana Hospital
Kollam- 691 001

Dr. Deepak Namjoshi
Director, Criticare Hospital
39 , JVPD Scheme Main Road, Gulmohar Road Juhu
Mumbai- 400 049

Corresponding Author:
Dr. I. Sathyamurthy, Director–Department of Cardiology, Apollo Hospitals Chennai, No. 21, Greams Lane, Off. Greams Road, Chennai – 600 006
Phone: + 91-44-28296548 /2829 3333.
Email: drisapollo@gmail.com

Total number of pages: 18; **Total number of tables:** 6; **Total number of figures:** 0

Efficacy and safety of Tenecteplase in Indian STEMI patients

Elaxim Study Group[1]

Abstract

This open-label, clinical, multicentric study examined efficacy and safety of weight-adjusted bolus administration of Tenecteplase in thrombolytic management of ST elevation Myocardial Infarction (STEMI) in 70 Indian patients presenting within six hours of symptom onset and satisfying all inclusion and exclusion criteria. Reperfusion as indicated by any one of the three criteria (≥50% ST resolution at 90 min, reperfusion arrhythmia, 90 min to baseline ratio >4 in cardiac enzymes) was observed in 85.71% patients. Minor bleeding was seen in 7 patients. Angiographic evaluation (n= 47) showed TIMI 2/3 flow of infarct related artery (IRA) in 85.1% patients. All patients survived 30 days. Tenecteplase was found to be safe and effective in thrombolytic treatment of STEMI in Indian patients.

Key words: STEMI, Tenecteplase

Running title: Tenecteplase for thrombolysis in Indian STEMI patients.

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

[1] Elaxim Study Group: Dr. P.K Grant, Ruby Hall Clinic, Pune ; Dr. A.K. Thakur , Heart Hospital, Patna; Dr. Anil Katdare, B. J. Medical College & Sassoon Hospital, Pune; [redacted] Research Centre, Pune; Dr. Lekha Pathak, Heart Clinic, Mumbai; Dr. S. Jalal, Sher-I-Kashmir Institute of Medical Sciences, Srinagar; Dr. Arvind Pandit, Kotbagi Hospital, Pune; Dr.Upendra Kaul, Fortis Hospital, NOIDA; Dr. Dhiman Kahali, B.M. Birla Heart Research Institute, Kolkata; Dr. R. R. Kasliwal, Escorts Heart Institute and Research, New Delhi; Dr. Ajay Mahajan, Lokmanya Tilak Medical College and Hospital, Sion, Mumbai; Dr. Arun Srinivas, Vikram Hospital and Heart Centre, Mysore.

BLOOD PRESSURE

For the Advancement of Hypertension Research

Endorsed by the European Society of Hypertension

Reprinted from

Blood Pressure Dec 2011, Vol. 20, No. S2: 5–12.

Effect of fixed dose combinations of metoprolol and amlodipine in essential hypertension: MARS – A randomized controlled trial

Padmini Devi, Denis Xavier, Alben Sigamani, Sudhanshu Pandey, Tinku Thomas, Sreenivas Murthy, Kamal Sharma, Balraj Bosco, Ketan Mehta, Sindhu Joshi, Rajeev Gupta, Girija Singh, Jagadish Hiremath, Chadha Ds Ashokan Nambiar & Prem Pais

Blood Pressure, 2011; 00: 1–8

informa
healthcare

ORIGINAL ARTICLE

Effect of fixed dose combinations of metoprolol and amlodipine in essential hypertension: MARS – A randomized controlled trial

PADMINI DEVI[1,2], DENIS XAVIER[1,2], ALBEN SIGAMANI[1,2], SUDHANSHU PANDEY[3], TINKU THOMAS[4], SREENIVAS MURTHY[5], KAMAL SHARMA[6], BALRAJ BOSCO[7], KETAN MEHTA[8], SINDHU JOSHI[9], RAJEEV GUPTA[10], GIRIJA SINGH[11], JAGADISH HIREMATH[12], CHADHA DS[13], ASHOKAN NAMBIAR[14] & PREM PAIS[2,11]

[1]*Department of Pharmacology, St John's Medical College, Bangalore, India,* [2]*Division of Clinical Trials, St John's Research Institute, Bangalore, India,* [3]*AstraZeneca, Bangalore, India,* [4]*Epidemiology and Biostatistics Unit, St John's Research Institute, Bangalore, India,* [5]*Life Care Clinic, Bangalore, India,* [6]*Life Care Hospital, Ahmedabad, India,* [7]*Trichy Diabetes Specialty Centre (P) Ltd, Trichy, Tamil Nadu, India,* [8]*Health Harmony Hospital, Mumbai, India,* [9]*Department of Medicine, Mahavir Jain Hosptial, Hyderabad, India,* [10]*Fortis Escorts Hospital, Jaipur, India,* [11]*Department of Medicine, St John's Medical College Bangalore, India,* [12]*Poona Hospital, Pune, India,* [13]*Department of Cardiology, Command Hospital, Bangalore, India,* [14]*Department of Cardiology, Baby Memorial Hospital, Calicut, India*

Abstract

Aim. To compare two strengths of a fixed drug combination (FDC) containing metoprolol XL and amlodipine (metoprolol/amlodipine 50/5; and metoprolol/amlodipine 25/2.5) with its components in hypertension. *Methods.* We conducted this multicentre, randomized, open-label, trial in Indian patients with hypertension (140–180 mmHg/90–114 mmHg) in 11 centres from nine cities. Eligible patients ($n = 402$) were randomized into one of five treatment groups (metoprolol XL 50 mg + amlodipine 5 mg, metoprolol XL 25 mg + amlodipine 2.5 mg, metoprolol XL 50 mg, metoprolol XL 25 mg or amlodipine 5 mg) and treated for 8 weeks with five follow-up visits to record blood pressure (BP) and clinical status. *Results.* At baseline, treatment groups were well balanced; mean ± SD BP was 154.87 ± 11.91/96.63 ± 6.97 mmHg. The greatest reduction in BP from baseline to 8 weeks was seen in the high-dose FDC group (23.61/14.91 mmHg; $p < 0.001$). The remaining 4 groups too demonstrated a significant reduction ($p < 0.001$): low-dose FDC – 22.29/ – 14.66; metoprolol 50, – 23.17/ – 13.37; metoprolol 25, – 18.41/ – 12.50 and amlodipine 5, – 23.01/ – 13.08. BP reductions by FDCs, however, were not statistically superior to monotherapies. Responder rates (sitting diastolic BP < 90 mmHg or reduction ≥ 10 mmHg) were 93% in the high-dose FDC group and 97% in the low-dose FDC group, and control rates (sitting BP < 140/90 mmHg) were 66% and 58%, respectively. These rates were higher than that seen in individual components. There were no reports of serious adverse events related to study medications. One each from the low-dose FDC and metoprolol 25 mg group discontinued because of adverse events. *Conclusions.* FDCs of metoprolol and amlodipine are effective and safe in mild to moderate hypertension.

Keywords: *Amlodipine, fixed dose combination, hypertension, metoprolol*

Introduction

Hypertension is a major risk factor for cardiovascular and renal diseases. Untreated hypertension can reduce life expectancy by approximately 5 years (1). Despite the importance of treating high blood pressure (BP) to reduce cardiovascular complications, most patients do not achieve the target blood pressure. The seventh Joint National Committee on prevention, detection, evaluation and treatment of high BP (JNC 7) recommends appropriate treatment of hypertension and to consider combination therapy to achieve and maintain the goal BP (2). TheAntihypertensive and Lipid Lowering to prevent Heart Attack Trial

Correspondence: Denis Xavier, Professor and Head, Department of Pharmacology, St John's Medical College, and Co-ordinator, Division of Clinical Trials, St John's Research Institute, St John's National Academy of Health Sciences, Bangalore 560 034, India. Tel. + 91-80-25526382, 25523416. Fax: + 91-80-25632382, 25634483. E-mail: denis@sjri.res.in

(Received 21 April 2011; accepted 10 August 2011)

ELSEVIER

The Journal of Heart and Lung Transplantation

http://www.jhltonline.org

Exercise improvement and plasma biomarker changes with intravenous treprostinil therapy for pulmonary arterial hypertension: A placebo-controlled trial

Jagdish Hiremath, MD,[a] Sadagopa Thanikachalam, MD,[b] Keyur Parikh, MD,[c] Somasundaram Shanmugasundaram, MD,[d] Sudhakar Bangera, MD,[e] Leland Shapiro, MD,[f] Gregory B. Pott, PhD,[f] Cindy L. Vnencak-Jones, PhD,[g] Carl Arneson, MStat,[h] Michael Wade, PhD,[h] and R. James White, MD, PhD,[i] for the TRUST Study Group

From the [a]Ruby Hall Clinic, Pune, India;
[b]Sri Ramachandra Medical College, Chennai, India;
[c]SAL Hospital and Medical Institute, Ahmedabad, India;
[d]K.S. Hospital, Chennai, India;
[e]Asian Clinical Trials, Ltd., Hyderabad, India;
[f]Denver Veterans Affairs Medical Center and University of Colorado Denver, Denver, Colorado;
[g]Department of Pathology and Pediatrics, Vanderbilt University Medical Center, Nashville, Tennessee;
[h]United Therapeutics Corp., Research Triangle Park, North Carolina; and
[i]Division of Pulmonary and Critical Care Medicine, University of Rochester, Rochester, New York.

KEYWORDS:
pulmonary hypertension;
prostacyclin;
biomarkers;
angiopoietin;
six minute walk

BACKGROUND: Pulmonary arterial hypertension (PAH) remains a poorly understood and frequently lethal disease with few treatment options.

METHODS: We conducted a placebo-controlled trial of intravenous treprostinil, a prostacyclin analog in treatment-naive PAH patients. During 12 weeks of treatment with treprostinil or placebo, we quantified 6-minute walk distance (6MW), clinical symptoms and 11 cytokines/growth factors.

RESULTS: Forty-two of 44 study patients had idiopathic/familial PAH in New York Heart Association (NYHA) Class III. Treprostinil increased 6MW by a placebo-corrected median of 83 meters ($p = 0.008$; mean increase 93 ± 42 meters), reduced Borg score by a median 2.0 units ($p = 0.02$), and improved NYHA class by a median of 1.0 ($p = 0.02$). There was a trend toward improved survival with treprostinil ($p = 0.051$). Baseline plasma angiopoietin-2 (Ang-2), vascular endothelial growth factor (VEGF), matrix metalloproteinase-9 (MMP-9) and platelet-derived growth factor (PDGF) were elevated compared with reported normal ranges. Treatment with treprostinil was associated with decreased Ang-2 levels. Improvement in 6MW distance after treatment was associated with reductions in Ang-2 and MMP-9 levels. Most of the cytokines and growth factors studied were not abnormal with disease nor did they change with treatment.

CONCLUSIONS: We conclude that treprostinil treatment significantly improved exercise capacity, dyspnea and functional class. Several plasma proteins that might track disease were abnormal at baseline, and changes were associated with improved exercise capacity.

J Heart Lung Transplant 2010;xx:xxx

Supported by United Therapeutics Corporation and by an American Heart Association National Scientist Development Grant (0735410N) to R.J.W.
Trial number: TRUST-1; NCT00494533 (http://www.clinicaltrials.gov/ct2/show/NCT00494533).
Present affiliation for author J.H.: Poona Hospital, Pune, India; K.P.: Heart Care Clinic, Ahmedabad, India; S.B.: Axis Clinicals, Hyderabad, India.
Reprint requests: R. James White, MD, PhD, Division of Pulmonary and Critical Care Medicine, University of Rochester, 400 Red Creek Drive, Rochester, NY 14623. Telephone: 585-486-0147 (ext. 123). Fax: 585-486-0947.
E-mail address: jim_white@urmc.rochester.edu

1053-2498/$ - see front matter © 2010 International Society for Heart and Lung Transplantation. All rights reserved.
doi:10.1016/j.healun.2009.09.015

ANNEXURE – "F"

Information of Mentor of Training Centre

It shall be verified by the Head of the concerned Training Center,

Sr. No.	Particular	-	Information to be filled
01.	Name of the Mentor	:	Dr. Madhura Atul Bhide
02.	Date of Birth	:	27/05/1974
03.	Address	:	A – 1/403, Kumar Prerana, Pune 411007
04.	Tel. No./ Mob. No.	:	9422318089
05.	E-mail id	:	9madhura@gmail.com
06.	Nationality	:	Indian
07.	Qualification in details : (attach documentary proof)	:	B.A.M.S. MD (Dravyagun)
08 .	Teaching Experience / Health Sciences: Profession Experience (Attached document proof with signature of Head of the Institute. Also it is mandatory to attach self-attested Photocopy of the Experience Certificate of each Mentor in the Subject of concerned Fellowship/Certificate Course)	:	Teaching Experience 5 Years 11 Months Clinical Experience 20 Years
09.	Present Appointment	:	Mentor
10.	Publications (List & Proof)	:	-
11.	Post Graduate Teaching experience(Attach documentary evidence)	:	-
12.	Any other relevant information	:	-

Dr. Madhura Atul Bhide
Name & Sign. of Mentor

Date: - 23.05.22

For the use of affiliated Training Center:

I have verified the eligibility of the above Mentor as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended) and UniversityCircular No. MUHS/UDC/FCCC/736/2019 dated 30/09/2019.

Sign & Stamp
Head of the Department
Date: 23.05.22

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center
Sign & Stamp
Dean/ Principal/ Director of Training Centre
Date: 23.05.22

Madhavbaug Institute of Preventive Cardiology
MIPC

Training Centre Round Seal

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Ref. No. – VRT / MIPC/GT/002/2016

Date – 27th May 2016

To,
Dr. Madhura Bhide,
BAMS, MD (Dravyaguna)
Mumbai

Madam,

With reference to your application dated 1st April 2016 for the post of 'Mentor' in Madhavbaug Institute of Preventive Cardiology. I am pleased to inform you that you have been selected and appointed as 'Mentor' at VRT's Madhavbaug Institute of Preventive Cardiology with effect from 1/6/16.

You will be abide by existing rules, regulations Terms and conditions of VRT's Madhavbaug Institute of Preventive Cardiology and will be amended time to time.

Thanking you.

Dr.Jagdish Hiremath
Chair Professor
Madhavbaug Institute of Preventive Cardiology

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

88789

Office : Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No - 022-41235315/16 / 7722088789
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Madhura A. Bhide is working with us as a Mentor, since 1st June 2016 till date.

Dr. Vilas D. Potnis
Trustee
Vd. Sane's Ayurvedic Education
& Agricultural Research Trust

Director
Vd. Sane's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Office : Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No.- 022-41235315/16 / 7722088789
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

University Of Pune

(Formerly University of Poona)

We, the Chancellor, the Vice Chancellor and the Members of the Management Council and the Academic Council of the University of Pune certify that Bhide Madhura Atul of Tilak Ayurved Mahavidyalaya, Pune having been examined and found duly qualified for the degree of

Doctor of Medicine

(Ayurveda)

(Subject Dravyaguna)

in October 2002

The said degree has been conferred on her.

In testimony whereof is set the seal of the said University

पुणे विद्यापीठ

आम्ही, पुणे विद्यापीठाचे कुलपति, कुलगुरु आणि व्यवस्थापन परिषद व विद्या परिषद सदस्य, प्रमाणित करितो की,

भिडे मधुरा अतुल

हे / या टिळक आयुर्वेद महाविद्यालय, पुणे येथून

ऑक्टोबर २००२ मध्ये

वैद्यक निष्णात

(आयुर्वेद)

(विषय : द्रव्यगुण)

पदवी परीक्षा उत्तीर्ण झाल्याबद्दल त्यांना ही पदवी प्रदान करण्यात येत आहे.

याची साक्ष म्हणून विद्यापीठाची अधिकृत मुद्रा येथे अंकित करण्यात येत आहे.

University of ~~Bombay~~ Mumbai

No 2916

I Certify that Sane Rajani Madhav

has, subsequent to his/her passing the examination for the degree of B.A.M.S. held by this University in the month of October, 1995, completed satisfactorily the post examination internship training prescribed in that behalf and has been declared qualified for the award of the B.A.M.S. degree of this University.

~~Bombay~~ Mumbai 15.4, 1997.

for ~~REGISTRAR~~.

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

MAHARASHTRA COUNCIL OF INDIAN MEDICINE

Certificate of Registration

Certificate No. L-30220-A-1

This is to certify that

*** SHRI RAJANI MADHAV ***

has been duly registered under the Maharashtra Medical Practitioners' Act, 1961 (Mah. XXVIII of 1961) read with section 17 of the Indian Medicine Central Council Act, 1970 (Act No. 48 of 1970) in Part ONE of the Register.

In witness whereof are herewith affixed the seal of the Maharashtra Council of Indian Medicine, Bombay and the signature of the Registrar.

This Certificate shall be valid, subject to the provisions of the Act.

TRUE COPY

Director
Bhaubaug Institute of Preventive Cardiology & Research Center

Signature of Registrar

Joining Letter

To,

The Trustee

Date: 01.06.2016

Vd.sane's Ayurvedic Education & Agricultural research

This with reference of your Appointment letter Dated. 01.06.2017 I hereby confirm that I have joined the duty today i.e. 1st June 2016 before noon.

Submitted for your kind information and necessary action please.

Thanking You,

Yours Faithfully,

(Dr. Madhura Bhide)

Madhavbaug Institute of Preventive Cardiology MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

From

Dr.Madhura Bhide

Date:01 April 2016

To,

The Trustees,

Vd. Sanes's Ayurvedic Education and Agricultural Research Trust,

Thane.

Sub: Application for the post of "Guest Teacher in Ayurved".

Respected Sir,

Through a personal reference of mine, I came to know that there is a vacancy for the post of "Guest Teacher in Ayurved" at your esteemed organization.

I am a doctor of Medicine and have also completed my post Graduation in BAMS with 20 years of clinical; experience. My experience in Clinical aligns well with the qualifications that you are looking out for the said post.

With my experience and personal qualities , I assure you that I would make a valuable addition to your esteemed organization.

Thanking you,

Yours Faithfully,

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

(Dr.Madhura bhide)

BAMS, M.D. (Dravyaguna)

TRUE COPY

ANNEXURE – "F"

Information of Mentor of Training Centre

It shall be verified by the Head of the concerned Training Center,

Sr. No.	Particular	-	Information to be filled
01.	Name of the Mentor	:	Dr. Nitin Madhav Kamat
02.	Date of Birth	:	26/03/1953
03.	Address	:	505/D, Aakash Tower, Sri-Prastha Complex, Nalasopara (W) Taluka Vasai, District- Palghar - 401203
04.	Tel. No./ Mob. No.	:	9820632772
05.	E-mail id	:	Nitinkmt3@gmail.com
06.	Nationality	:	Indian
07.	Qualification in details:(attach documentaryproof)	:	BAMS, MD (Kayachikista)
08.	Teaching Experience / Health Sciences: Profession Experience (Attached document proof with signatureof Head of the Institute. Also it is mandatory to attach self-attested Photocopy of the Experience Certificate of each Mentor in the Subject oconcerned Fellowship/Certificate Course)		Teaching Experience 39 Years Clinical Experience 37 Years
09.	Present Appointment	:	Mentor
10.	Publications (List & Proof)	:	-
11.	Post Graduate Teaching experience(Attach documentary evidence)	:	16 Years
12.	Any other relevant information	:	-

Dr. Nitin Madhav Kamat
Name & Sign. of Mentor

Date: - 23.05.22

For the use of affiliated Training Center:

I have verified the eligibility of the above Mentor as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended) and UniversityCircular No. MUHS/UDC/FCCC/736/2019 dated 30/09/2019.

Sign & Stamp
Head of the Department
Date: 23.05.22

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Sign & Stamp
Dean/ Principal/ Director of Training Centre
Date: 23.0522

Training Centre Round Seal

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Nitin M. Kamat is working with us as a Mentor, since 2nd May 2017 till date.

Dr. Vilas D. Potnis
Trustee
Vd. Sane's Ayurvedic Education
& Agricultural Research Trust

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

Office : Ishan Bldg No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel. No. 7722088789
Website-www.mipconline.com Email - mipccoursecoordinator@gmail.com

आयुर्वेद महाविद्यालय
व शेठ व. मा. धर्मार्थ दवाखाना
(शेठ रणछोडदास वरजीवनदास आयुर्वेदीय रुग्णालय)
मुख्य कार्यालय : शीव स्टेशन नजीक, शीव, मुंबई-४०० ०२२. टे.नं. : २४०७ २१७६ / २४०९ २६६२
शाखा : मुलुभाट, गिरगांव, मुंबई - ४०० ००४.

F99

जावक क्रमांक.....

तारीख. 31-05-2013

TEACHING EXPERIENCE CERTIFICATE

This is to certify that **Vd Nitin Madhav Kamat** is working as Professor in the Kayachikitsa Department of this Institution.

His teaching experience is as follows:-

Designation	Full/Part Time	Department Subject	Period From	Period To	Y.	M.	D.
Demonstrator Ayurved College, Sion, Mumbai-22	Full Time	Shalya Shalakya	21.8.1978	30.10.1978	--	02	11
Demonstrator Ayurved College, Sion, Mumbai-22	Full Time	Kayachikitsa	31.10.1978	15.8.1980	01	09	17
Lecturer Ayurved College, Sion, Mumbai-22	Full Time	Kayachikitsa	16.8.1980	18.2.1990	09	06	03
Reader Ayurved College, Sion, Mumbai-22	Full Time	Kayachikitsa	19.2.1990	30.6.2000	10	04	10
Professor Ayurved College, Sion, Mumbai-22	Full Time	Kayachikitsa	1.7.2000	Till Today	12	11	0
Principal Ayurved College, Sion, Mumbai-22	Full Time		1.9.2006	31.03.2013			

His total teaching experience is 34 Years, 9 Months & 10 Days.

Mumbai University and M.U.H.S.Nashik has approved his appointment as full time Professor in Kayachikitsa department.

His Work is satisfactory.

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

TRUE COPY

(Vd. Mrs. R.A.Patankar)
Principal
Ayurved Mahavidyalaya
Near Sion Railway Station
Sion Mumbai-400 022.

TRUE COPY

F163

Joining Letter

To,

The Trustee

Date: 02.05.2017

Vd.sane's Ayurvedic Education & Agricultural research

This with reference of your Appointment letter Dated. 28.04.2017 I hereby confirm that I have joined the duty today i.e. 2nd May 2017 before noon.

Submitted for your kind information and necessary action please.

Thanking You,

Yours Faithfully,

(Dr. Nitin Kamat)

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

From

Dr.Nitin Kamat

Date:01 April 2017

To,

The Trustees,

Vd. Sanes's Ayurvedic Education and Agricultural Research Trust,

Thane.

Sub: Application for the post of "Guest Teacher in Ayurved".

Respected Sir,

Through a personal reference of mine, I came to know that there is a vacancy for the post of "Guest Teacher in Ayurved" at your esteemed organization.

I am a doctor of Medicine and have also completed my post Graduation in BAMS with a teaching experience of 39 years and 37 years of clinical; experience. My experience in Academic and Teaching aligns well with the qualifications that you are looking out for the said post.

With my experience and personal qualities, I assure you that I would make a valuable addition to your esteemed organization.

Thanking you,

Yours Faithfully,

(Dr.Nitin Kamat)

BAMS, M.D. (Kayachikitsa)

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

F102

CERTIFICATE OF REGISTRATION

THE MAHARASHTRA BOARD OF AYURVEDIC AND UNANI SYSTEMS OF MEDICINE, BOMBAY

Certificate No. A-70156

This is to Certify that

Bhavsar, Nitin Madhav

has been duly registered under the Maharashtra Medical Practitioners' Act, 1961 (Mah. XXVIII of 1961) in Part One of the Register.

In witness whereof are herewith affixed the seal of the Maharashtra Board of Ayurvedic and Unani Systems of Medicine, Bombay and the signature of the Registrar.

This Certificate shall be valid, subject to the provisions of the Act.

Signature of the Registrar

Dated 7 JAN 19

True Copy

In Charge Principal,
Ayurved Mahavidyalaya
Sion Bombay-400022

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

We, the Chancellor, Vice-Chancellor and Fellows of the University of Bombay certify

No. 10M&AI E-11155

that the withinsigned

Nitin Madhav Kamat of

R. A. Podar Medical College (Ayurvedic)

having been examined for the Degree of Bachelor of Shuddha Ayurvedic Medicine (Ayurvedacharya) and placed in the Second Class, the Degree of

Bachelor of Shuddha Ayurvedic Medicine

(Ayurvedacharya)

has been conferred on him at Bombay on the twenty fourth day of the month of March in the year one thousand nine hundred and seventy nine.

In Testimony whereof are set the Seal of the said University and the Signature of the said Chancellor.

Chancellor

TRUE COPY

MIPC

TRUE COPY

Incharge Principal
Ayurved Mahavidyalaya
Near Sion Railway Station,
Mumbai 400 022.

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

TRUE COPY

True Copy

मुंबई विद्यापीठ

UNIVERSITY OF MUMBAI

आम्ही मुंबई विद्यापीठाचे कुलपती, कुलगुरू आणि व्यवस्थापन परिषदेचे सदस्य असे प्रमाणित करतो की आर. ए. पोदार मेडिकल कॉलेज (आयुर्वेदिक)चे नितिन माधव कामत हे मे १९९७ मध्ये घेण्यात आलेली आयुर्वेद वाचस्पती (आयुर्वेद औषधि) (शाखा क्रमांक ३ : कायाचिकित्सा) परीक्षा उत्तीर्ण झाले असून दिनांक १२ डिसेंबर १९९७ रोजी मुंबई येथे झालेल्या दीक्षांत समारंभात त्यांना आयुर्वेद वाचस्पती (आयुर्वेद औषधि) ही पदवी प्रदान करण्यात आली आहे.

विद्यापीठाची मुद्रा व कुलपतींची स्वाक्षरी यांसह साक्षीने अंकित.

We, the Chancellor, Vice-Chancellor and Members of the Management Council of the University of Mumbai certify that ***Nitin Madhav Kamat*** *of* ***R. A. Podar Medical College*** *[Ayurvedic] having passed the* ***Ayurved Vachaspati - Doctor of Medicine (Ayurveda)*** *(Branch III : Kayachikitsa) degree examination held in May 1997, the degree of* ***Ayurved Vachaspati - Doctor of Medicine (Ayurveda)*** *has been conferred on him at the Convocation held in Mumbai on 12th December, 1997.*

In testimony whereof are set the Seal of the said University and the signature of the said Chancellor.

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

कुलपती CHANCELLOR

97-PC-DMAV-2

टिळक महाराष्ट्र विद्यापीठ, पुणे.

(अभिमत विद्यापीठ)

टिळक महाराष्ट्र विद्यापीठाचे कुलपती, कुलगुरू, नियामक मंडळाचे आणि कार्यकारी मंडळाचे सभासद यांच्याकडून प्रमाणित करण्यात येते की,

श्री वैद्य कामत नितीन माधव

जानेवारी १९८५ मध्ये घेतलेल्या आयुर्विद्या पारंगत या परीक्षेत (कायचिकित्सा गटात) तृतीय श्रेणीत उत्तीर्ण झाले असल्याने त्यांना

आयुर्विद्या पारंगत

ही पदवी सार्वभौमी ३ शके १९०७ दिनांक २४ नोव्हेंबर १९८५ या दिवशी झालेल्या पदवीदान समारंभप्रसंगी प्रदान करण्यात आली आहे.

याची साक्ष म्हणून विद्यापीठाची अधिकृत मुद्रा व विद्यापीठाच्या कुलपतींची स्वाक्षरी येथे अंकित करण्यात आली आहे.

सही- शंकरराव चव्हाण
कुलपती

TILAK MAHARASHTRA VIDYAPEETH, PUNE.

(DEEMED UNIVERSITY)

We, the Kulapati, the Kulaguru, the Members of the Niyamak Mandal and the Karyakari Mandal of the Tilak Maharashtra Vidyapeeth certify that

Shri Vaidya Kamat Nitin Madhav

having passed the AYURVIDYA PARANGAT examination (Kayachikitsa *Group) held in* January 19[illegible] *in* Pass *class, the degree of*

AYURVIDYA PARANGAT

has been conferred on him at the convocation ceremony held on 24th November *1985*
In testimony whereof are set the seal of the Vidyapeeth and the signature of the Kulapati.

sd/- Shankarrao Chavan
Kulapati

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

ANNEXURE – "F"

Information of Mentor of Training Centre

It shall be verified by the Head of the concerned Training Center,

Sr. No.	Particular	-	Information to be filled
01.	Name of the Mentor	:	Dr. Suvarna Shivaji Pol
02.	Date of Birth	:	23/02/1986
03.	Address	:	C/o Udgaon Ves, Near School No. 10, Miraj 416410
04.	Tel. No./ Mob. No.	:	9766211194
05.	E-mail id	:	drsuvarnapol@gmail.com
06.	Nationality	:	Indian
07.	Qualification in details : (attach documentary proof)	:	BAMS, MD (Panchakarma)
08.	Teaching Experience / Health Sciences: Profession Experience (Attached document proof with signature of Head of the Institute. Also it is mandatory to attach self-attested Photocopy of the Experience Certificate of each Mentor in the Subject of concerned Fellowship/Certificate Course)		Teaching Experience 3 Years Clinical Experience 12 years
09.	Present Appointment	:	Mentor
10.	Publications (List & Proof)	:	-
11.	Post Graduate Teaching experience(Attach documentary evidence)	:	-
12.	Any other relevant information	:	-

Dr. Suvarna Shivaji Pol
Name & Sign. of Mentor

Date: - 23.05.22

For the use of affiliated Training Center:

I have verified the eligibility of the above Mentor as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended) and University Circular No. MUHS/UDC/FCCC/736/2019 dated 30/09/2019.

Sign & Stamp
Head of the Department
Date: 23.05.22

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center
Sign & Stamp
Dean/ Principal/ Director of Training Centre
Date: 23.05.22

Madhavbaug Institute of Preventive Cardiology
MIPC

Training Centre Round Seal

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Suvarna S. Pol is working with us as a Mentor, since 1st June 2019 till date.

Dr. Vilas D. Potnis
Trustee
Vd. Sane's Ayurvedic Education & Agricultural Research Trust

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

TRUE COPY

Office : Ishan Bldg No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 I Tel. No. 7722088789
Website-www.mipconline.com Email - mipccoursecoordinator@gmail.com

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's

MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY

[A Chair of Maharashtra University of Health Sciences, Nashik]

MUHS VRT

Ref.No. – VRT/ MIPC/ GT/006/2019 Date – 20th May 2019

To,
Dr.Suvarna Pol
BAMS, MD (Panchakarma)
Miraj, Sangli.

Madam,

With reference to your application dated. 18th May 2019 for the post of 'Mentor' in Madhavbaug Institute of Preventive Cardiology. I am pleased to inform you that you have been selected and appointed as 'Mentor' at VRT's Madhavbaug Institute of Preventive Cardiology with effect from 01st June 2019.

You will be abide by existing rules, regulations, terms and conditions of VRT's Madhavbaug Institute of Preventive Cardiology and will be amended time to time.

Thanking you,

Dr.Jagdish Hiremath
Chair Professor
VRT's Madhavbaug Institute of Preventive Cardiology

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

TRUE COPY

Office . Ishan Bldg. No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 | Tel No - 022-41235315/16 / 7722088789
Website- www.mipconline.com | Email - [redacted] / mipccoursecoordinator@gmail.com

F109

From
Dr. Suvarna Shivaji Pol

Date: 18/05/2019

To,
The Trustees,
Vd. Sane's Ayurvedic education an agricultural research trust,
Thane.

Sub: Application for the post of "Guest Teacher in Panchakarma".

Respected Sir,

Through a personal reference of mine, I came to know that there is a vacancy for the post of "Guest Teacher in Panchakarma" at your esteemed organization.

I am a doctor of medicine and have also completed BAMS with 9 years of clinical experience. My experience aligns well with the qualifications that you are looking out for the said post.

With my experience and personal qualities, I assure you that I would make a valuable addition to your esteemed organization.

Thanking you,

Yours faithfully,

(Dr.Suvarna Shivaji Pol)

B.A.M.S., M.D. (Panchakarma)

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

TRUE COPY

10030912

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

We, the Chancellor, the Pro-Chancellor, the Vice-Chancellor, the Members of the Management Council and the Academic Council of the Maharashtra University of Health Sciences, Nashik, certify that

Shri/Smt POL SUVARNA SHIVAJI

of R.J.V.S. Bhaisaheb Sawant Ayurved Mahavidyalaya, Sawantwadi

having been examined and found duly qualified for the

Bachelor of Ayurved Medicine & Surgery

In Nov-2008 the said Degree has been conferred on him/her. In testimony whereof is set the seal of the said University.

PRN 1306201400
20th May 2010

VICE-CHANCELLOR

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ, नाशिक

आम्ही, महाराष्ट्र आरोग्य विज्ञान विद्यापीठाचे कुलपति, प्रकुलपति, कुलगुरू, व्यवस्थापन परिषद व विद्यापरिषद सदस्य प्रमाणित करतो की,
सावंतवाडी येथील रा.जा.वै.सं.चे भाईसाहेब सावंत आयुर्वेद महाविद्यालया चे/च्या

पोळ सुवर्णा शिवाजी

हे/हया नोव्हेंबर-२००८ मध्ये

आयुर्वेदाचार्य

परीक्षा उत्तीर्ण झाल्याबद्दल त्यांना ही पदवी प्रदान करण्यात येत आहे.
याची साक्ष म्हणून विद्यापीठाची अधिकृत मुद्रा येथे अंकित करण्यात येत आहे.

-गिरीश सोनार
कुलगुरू

Director
VKT's Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

TRUE COPY

2018208139

MUHS

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ, नाशिक

Maharashtra University of Health Sciences, Nashik, India

आम्ही, कुलपती, प्रतिकुलपती, कुलगुरु
आणि व्यवस्थापन परिषद व विद्यापरिषदेचे सदस्य
आयुर्वेद वाचस्पती (एम.डी. आयुर्वेद) - पंचकर्म

ही पदवी उन्हाळी–२०१८ परीक्षेत उत्तीर्ण झाल्याबद्दल
यशोदीप, यशवंतपुर वर्धापन यशवंत आयुर्वेदिक महाविद्यालय, पदव्युत्तर शिक्षण व संशोधन केंद्र
च/या
पोल सुवर्णा शिवाजी
यास
१० डिसेंबर २०१८ या दीक्षांत समारंभात प्रदान करीत आहोत

We, the Chancellor, Pro-Chancellor, Vice-Chancellor
and Members of the Management Council, Academic Council
confer the Degree of
Ayurveda Vachaspati (M.D.-Ayurveda)-Panchkarma

on
Pol Suvarna Shivaji
(PRN 2916131725)
of
Yashwant Ayurvedic College, Post Graduate Training & Research Centre, Kodoli, Kolhapur

for the examination held in ... 2018
at the Convocation held on ... 10th day of December 2018

20F61201118

VICE-CHANCELLOR
कुलगुरु

Madhavbaug Institute of Preventive Cardiology
MIPC

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Maharashtra Council of Indian Medicine, Mumbai

CERTIFICATE OF REGISTRATION

Certificate No.: I-63630-A Date : 12 MAY 2010

This is to certify that Pol Swarna Shivaji has been duly registered under the Maharashtra Medical Practitioner's Act, 1961 (Act XXVIII of 1961) read with section 17 of the Indian Medicine Central Council Act, 1970 (Act No. 48 of 1970) in part One of the Register.

Qualification B.A.M.S.

University M.U.H.S. Nashik

Date of Birth 23-02-1986

Address Udgaon Tes. Dhor Galli, Miraj, Dist - Sangli

In witness where of are here with affixed the seal of the Maharashtra Council of Indian Medicine, Mumbai and the Signature of the Registrar.

This Certificate valid, subject to the provisions of the Act.

22/12

Signature of the Registrar

TRUE COPY

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Joining letter

To,

Date: 01.06.2019

The Trustee,

Vd. Sane's Ayurvedic Education & Agricultural Research Trust.

This is with reference of your appointment letter dated.20.05.2019 I hereby confirm that I have joined the duty today i.e. 01.06.2019

Submitted for your kind information and necessary action please.

Thanking you,

Yours Faithfully,

(Dr.Suvarna Pol)

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Madhavbaug Institute of Preventive Cardiology
MIPC

TRUE COPY

Dr. Suvarna Shivaji Pol

Mobile No: 9766211194
Email : drsuvarnapol@gmail.com

CAREER OBJECTIVE

To work as a dynamic professional in an organization that encourages the growth and efficiency and would serve as a platform to extend my hard work and complete contribution.

ACADEMIC PROFILE: M.B.B.S. & D.A.

QUALIFICATION	COLLEGE	Year of Passing
B.A.M.S.	BHAISAHEB SAWANT AYURVEDIC COLLEGE, SAWANTWADI	FEB' 2009
M.D. PANCHKARMA	Y.A.C. KODOLI, KOLHAPUR	AUG' 2018

Internship Completed in Mar'2010

WORK EXPERIENCE =9 YRS

Madhavbaug Cardiac Rehab centre

COMPUTER SKILLS

- Other Domain : MS-Office

Good Knowledge of Windows, PowerPoint.

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

PERSONAL INFORMATION

NAME : Dr. Suvarna Shivaji Pol

PERMANENT ADDRES : Dr. Suvarna Shivaji Pol

C/o Udgaon Ves, Near school No. 10,
Miraj 416410
Dist-Sangli

CONTACT NO. : +91-9766211194

E-MAIL ID : drsuvarnapol@gmail.com

DATE OF BIRTH : 23rd Feb 1986

GENDER : Female

NATIONALITY : Indian

LANGUAGES KNOWN : English, Hindi, Marathi,

HOBBIES : Reading and Travelling.

DECLAIRATION

I do hereby declare that all the above furnished information is true to the best of my knowledge and belief.

(Dr. Suvarna Shivaji Pol)

Date : 17/5/19
Place: Panjim, Goa

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Madhavbaug Institute of Preventive Cardiology MIPC

TRUE COPY

आयकर विभाग
INCOME TAX DEPARTMENT

भारत सरकार
GOVT. OF INDIA

स्थायी लेखा संख्या कार्ड
Permanent Account Number Card

CPIPK1166E

नाम/ Name
SUVARNA SHIVAJI POL

पिता का नाम/ Father's Name
SHIVAJI TAYAPPA POL

जन्म की तारीख / Date of Birth
23/02/1986

हस्ताक्षर/ Signature

MIPC

Director
MRI's Madhavbaug Institute of Preventive Cardiology & Research Center

02062018

सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

सुवर्णा शिवाजी पोळ

Suvarna Shivaji Pol

जन्म तारीख / DOB: 23/02/1986

महिला / FEMALE

Mobile No.: 9766211194

3392 4933 9639

VID : 9186 6959 1379 2053

माझे आधार, माझी ओळख

TRUE COPY

MIPC

Director
VRTI's Madhavbaug Institute of
Preventive Cardiology &
Research Centre

Scanned by CamScanner

Scanned with Oken Scanner

आधार

भारतीय विशिष्ट पहचान प्राधिकरण

UNIQUE IDENTIFICATION AUTHORITY OF INDIA

पत्ता:
२८८१ उदगाव वेस स्कूल नं १० जवळ ढोर गल्ली मिरज,
मिरज, सांगली,
महाराष्ट्र - 416410

Address:
2881 UDGAON VES SCHOOL NO 10
JAVAL DHOR GALLI MIRAJ, Miraj,
Sangli, Maharashtra - 416410

3392 4933 9639
VID : 9186 6959 1379 2053

QR Code with Photograph

Download Date: 22/04/2019

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

TRUE COPY

1947
1800 300 1947

help@uidai.gov.in

www.uidai.gov.in

P.O. Box No. 1947,
Bengaluru-560 001

ANNEXURE – "F"

Information of Mentor of Training Centre

It shall be verified by the Head of the concerned Training Center,

Sr. No.	Particular	-	Information to be filled
01.	Name of the Mentor	:	Dr. Prabha Bhavesh Acharya
02.	Date of Birth	:	20/06/1967
03.	Address	:	401. Sankalpa Mistry Complex, Andheri (East) Mumbai 400059
04.	Tel. No./ Mob. No.	:	9167000152
05.	E-mail id	:	drprabhaacharya@gmail.com
06.	Nationality	:	Indian
07.	Qualification in details : (attach documentary proof)	:	B.H.M.S. M.D (Homoeopathic Materia Medica)
08.	Teaching Experience / Health Sciences: Profession Experience (Attached document proof with signature of Head of the Institute. Also it is mandatory to attach self-attested Photocopy of the Experience Certificate of each Mentor in the Subject of concerned Fellowship/Certificate Course)	:	Teaching Experience 25 Years 10 Months Clinical Experience 25 years 10 Months
09.	Present Appointment	:	Mentor
10.	Publications (List & Proof)	:	Sr.No – Title of Paper/Book 01 – Impact of Comprehensive Diabetes Care (CDC) Management Program im Type II Diabetes Melitus: A Retrospective Study 02 – Impact of Comprehensive Diabetes Care on Glycaemic Cantrol With Reduction in Dependency of Oral Hypoglycaemic Medicines in Diabetic Patients: A Retrospective Study 03 – Study of The Liver And Renal Function In Patients of Chronic Heart Failure Based On The Body Mass Index: A Retrospective Study 04 – To Study Effect of Heart Failure Reversal Therapy (HFRT) on The Anthropometric Obesity Parameters In Patients of Chronic Heart Failured Obesity 05 – Efficacy of Low-Corohydrate Diet (LCD) and Obesity Management Program on Obese Patints
11.	Post Graduate Teaching experience(Attach documentary evidence)	:	Attached
12.	Any other relevant information	:	-

Dr. Prabha Bhavesh Acharya
Name & Sign. of Mentor

Date: - 23.05.22

For the use of affiliated Training Center:

I have verified the eligibility of the above Mentor as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended) and University Circular No. MUHS/UDC/FCCC/736/2019 dated 30/09/2019.

Sign & Stamp
Head of the Department
Date: 23.05.22

Madhavbaug Institute of Preventive Cardiology MIPC

Training Centre Round Seal

Director
VRT s Madhavbaug Institute of Preventive Cardiology & Research Center
Sign & Stamp
Dean/ Principal/ Director of Training Centre
Date: 23.05.22

Vd. Sane's Ayurvedic Education and Agricultural Research Trust's
MADHAVBAUG INSTITUTE OF PREVENTIVE CARDIOLOGY
[A Chair of Maharashtra University of Health Sciences, Nashik]

Date : 21/05/2022

Experience Letter

This is to certify that, Dr. Prabha B. Acharya is working with us as a Mentor, since 1st Nov 2020 till date.

Dr. Vilas D. Potnis
Trustee
Vd' Sane's Ayurvedic Education
& Agricultural Research Trust

VD SANE'S AYURVEDIC EDUCATION & AGRICULTURAL RESEARCH TRUST
Reg No E 20153 Mumbai

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Madhavbaug Institute of Preventive Cardiology
MIPC

TRUE COPY

Office : Ishan Bldg No. 2, 701, 7th floor, Gokhale Road, Naupada Thane (W) - 400602 I Tel. No. 7722088789
Website-www.mipconline.com Email - mipccoursecoordinator@gmail.com

KONKAN EDUCATION & MEDICAL TRUST'S
VIRAR HOMOEOPATHIC MEDICAL COLLEGE
[illegible] MAHARASHTRA
[illegible] Savarkar Marg, Pin [illegible] Tal. Vasai, Dist. Palghar
[illegible] (0250) - 25[illegible] 9481[illegible] 2529465 ● E-mail: vhmcvirar@hotmail.com

VHMC/023/2017 Date 03/05/2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Dr Prachi Acharya was working as Professor in our Virar Homoeopathic Medical College, Virar in the department of Homoeopathic Pharmacy on temporary basis from 01/04/2013 to 03/05/2017. She was approved by Maharashtra University of Health sciences, Nashik. Her work was satisfactory. I wish her good wishes & success for her future.

I/C PRINCIPAL
KONKAN EDUCATION & MEDICAL TRUST'S
VIRAR HOMOEOPATHIC MEDICAL [illegible]
(RECOGNISED BY GOVT. OF MAHARA[illegible]
VIR SAVARKAR MARG, VIRAR (E)-401 305, DIST. PALGHAR

TRUE COPY

Madhya Pradesh Institute of Preventive Care & Research
MIPC

मुंबई विद्यापीठ
University of Mumbai

आम्ही मुंबई विद्यापीठाचे कुलपती कुलगुरू व्यवस्थापन परिषदेचे सदस्य असे प्रमाणित करतो की वरील मेडिकल कॉलेज चे [illegible] सदस्य वाय. एम. टी. होमिओपॅथिक मेडिकल कॉलेजच्या प्रभा आचार्य हया जुलै २००५ मध्ये घेण्यात आलेली वैद्यक विशारद (होमिओपॅथी) (बाहेरस्थ) (शाखा क्रमांक : (अ) समविधिकतत्वीय औषधीद्रव्यशास्त्र) ही पदवी परीक्षा [illegible] झाल्या वरून दिनांक १२ डिसेंबर २००५ रोजी मुंबई येथे भरलेल्या दीक्षांत समारंभात त्यांना

वैद्यक विशारद (होमिओपॅथी) (बाहेरस्थ)

ही पदवी प्रदान करण्यात आली आहे

विद्यापीठाची मुद्रा व कुलगुरूंची स्वाक्षरी यांनी त्याची साक्ष.

We the Chancellor, Vice-Chancellor and Members of the Management Council of the University of Mumbai, certify that **Prabha Acharya** of Yerala Medical Trust and Research Center's Y. M. T. Homoepathic Medical College having passed the **Doctor of Medicine (Homoeopathy)(External)** (Branch : (a) **Homoeopathic Materia Medica**) degree examination held in July 2005, the degree of

Doctor of Medicine (Homoeopathy)(External)

has been conferred on her at the Convocation held in Mumbai on 12th December, 2005

In testimony whereof are set the Seal of the said University and the signature of the said Vice-Chancellor

[illegible] CHANCELLOR

2005 PC [illegible]

CERTIFICATE OF REGISTRATION

Maharashtra Council of Homoeopathy, Bombay

Similia Similibus Curentur

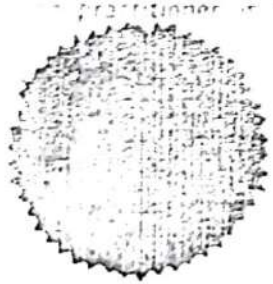
Certificate No. 17716 **Date of Registration :** 12-7-1990

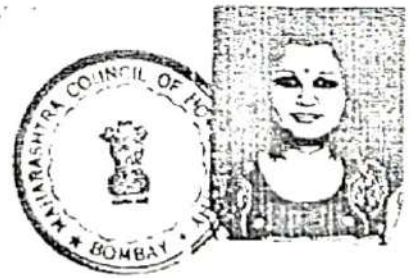
This is to certify that Dr (Mrs.) Achaya Babha Bhavesh

has been duly registered under the Bombay Homoeopathic Practitioners' Act, 1959 (Bom. XII of 1960).

In witness whereof are herewith affixed the seal of the Maharashtra Council of Homoeopathy, Bombay and the signature of the Registrar

Subject to the provisions of the Act, this certificate is valid until [illegible] and the name of the practitioner will be removed from the Register





Signature of the Registrar

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

MIPC

TRUE COPY

TRUE COPY

MIPC

F+2

We the Chancellor, Vice-Chancellor, and Members of the Executive Council of the University of Bombay certify

Prabha Gupta

that the withinsigned

Prabha Gopalkrishna Gupta of

Smt. Chandaben Mohanbhai Patel Homoeopathic Medical College and Hospital

having been examined in the month of November in the year 1988 for the Degree of Bachelor of Homoeopathic Medicine and Surgery and found qualified for the same, the Degree of

Bachelor of Homoeopathic Medicine and Surgery

has been conferred on her at Bombay, on the eighteenth day of the month of January in the year one thousand nine hundred and eighty ninety-one

In Testimony whereof are set the Seal of the said University and the Signature of the said Vice-Chancellor

M D Bungalow

Vice-Chancellor

MIPC

TRUE COPY

TRUE COPY

MIPC

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

University of Mumbai

No 12

Seat No 2

I CERTIFY THAT

Acharya Pooja

passed the Doctor of Medicine (Homoeopathy) (M.D. Hom.)

(External) Degree Examination (Part II)

Homoeopathic Materia Medica held by the University of Mumbai in the month of July 2005

Mumbai 28 SEP 2005

for Controller of Examinations

MIPC

Madhavbaug Institute of Preventive Cardiology

TRUE COPY

Director

VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

CMPH

University of Bombay

Seat No. 27 No 220.

I CERTIFY THAT

Gupta Barbka Gopalkrishna

passed the First Year Examination for the degree of Bachelor of Homoeopathic Medicine and Surgery held by the University of Bombay in the month of October 1985.

Bombay, 14 DEC 1985. for Registrar.

TRUE COPY

MIPC

TRUE COPY

Director
VPT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

University of Bombay

Seat No. 17 No 219

I CERTIFY THAT

Gupta Prabhu Gopalkrushna

passed the Second Year Examination for the degree of Bachelor of Homoeopathic Medicine and Surgery held by the University of Bombay in the month of November 1986.

Bombay, 22 JAN 1987

for Registrar.

TRUE COPY

MIPC

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

University of Bombay

No 115

Seat No. 18

I CERTIFY THAT

Gupta Prabha Gopalkrish

passed the Third Year Examination for the degree
Bachelor of Homoeopathic Medicine and Surge
held by the University of Bombay in the mon
of November 1987

15 JAN 1988

Bombay,

for Registrar.

A.T.C.

TRUE COPY

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

MIPC

cmph

University of Bombay

Seat No. 20 No 116

I CERTIFY THAT

Gupta Prabha Gopalkrishna

passed the Bachelor of Homoeopathic Medicine and Surgery Degree Examination held by the University of Bombay in the month of November 1983.

14 ... 989

for Registrar.

Bombay,

TRUE COPY

MIPC

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

TRUE COPY

MIPC

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

Mhasrul, Vani-Dindori Road, Nashik 422 004

Phone ... EPABX 0253 - ... Fax: 0253 - 2539195

Email: ... Web: http://www.muhsnashik.com

No. MUHS/E4(UG)/4103/ ... /2011

Date: 07/10/2011

To

The Secretary,
Virar Homoeopathy Medical College
Veer Savarkar Marg
Virar (E), Tal – Vasai
Dist. Thane - 401 303

Inward No. ...
Date ...
Replied / Filed

Sub :- Approval to the appointment of Teachers

Ref :- Your Letter No 1) KEMT/078/2011 dated 02/06/2011
2) KEMT/09/2011 dated 26/09/2011
Our Letter No MUHS/E4(UG)/4103/3778/2011 dated 12/08/2011

Sir

With reference to the above cited subject regarding the proposal for approval to the appointment of teachers of your College I am directed to inform you that the Hon'ble Vice- Chancellor is pleased to grant approval to the appointment of following teachers as indicated below

Sr. No.	Name of Teacher	Subject	Post	Status of approval.
01	Dr. Brahmadeo R. Mishra	HMM	Principal & Prof.	w.e.f. joining date i.e. from 02/06/2011 for one year only
02	Dr. Anuradha Kamat	Anatomy	Professor	w.e.f. joining date i.e. from 02/06/2011
03	Dr. Winifred Desouza	Anatomy	Guest Reader	w.e.f. joining date i.e. from 02/06/2011
04	Dr. Rohit Sane	Anatomy	Lecturer	w.e.f. joining date i.e. from 02/06/2011
05	Dr. Vivek Kamtikar	Physiology	Guest Professor	w.e.f. joining date i.e. from 02/06/2011
06	Dr. Maneesha Soni	Physiology	Lecturer	w.e.f. joining date i.e. from 02/06/2011
07	Dr. Prabha Acharya	Pharmacy	Professor	w.e.f. joining date i.e. from 02/06/2011
08	Dr. Amit Dhavalikar	Pharmacy	Reader	w.e.f. joining date i.e. from 02/06/2011
09	Dr. Dilip Bhavsar	Organon	Professor	w.e.f. joining date i.e. from 02/06/2011
10	Dr. Gautam Arora	Organon	Reader	w.e.f. joining date i.e. from 02/06/2011
11	Dr. (Mrs.) Bharati M. Bais	Organon	Reader	w.e.f. joining date i.e. from 02/06/2011 for one year only
12	Dr. Tejas Trivedi	Organon	Lecturer	w.e.f. joining date i.e. from 02/06/2011

Seen 11/10/11

Director
Vd. ... Madhavbaug Institute of Preventive Cardiology & Research Center

MIPC

TRUE COPY

TRUE COPY

Sr No	Name of Teacher	Subject	Post	Status of approval
13	Dr. Japa Shibila Rajamony	Organon	Lecturer	w.e.f. joining date i.e. from 02/06/2011 for one year only.
14	Dr. Arun Bhure	HMM	Professor	w.e.f. joining date i.e. from 02/06/2011.
15	Dr. Shailendra Vaishampayan	HMM	Reader	w.e.f. joining date i.e. from 02/06/2011
16	Dr. Gunjan Ramteke	HMM	Lecturer	w.e.f. joining date i.e. from 02/06/2011
17	Dr. Samir Joshi	Pathology	Reader	w.e.f. joining date i.e. from 02/06/2011
18	Dr. Kaushalendra Kumar Bibhuty	PMT	Reader	w.e.f. joining date i.e. from 02/06/2011
19	Dr. Swapnil Naik	Medicine	Lecturer	w.e.f. joining date i.e. from 02/06/2011 for one year only.
20	Dr. Himangi Raut	Medicine	Lecturer	w.e.f. joining date i.e. from 02/06/2011
21	Dr. Jatin Valiya	Surgery	Professor	w.e.f. joining date i.e. from 02/06/2011.
22	Dr. Jayant D. Jadhav	Surgery	Guest Reader	w.e.f. joining date i.e. from 02/06/2011
23	Dr. Dinesh Bhasme	PSM	Professor	w.e.f. joining date i.e. from 02/06/2011
24	Dr. Fatima Jerpurwala	PSM	Reader	w.e.f. joining date i.e. from 02/06/2011.
25	Dr. Tiji Chakkumny	PSM	Lecturer	w.e.f. joining date i.e. from 02/06/2011
26	Dr. Rajesh Barve	Repertory	Professor	w.e.f. joining date i.e. from 02/06/2011
27	Dr. Manisha Ghurde	Repertory	Reader	w.e.f. joining date i.e. from 02/06/2011
28	Dr. Priti Patanal	Repertory	Lecturer	w.e.f. joining date i.e. from 02/06/2011.

You are requested to handover the copy of this letter to above mentioned teachers.

Yours,

(R. B. Bodake)
Assistant Registrar

TRUE COPY

D:\21-2011\F-4 (T.A.)\4102\Joining Let. doc

TRUE COPY

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

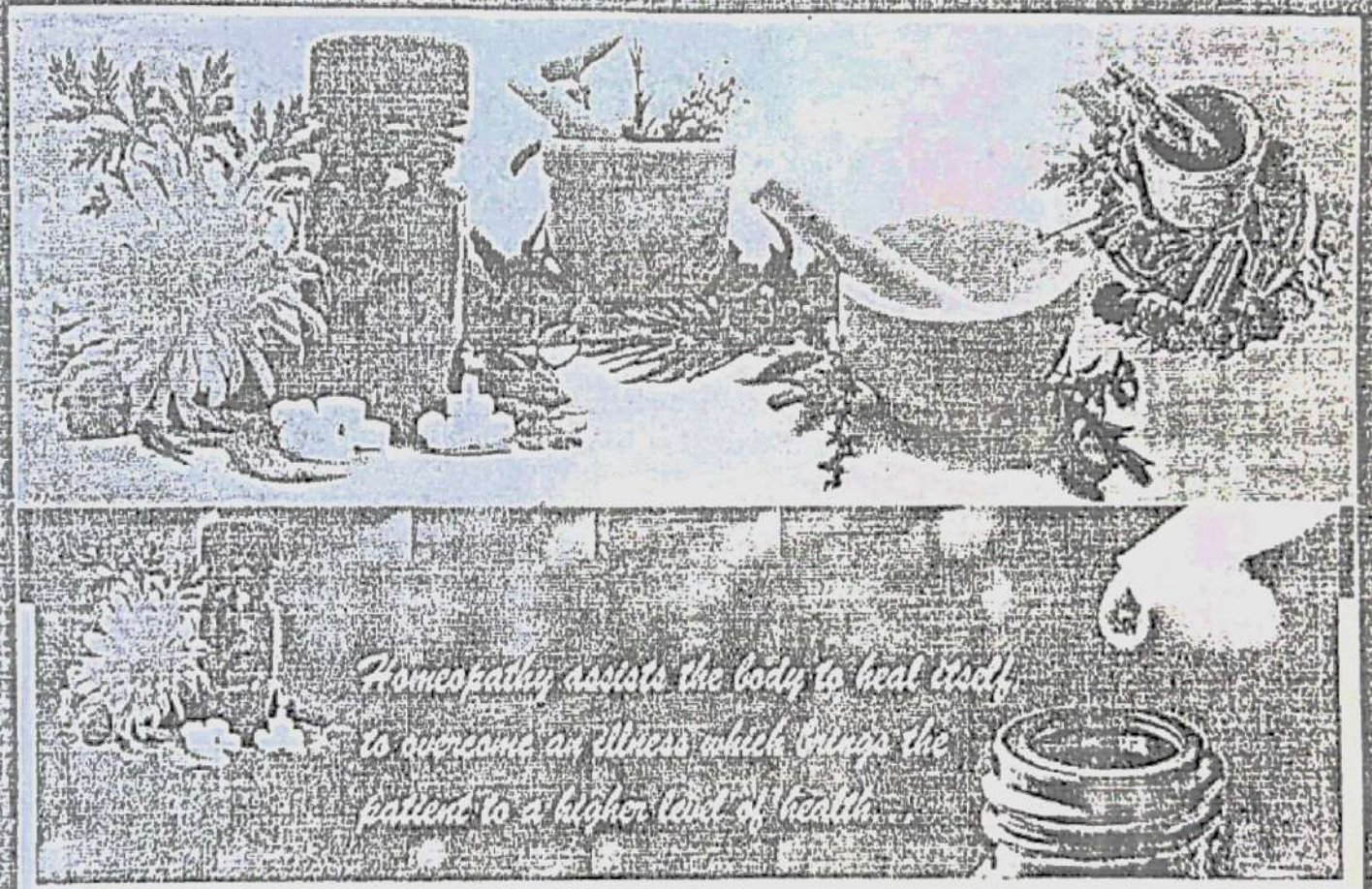
Postal Registration No
STR/038/2016-2018

ISSN 2278 - 8646
RNI. No. MAHMUL/2007/19492

THE CLASSICAL SCIENCE

A PEER REVIEWED MONTHLY MEDICAL JOURNAL

Vol.13 | Issue No 09 | SEPTEMBER 2019 | Rs. 25/-



Inside

धन्वंतरी नागरी सहकारी पतसंस्था मर्या., सातारा

Reg.No.SAT/SAT/RSR/(CR)/340/89-90 Dt.16-10-1989

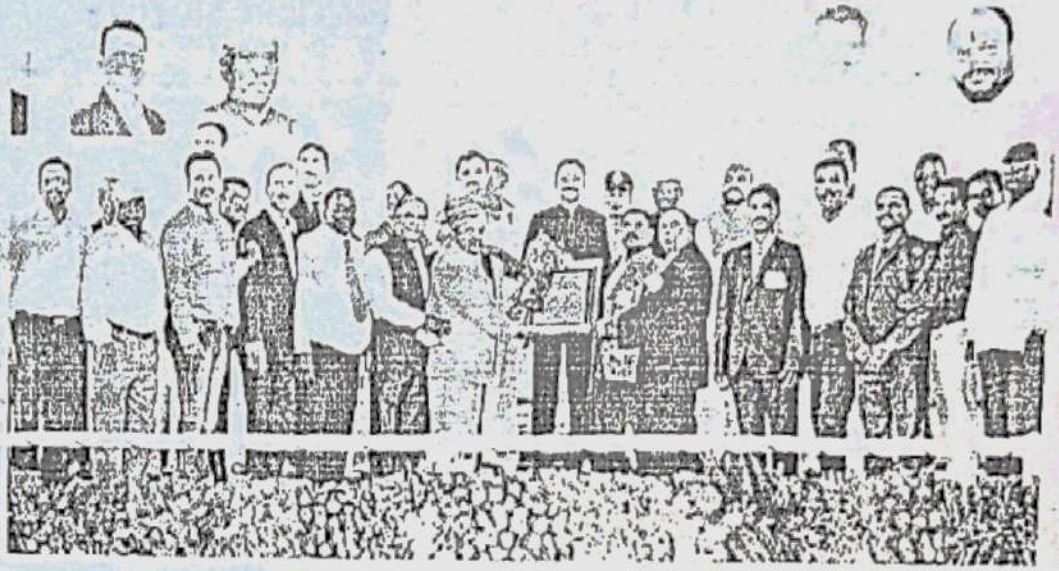
डॉ. रविंद्र भोसले
संस्थापक-चेअरमन

मुख्य कार्यालय : 'धन्वंतरी भवन', ९३ शनिवार पेठ,सातारा फोन :(०२१६२)२३८३४१

शाखा : सातारा, कोरेगांव, फलटण, कराड, निगडी-पुणे, धनकवडी पुणे

Website : www.dhanvantaripatsanstha.in Email : dhanvantari_patsanstha@rediffmail.com

डॉ. कांत फडतरे
व्हा. चेअरमन



संस्थेच्या सातारा शाखेत कामकाज सकाळी ९ ते रात्री ९

संस्थेच्या सातारा शाखेत कामकाज सकाळी ९ ते रात्री ९

सन २०१५-२०१६ करिता महाराष्ट्र शासनाचा पुणे विभागातून 'सहकार भूषण' पुरस्काराने मा. राज्यपालसो यांचे हस्ते गौरव

३०/०९/२०१९ अखेरील माहिती

१)	खेळत भाग भांडवल	२०७ कोटी ९९ लाख
२)	वसूल भाग भांडवल	१० कोटी ४३ लाख
३)	एकूण निधी	२४ कोटी ८२ लाख
४)	एकूण ठेवी	१७१ कोटी ७१ लाख
५)	एकूण येणे कर्ज	११४ कोटी ७८ लाख
६)	एकूण गुंतवणूक	९२ कोटी ८० लाख
७)	एकूण सभासद	९९४४
८)	सी.डी.रेशो	६१.२०%
९)	थकबाकी शेकडा प्रमाण	८.७१%
१०)	सी.आर.ए. आर.	४८.१९%

ठेवीचा प्रकार व मुदत	द. सा. द. शे
३० दिवस ते ९० दिवस	५ %
९१ दिवस ते १ वर्ष	६%
१ वर्ष ते ३ वर्ष मुदतीसाठी	७.५०%
पेन्शन ठेव (दरमहा व्याज	७.५०%
धनसंचय ठेव	३.००%
रिकरिंग ठेव	८.५०%
सेव्हिंग्ज ठेव	४%
दामदिडपट ठेव	७.२५%
दामदुप्पट ठेव	७.२५%
जादा नागरिक मुदत ठेव	८.००%

५० वर्षे [illegible] नागरिकांना १ वर्षापुढे मुदत ठेवीत व किमान २ वर्षापुढे पेन्शन [illegible] प्रचलित व्याजदरापेक्षा १/२% जास्त व्याज देण्यात येईल.

श्री. संजय यादवराव पवार
सरव्यवस्थापक

Director
VPT's Madhavbaug Institute of Preventive Cardiology & Research Center

डॉ. कांत नारायण फडतरे
व्हाईस चेअरमन

MIPC Madhavbaug Institute of Preventive Cardiology

डॉ. रविंद्र नामदेव भोसले
संस्थापक- चेअरमन

TRUE COPY

संचालक मंडळ

डॉ. श्री. लाहोटी, डॉ. शिरीष भाईटे, डॉ. अरविंद काळे, डॉ. शकील अत्तार, डॉ. सुनिल कोडगुले, डॉ. हेमंत शिंदे, डॉ. राजेंद्र जाधव, डॉ. राजेंद्र सरगर, डॉ. वैजयंता खडतरे, डॉ. सौ. सारिका सरकार, डॉ. अभिजीत भोसले.

आमचा संकल्प आपली सेवा - आपला मात्र सहकार्याचा हात हवा.

STUDY OF THE LIVER AND RENAL FUNCTION IN PATIENTS OF CHRONIC HEART FAILURE BASED ON THE BODY MASS INDEX: A RETROSPECTIVE STUDY

Dr. Rohit Sane[1], Dr. Gurudatta Amin[2], Dr.Manisha Ghurde[3], Dr. Snehal Dongre[1], Dr.Prabha Acharya[4] and Dr. Rahul Mandole*[1]

Department of Research and Development, Madhavbaug Hospital, Khopoli, India.
Department of Clinical Operations, Madhavbaug Hospital, Khopoli, India.
Medical Head, Madhavbaug Hospital, Khopoli, India
Department of Research and Development, Madhavbaug Hospital, Khopoli, India.
VRT's Madhavbaug Institute of Preventive Cardiology, Thane India.

*Corresponding Author: Dr. Rahul Mandole
Department of Research and Development, Madhavbaug Hospital, Khopoli, India

ABSTRACT

Background: Chronic heart failure (CHF) is known to affect hepatic and renal function adversely, but relevant Indian data is scarce. This study aimed to assess liver function tests (LFTs) and renal function tests (RFTs) of CHF patients and their relation to BMI status. **Methodology:** The retrospective study considered data of patients who consulted Madhavbaug clinics in Maharashtra, India between July-December 2018. Baseline LFTs and RFTs were analyzed wholly and based on BMI status, viz. normal-BMI, overweight and obese. **Results:** Of 147 patients, majority were males (74.15%) with mean age of 59.15±10.28 years. Based on BMI, three patient sub-groups were made: (56 with normal BMI, 60 were overweight and 30 were obese). Mean SGOT and SGPT were lower in obese group, but this was insignificant ($p>0.05$). OverallALP was increased in all CHF patients but was comparable in all three sub-groups ($p>0.05$). Mean direct bilirubin were above-normal in all sub-groups, but mean total and indirect bilirubin were normal. Mean A:G ratio was normal in all sub-groups. Total serum protein was below normal in all sub-groups, being lowest in overweight group, but these findings were insignificant ($p>0.05$). RFTs, viz. BUN and serum creatinine, were normal and comparable in all sub-groups ($p>0.05$). **Conclusion:** Mild elevation in direct bilirubin and notable ALP elevations were seen in CHF patients but their RFTs were normal. Mean LFTs and RFTs were comparable in patients with normal BMI, overweight or obese patients, indicating lack of association between BMI and hepatic or renal function.

KEYWORDS: Liver function, Renal function, Body Mass Index, Heart Failure.

INTRODUCTION

Cardiovascular diseases (CVDs) are few of the commonest reasons for morbidity as well as mortality in the world, and India is no exception. According to available data, CVD is the commonest cause of death in India. Chronic heart failure (CHF), which is reduced proficiency of the heart to pump the blood in the systemic circulation or inability to fill itself suitably with blood, affects about 10 million Indians. The prevalence of CHF is about 1% in thecountry.

CHF is associated with hepatic derangement due to liver congestion, which are generally asymptomatic but associated with deranged liver function tests (LFTs). Abnormal biochemical LFTs may be seen in CHF patients, but studies have shown variability in the findings. Also, if there are massive elevations seen in LFTs of CHF patients, these may be predictive ofadverse outcomes. There are studies based on the LFTs in CHF patients in the developed countries, but suchdatain the Indian setting is scarce.

Renal function is a known, but often neglected determinant of CHF prognosis. Studies have reported that renal insufficiency may be associated with poor CHF outcomes. However, there is a definite paucity of data with respect to the prevalence of renal insufficiency in CHF patients in the Indian context.

Body mass index (BMI), which is used to indicate the presence or absence of obesity in the population, is considered to be an important determinant of CHF risk and prognosis. Studies have shown that there is an increased risk of CHF development in patientswith increased BMI. Obesity, which is defined as BMI

more than 30 kg/m2, is considered an important risk factor for development of hypertension (HTN), diabetes mellitus (DM) and dyslipidemia, all of which are diseases which worsen the CHF prognosis. Literature search revealed that majority of CHF patients are obese, and this may be related to the impaired LFTs and RFTs in these patients. However, the specific impact of increasedBMI on the RFTs and the LFTs have not been studied in detail

In this retrospective study, we planned to assess the baseline LFTs and RFTs of CHF patients who visited the Madhavbaug clinics in India to tap the abnormalities in the hepatic or renal functioning. We also tried to assess these biochemical parameters based on the BMI status of the patients, after classifying the patients as those with normal BMI, overweight or obese

METHODOLOGY

This retrospective study was conducted utilizing the data of patients who suffered from CHF and visited the Madhavbaug clinics in the Indian state of Maharashtra. These CHF patients visited the clinics for check-up between July 2018 to December 2018. The case record files of these patients were assessed for completeness of the baseline characteristics, viz demographic details, anthropometric details, liver function tests (LFT) and the renal function tests (RFT). Data of only those patients was assessed who had completeness of the baseline records.

The CHF patients who came to the Madhavbaug clinics for the first time were subjected to general and systemic

examination, followed by blood collection to assess the LFTs and the RFTs. The blood was collected from the antecubital vein and sent to the laboratory for reporting. The biochemical values obtained were then entered in the case records of these patients after the test reports arrived. The LFTs which were taken into consideration from the baseline clinical records included alkaline phosphatase, serum glutamic-oxalacetic transaminase (SGOT), serum glutamic-pyruvic transaminase (SGPT), serum bilirubin (total, direct and indirect), albumin to globulin ratio and total protein levels. The baseline RFTs which were checked for in the medical records included serum creatinine and blood urea nitrogen (BUN). The normal range for the LFTs and RFTs were considered from standard textbooks and published literature (Table1)

The patients were classified based on the BMI as those having BMI in normal range, those who are overweight or obese based on the WHO classification followed worldwide. The BMI of between 18-24.9 kg/m2 were considered normal, between 25 to 29.9 kg/m2 were considered overweight while those above 30 kg/m2 were considered obese. The mean RFTs and LFTs values were calculated separately for these three BMI sub- groups and then the mean values werecompared.

Table 1: Normal Range for LFTs and RFTs.

Serum BUN	0-45
SGPT/ALT	0-35
ALP/ALT	30-120
Total bilirubin (mg/dl)	0.2-1
Direct bilirubin (mg/dl)	0-1
Indirect bilirubin (mg/dl)	1
Albumin/Globulin ratio	1.5-2.5:1
Total protein (g/dl)	6-7.8
BUN (mg/dl)	7-20
Serum creatinine (mg/dl)	0.7-1.2

Data entry as well as coding was done in Microsoft Excel. Graphpadinstat software was utilized for data analysis. Categorical data was represented in the numeric form and continuous data was described as mean ± SD. The mean values of LFTs and RFTs were compared between the three subsets (normal BMI, overweight and obese) using Analysis of Variance (ANOVA) test. P value of less than 0.05 was considered statistically significant

RESULTS

147 patients visited the Madhavbaug clinics between the study period and had all the relevant details present in the case records. The data of these 147 patients was included in the study for analysis. The demographic details were recorded, and it was found that most of the patients were males (109 patients, 74.15%). The mean age of the CHF patients included in the study was 59.15 years, witha mean weight of 69.21 and mean heightof

1.6 meters, i.e. 160 centimeters. The mean BMI calculated forthe patients was 26.69 kg/m (Table2)

Based on the BMI the patients were classified as per the WHO guidelines in three categories: those having normal BMI, those who were overweight and those who were obese (Table 3). 56 patients were found to

have normal BMI, 60 patients were over-weight while the remaining 30 were found to beobese.

Table 2: Demographic Details of CHF Patients (n=147).

Mean age (years)	59.15 ± 10.28
Median age (years)	59 (Range: 30-80)
Number of males	109 (74.15%)
Number of females	38 (25.85%)
Mean baseline weight (kg)	69.21 ± 14.39
Mean baseline height (meter)	1.6 ± 0.08
Mean Body mass index (BMI) (kg/m2)	26.69 ± 4.97

Table 3: Classification of patients based on BMI (n=147).

Normal BMI (18.5-24.99 kg/m²)	Overweight (25-29.99 kg/m²)	Obese (>30 kg/m²)
56	60	30

The mean values of all the LFTs and the RFTs were calculated based on the BMI-based subgroups and the comparison of these mean values was made between the three sub-groups. Amongst the LFTs, the mean SGOT and SGPT values were lower in the obese group, but this was not statistically significant ($p>0.05$). The overall ALP was increased in all the CHF patients. However, the mean ALP was comparable in all the three sub-groups ($p>0.05$) but was lowest in the normal BMI group. The mean direct bilirubin levels were found to be above the normal range in all the groups, but the total and the indirect bilirubin levels were in the normal range. Total bilirubin and indirect bilirubin were lowest in the obese group, and this was a statistically significant finding ($p<0.05$). The mean A/G ratio was found to be in the normal range, but the total serum protein was lower than the normal range in all the sub-groups. The mean A/G ratio was lowest but mean total protein was highest in the normal-BMI group, but these findings were statistically insignificant ($p>0.05$). The RFTs, viz. BUN and serum creatinine, were all in the normal range in all the groups, and comparable in the sub-groups ($p>0.05$) (Table 4).

Table 4: Comparison of Liver function test and Renal Function test according to BMI parameters in CHF patients.

Variables assessed	Overall mean values (n=147)	Normal BMI (18.5-24.99 kg/m²) (N=56)	Overweight (25-29.99 kg/m²) (N=60)	Obese (>30 kg/m²) (N=30)	P value
SGOT (U/L)	31.03 ± 15.04	34.01 ± 14.07	32.79 ± 17.96	27.67 ± 9.32	0.56
SGPT (U/L)	26.36 ± 15.05	27.46 ± 17.95	26.12 ± 13.60	24.87 ± 11.87	0.62
Alkaline phosphatase (ALP)	213.87 ± 82.1	210.16 ± 90.22	210.25 ± 70.38	215.84 ± 78.48	0.47
Total bilirubin	0.94 ± 0.11	1.04 ± 0.38	0.93 ± 0.39	0.79 ± 0.42	<0.001*
Direct Bilirubin	0.31 ± 0.19	0.35 ± 0.21	0.31 ± 0.11	0.33 ± 0.31	0.43
Indirect bilirubin	0.59 ± 0.3	0.66 ± 0.2	0.59 ± 0.31	0.48 ± 0.28	<0.001*
Albumin/Globulin ratio	1.57 ± 0.65	1.49 ± 0.37	1.65 ± 0.86	1.56 ± 0.57	0.27
Total protein	6.6 ± 0.94	6.6 ± 0.98	6.41 ± 1.22	6.47 ± 1.35	0.8
BUN	12.71 ± 8.11	11.5 ± 7.71	12.76 ± 6.26	14.81 ± 11.6	0.71
Serum creatinine	1.12 ± 0.44	1.12 ± 0.34	1.14 ± 0.45	1.1 ± 0.59	0.43

DISCUSSION

Obesity is an important risk factor for CVDs including CHF, and BMI is an important indicator for imminent or prevalent obesity. Multiple studies have found that CHF patients having BMI higher than the normal range are at an enhanced risk of mortality [1]. Higher than normal BMI is related to the development of multiple metabolic diseases including HTN and DM. Hence, directly and indirectly, BMI affects the CHF development and prognosis. CHF is also known to affect the liver and the renal function of the body according to many studies published in the developed countries, but it is not clearly known whether the same can be said about Indian CHF patients. It is also not clear that whether BMI plays a role in the deranged LFTs and RFTs in the CHF patients. Hence, the authors decided to analyze the available baseline data to evaluate whether CHF patients showed any biochemical derangement in LFTs or RFTs, both as a whole as well as based on the BMI status of the patients.

The baseline LFT and RFT data of 147 CHF patients were analyzed. On evaluation of the whole data set, it was found that, out of the LFTs, the mean ALP and the mean direct bilirubin were raised above the normal range. The mean serum total protein was found to be mildly lowered in the CHF patients. However, the mean SGOT, mean SGPT, mean total bilirubin as well as indirect bilirubin, and the mean A/G ratio were in the normal range. An increase in the direct bilirubin is seen in parenchymal liver disease, which may be due to CHF. The mean ALP levels in this study were increased approximately twice the normal range. The increased central venous pressure (CVP) leads to passive congestion of the liver in CHF, which can lead to ALP elevation along with elevation of other liver enzymes.[2] Another important reason for elevated liver enzymes is decreased hepatic perfusion due to reduced cardiac output in CHF, thereby causing hepatocellular damage and elevated liver enzymes and bilirubin. However, the ALP is a non-specific enzyme which may be raised in bile duct obstruction, cirrhosis or even in bone disease. Hence, the raised ALP may not be linked with CHF, in the presence of normal SGOT and SGPT. The decreased mean protein, which was mild, can also be physiological due to aging or due to decreased liver function. Once again, the change in serum protein is mild and hence, inconclusive.

The RFTs which were noted down were serum creatinine and BUN, and both were in the normal range. This was in contrast to multiple studies in the western countries, which have shown that how long-term CHF can compromise renal functions. In a study by Tonelli et al., 33% of patients with CHF developed chronic kidney disease (CKD) in late life while the number was 32% in another study by Damman et al. Just like for liver function, the main causes for compromised renal function in CHF patients are increased CVP and reduced renal blood flow. Initially, renal auto-regulation maintains the kidney function and this may be the reason why patients in our study had normal RFTs. However, glomerular filtration rate (GFR) declines over a period of time, and there is compromised renal function in the later stage of life.[3]

The mean BMI for the CHF patients in this study was 26.69 kg/m^2, falling in the overweight category.[4] 60 of the 147 patients were overweight, 56 of them fell in the normal BMI category while 30 of them were in the obese category. It was found that all the values, except total bilirubin and indirect bilirubin, were comparable in the three BMI categories. Even though the total and the indirect bilirubin were significantly lower in the obese class of CHF patients, the values in all the groups were in the normal range and hence this statistical significance was clinically irrelevant. In our knowledge, this is one of the first studies which has tried to assess the LFTs and RFTs in CHF patients, based on the BMI and hence, this study holds a novelty factor.

The study had a few limitations. The study was carried

only in Western India, and hence patients of the whole country were not represented in the sample, creating region bias. Also, the sample size was low. A study with a bigger sample size, multiple centers and over a longer period may help in creating more robustevidence.

CONCLUSION

Mild elevation in direct bilirubin and notable elevations in ALP were seen in CHF patients but their RFTs were in the normal range. The mean LFTs and RFTs values were comparable in patients with normal BMI, overweight or obese patients indicating possible lack of association between BMI and hepatic or renal derangement in CHF patients. More evidence needs to be generated in Indian

CHF patients to create stronger evidence with regards to the LFTs and RFTs in CHF patients.

REFERENCES

1. Prabhakaran D, JeemonP, Roy A Cardiovascular Diseases in India. Circulation, 2016; 133(16):1605-20.
2. Coronel R, de Groot JR, van Lieshout JJ. Defining heart failure. Cardiovasc Res., 2001; 50:419–22.
3. Seth S. Heart Failure in India: Need for Indian Guidelines. Cardiological Society of India. Accessed from www.csi.org.in/Cardio pdf-21.pdfon 6-February2018.
4. Auer J. What does the liver tell us about the failing heart? EHJ., 2013; 34:711-14.
5. Aaronson KD, Schwartz S, Chen TM. Development and prospective validation of a clinical index to predict survival in ambulatory patients referred for cardiac transplant evaluation. Circulation. 1997; 95: 2660- 67.
6. McAlister FA, Ezekowitz J, Tonelli M, Armstrong PW. Renal insufficiency and heart failure: prognostic and therapeutic implications from a prospective cohort study. Circulation, 2004, 109(8): 1004-9.
7. KenchaiahS, Evans JC, Levy D. Obesity and the risk of heart failure. New Engl J Med, 2002; 347: 305–13.
8. Gierach M, Gierach J, Ewertowska M, Arndt A, JunikR. Correlation between Body Mass Index and Waist Circumference in Patients with Metabolic Syndrome. ISRN Endocrinology. 2014;1-6.
9. Giallourakis CC. Liver Complications in Patients with Congestive Heart Failure. Gastroenterology & Hepatology. 2013; 9(4): 244-46.
10. LimdiJK, Hyde GM. Evaluation of abnormal liver function tests. Postgrad Med J., 2003, 79:307-12.
11. Harrison T, Kasper D. Harrison's principles of internal medicine. 20ed. New York: McGraw-Hill Medical Publ. Division,2018.
12. Nuttall FQ. Body Mass Index: Obesity, BMI, and Health: A Critical Review. NutrToday, 2015; 50(3): 117-128.
13. Martinez S, BykuM, Novak E, Cedars A, Eghtesady P, Ludbrook P et al. Increased Body Mass Index Is Associated with Congestive Heart Failure and Mortality in Adult Fontan Patients. Congenital Heart Disease, 2015, 11(1):71-9.
14. AuneD, Sen A, Norat T, Janszky I, Romundstad P, TonstadS, VattenLJ. Body Mass Index, Abdominal Fatness, and Heart Failure Incidence and Mortality: A Systematic Review and Dose-Response Meta- Analysis of Prospective Studies. Circulation. 2016; 133(7):639-49.
15. Tian CR, Qian L, Shen XZ, Li JJ, Wen JT. Distribution of serum total protein in elderly Chinese. PLoSOne, 2014; 9(6):e101242.
16. DammanK, Valente MA, Voors AA, O'Connor CM, Van VeldhuisenDJ, HillegeHL. Renal impairment, worsening renal function, andoutcomein patients with heart failure: an updated meta- analysis. Eur Heart J. 2014; 35, 455-69.
17. Tonelli M, Wiebe N, Culleton B, House A, Rabbat C, FokM, McAlister F, Garg AX. Chronic kidney disease and mortality risk: a systematic review. J Am Soc Nephrol. 2006; 17:2034-47.
18. Damman K, TestaniJM. The kidney in heart failure: an update. European Heart Journal, 2015, 36:1437-44.

To Study Effect of Heart Failure Reversal Therapy (HFRT) on the Anthropometric Obesity Parameters in Patients of Chronic Heart Failure

Dr. Rohit Sane [1], Dr. Gurudatta Amin [2], Dr.Prabha Acharya[5], Dr. Snehal Dongre[3], Dr.Manisha Ghurde[5], Dr. Rahul Mandole [*4]

[1]Department of Research and Development, Madhavbaug Hospital, Khopoli, India [2]Department of Clinical Operations, Madhavbaug Hospital, Khopoli, India [3]Medical Head, Madhavbaug Hospital, Khopoli, India

[4]Department of Research and Development, Madhavbaug Hospital, Khopoli, India

[5]VRT's Madhavbaug Institute of Preventive Cardiology, Thane, India

**Corresponding author* - Dr. Rahul Mandole

Abstract

Background: Chronic heart failure (CHF) is a common cause of mortality and morbidity. Obesity influences the CHF development and prognosis. This study was conducted to assess effect of Heart failure reversal therapy (HFRT), a combination of panchakarma and allied therapies, on anthropometric parameters in CHF patients. ***Methodology:*** This retrospective study was conducted on data of patients who visited Madhavbaug clinics in Maharashtra, India between July-December 2018. Selection was based upon the availability of complete baseline (day 1 of HFRT) and follow-up data (day 30 of HFRT) of CHF patients who were admitted for minimum 5 days for HFRT. ***Results:*** Out of 147 patients, 74.15% were males with mean age 59.15±10.28 years. There was statistically significant decrease ($p<0.05$) in both mean BMI and abdominal girth at day 30 of HFRT. 42 of 147 patients (28.57%) had hypertension (HTN) with CHF, 22 patients (14.97%) had diabetes mellitus (DM) and 61 patients (41.49%) had both HTN and DM. In all these sub-groups, mean BMI and abdominal girth was significantly decreased ($p<0.05$) at day 30. Strong positive correlation was found between BMI and abdominal girth on day 1 ($R=0.9$, $P<0.05$) and day 30 ($R=0.83$, $P<0.05$) by Pearson's correlation. Similar correlation was found between the two parameters in subsets of CHF patients having HTN or DM or both DM and HTN ($p<0.05$). ***Conclusion:*** HFRT decreased BMI and abdominal circumference significantly in CHF patients, irrespective of the presence of HTN or DM. Both the anthropometric parameters correlated strongly in all co-morbidity subsets of CHF patients.

Keywords: *HFRT, Obesity, Body mass Index, Abdominal Girth, Comorbidity*

Introduction

Globally, cardiovascular diseases (CVDs) are few of the commonest causes of morbidity and mortality and the picture in India matches the global scenario. In the true sense, CVD has become the commonest cause of death in the country.[1] Chronic heart failure (CHF) is an intricate clinical syndrome which involves reduction in the ability of the heart to pump the blood in the systemic circulation or inability to fill itself appropriately with blood.[2] Approximately 8-10 million Indians are suffering from CHF, with an estimated prevalence of 1%.[3] There are well-known guidelines which talk about different pharmacological agents like angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), vasodilators as well as beta blockers for the management of CHF. However, despite these multiple treatment options, the CHF mortality in India is as high as 20%- 30%.[4] Hence, there is a need of new treatment modalities which will improve the prognosis of CHF.

The role of obesity in the development or the CHF is widely debated. According to the Framingham Study there is an enhanced risk of developing CHF in people having elevated body mass index (BMI) (5% risk in men and 7% risk in women for every rising point of BMI).[5] Though there are doubts over the role of obesity as a solitary risk factor in the CHF development as well as prognosis, it is a proved fact that obesity is associated indirectly or directly in the

development of hypertension, type II diabetes mellitus and dyslipidemia, all of which are risk factors for CHF progress and development.[9] Hence, there needs to be development of therapeutic options which can help control obesity, benefitting the patients of CHF.

Physicians practicing alternative medicine believe that in the chronic stage of heart failure, use of *panchakarma* therapy (a 5- step procedure for delivering internal body purification) is an effective add-on therapy.[7] Heart failure reversal therapy (HFRT), also known as *sampurnahrudayshudhikaran*(SHS) therapy, is a blend of herbal treatment with panchakarma and allied therapeuticmodalities.[8-10] The techniques utilized in HFRT include snehana (massage), swedana (passive heat therapy) and basti (medicated enema), which are known to free the body from the toxins.

There has been some recent published evidence on the effect of the HFRT therapy on CHF patients. However, there is a paucity of data on the specific effect of HFRT on the modifiable anthropometric parameters for obesity in the CHF patients, which are BMI and abdominal circumference. Though BMI is a commonly utilized parameter to monitor obesity in the population, it does not give information on the adipose tissue distribution in an individual. Abdominal obesity, which is indicated by waist circumference, plays a crucial role in the cardiovascular risk assessment. Major health organizations like World Health Organization (WHO) have also suggested the combination of BMI as well as abdominal obesity to determine the distribution of adipose tissue in a more profoundway.[11]

In this retrospective study, the effect of HFRT was analyzed on BMI as well as waist circumference in CHF patients, to know the impact of HFRT on both the generalized body fat as well as on the abdominal obesity. We also assessed the correlation of the two anthropometric obesity parameters to check whether they go hand- in-hand, both before as well as after HFRT intervention

Methodology

This was a retrospective study conducted on the data of the patients who visited the Madhavbaug clinics in Maharashtra, India between July 2018 to December 2018. The data of only those patients was considered who had been administered HFRT over minimum 5 days of admission in the Madhavbaug clinics. Cases were identified, and data was assessed from the medical records of Madhavbaug clinics in Maharashtra. The selection was based upon the availability of complete relevant baseline data (day 1 of HFRT) and follow-up data (day 30 of HFRT) of the patients. The information about co-morbidities, if any, were noted down from the medicalrecords.

The HFRT is an amalgamation of panchakarma as well as allied therapies. HFRT uses different oils and decoctions, which constitutes of a 4-step procedure, described below in table 1.

Table 1: Study Treatment: Heart Failure Reversal Therapy (HFRT)

Step of HFRT	Type of Therapy	Herbs used for therapy	Duration of Therapy
Snehana	Massage [illegible] upper strokes [illegible] towards heart	[illegible] (Oil of extract processed [illegible] oil)	[illegible] minutes
Swedana	Passive heat therapy	Dashmoola group of ten herbal roots with [illegible]	10-15 minutes [illegible] 3-4 minutes [illegible] procedure
[illegible]	[illegible]	[illegible]	[illegible]
Basti	Medicated enema [illegible] should be [illegible] minutes for maximum absorption	[illegible] (Oil and aqueous extract)	10 minutes

Madhavbaug Institute of Preventive Cardiology
MIPC

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

On the first day of hospital admission before starting HFRT, the BMI was evaluated by taking into consideration the height and the weight of the patients and using the formula: weight in kilograms/(height in meters)^{2}. The abdominal girth of patients was measured on day 1 before initiating HFRT using a measuring tape and noted down in medical records. In a similar way, the measurements of height, weight and abdominal girth were done on day 30 from HFRT initiation and the comparison with the baseline BMI and abdominal girth was done.

Data was entered and coded in Microsoft Excel spreadsheet. GraphpadInstat software was used to analyze the data. Categorical data were represented in the numeric form and continuous data were presented as the mean ± SD. Paired t-test was used to assess the difference between the values at baseline and 30th day after treatment initiation. Correlation between BMI and abdominal girth was calculated using Pearson's correlation coefficient. P value <

0.05 was considered statistically significant.

Results

A total of 147 patients' data was included in the study for analysis. The demographic details were compiled, and it was found

that majority of the patients were males (74.15%). The mean age of the CHF patients was 59.15 years, with a mean baseline weight of

69.21 kilograms and mean height of 1.6 meters (Table 2).

Table 2: Demographic Details of CHF Patients (n=147)

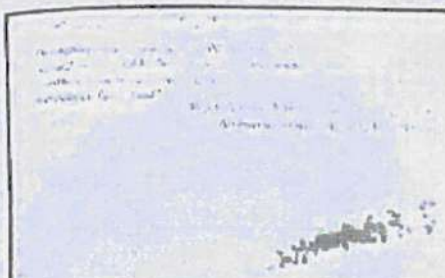
Mean age (years)	59.15 ± 10.28
Median age (years)	59 (Range: 30-80)
Number of males	109 (74.15%)
Number of females	38 (25.85%)
Mean baseline weight (kg)	69.21 ± 14.39
Mean baseline height (meter)	1.6 ± 0.08

On comparing the mean BMI of all CHF patients between day 1 and day 30 of HFRT treatment, there was statistically significant decrease, assessed by paired T test. Similar findings were noted for mean abdominal girth, with statistically significant decrease at day

30. 42 of the 147 patients (28.57%) had hypertension (HTN) associated with CHF, 22 patients (14.97%) had type II diabetes mellitus (DM) and 61 patients (41.49%) had both HTN and DM along with CHF. In all these sub-groups, the mean BMI and mean abdominal girth was found to be significantly decreased at day 30 compared to that on day 1. (Table3) **Table 3: Change in Anthropometric Obesity Parameters in Patients of CHF based on co-morbidities**

		Day 1 of treatment	*Day 30 of treatment*	*P value*
All CHF patients [N=147]	Mean BMI (kg/m2)	26.09 ± 4.6	25.16 ± 5.05	0.01*
	Mean Abdominal girth (cm)	98.82 ± 12.74	93.68 ± 12.36	0.01*
CHF with Hypertension (HTN) [N=42]	Mean BMI (kg/m2)	26.07 ± 4.64	25.09 ± 5.05	0.01*
	Mean Abdominal girth (cm)	[illegible]	[illegible]	0.01*
CHF with Diabetes mellitus (DM) [N=22]	Mean BMI (kg/m2)	[illegible]	24.46 ± 6.25	0.01*
	Mean Abdominal girth (cm)	[illegible] ± 15.47	91.44 ± 14.96	0.01*
CHF with both HTN and DM [N=61]	Mean BMI (kg/m2)	27.34 ± 4.83	25.66 ± 5.44	0.01*
	Mean Abdominal girth (cm)	101 ± 12.9	95.79 ± 12.35	0.01*

P<0.05 considered significant by Paired T test



s Pearson Correlation Coefficient: R=0.9 (Strongcorrelation

Pearson Correlation Coefficient: R=0.83 (Strongcorrelation)

On subgroup correlation analysis based upon the associated co-morbidities, we found strong correlation between BMI and abdominal girth in subsets of CHF patients having only HTN, only DM or both DM and HTN, and all these correlations were statistically significant.Table 4: Correlation between BMI and Abdominal girth in patients of CHF with various co-morbiditie

Obesity poses as a risk factor for multiple CVDs, prominent of which are CAD and CHF. BMI is considered as an important indicator of sedentary lifestyle as well as impending or prevalent obesity. Many studies have shown that CHF patients having high BMI are at an increased risk of mortality.[12,13] Abdominal obesity, indicated by calculating the abdominal girth, is associated with development of multiple metabolic diseases like HTN and DM. These metabolic diseases are known risk factors for not only the development of CHF but also alters the prognosis. Hence, measuring of the anthropometric obesity indicators, which are BMI and abdominal girth, are equally important to predict the development or prognosis of CHF.

The existing treatment modalities have positive effects on the cardiovascular parameters but when it comes to their effect on BMI or abdominal girth, none of the drugs of CHF are known to be affecting them. There is certainly a dire need of modalities which can help modify these anthropometric parameters, which may directly and indirectly help in making the CHF prognosis more positive. Physicians practicing alternative medicine utilize panchakarma therapy as an add-on therapy for treatment of CHF and HFRT is a combination of panchakarma with allied therapies.[14] However, the effect of HFRT on the specific anthropometric parameters in patients of CHF are not well established, and no study has taken the co-morbidities besides CHF into consideration. Hence, it was thought to evaluate the effect of HFRT on BMI and abdominal girth in CHF patients, and also analyze

Day of assessment	Comorbidity seen	R (Correlation coefficient)	Interpretation	P value
Day 1 of HFRT	All CHF patients [N=147]	0.9	Strong positive correlation	<0.01*
	CHF with Hypertension (HTN) [N=42]	0.83	Strong positive correlation	<0.01*
	CHF with Diabetes mellitus (DM) [N=22]	0.91	Strong positive correlation	0.01*
	CHF with both HTN and DM [N=64]	0.91	Strong positive correlation	0.01*
Day 30 of HFRT	All CHF patients [N=147]	0.83	Strong positive correlation	<0.01*
	CHF with Hypertension (HTN) [N=42]	0.8	Strong positive correlation	<0.01*
	CHF with Diabetes mellitus (DM) [N=22]	0.95	Strong positive correlation	<0.01*
	CHF with both HTN and DM [N=64]	0.8	Strong positive correlation	<0.01*

Discussion

the data based on the subgroups suffering from HTN or DM orboth.

In this study, we assessed the effect of HFRT, a novel treatment modality, in CHF patients, on the obesity parameters of BMI and abdominal girth, after 30 days of HFRT initiation. It was found that HFRT significantly lowers the BMI and abdominal girth at day 30, compared to the baseline. The sub-group analysis to assess the effect of HFRT in CHF patients suffering from DM and HTN, separately and together, yielded positive results. This was done to evaluate whether any underlying metabolic disease will affect the positive effect of HFRT on the anthropometric measurements, which was not the case. Hence, irrespective of the underlying metabolic disease of HTN and DM, HFRT may benefit the patients based on BMI and abdominal girth.

HFRT comprises of *Snehana*(external oleation or massage), *Swedana*(passive heat therapy), *Hridaydhara*(decoction dripping therapy) as well as *Basti* (per rectal drug administration). Published literature states that the sympathetic nervous system is activated in obesity.[14] It has been theorized that *Snehana*decreases the sympathetic activity of the body, which may be one of the factors which may be decreasing the body fat. *Swedana*involves exposure of the body to external heat, which is believed to decrease the subcutaneous body fat. Stress is a common factor which is associated with increasing BMI as well as obesity which may be tackled by *Hridaydhara*, which leads to patient relaxation both mentally as well as physically. According to a published research on obese patients, *Basti* moderates the immune responses by controlling the pro-inflammatory cytokines, immunoglobulins and functional properties of T-cells. These alterations are associated with a reduction in the bodyweight.[15]

BMI does not discriminate between the fat mass and fat-free mass, which is an accepted indicator of the general health status. The robustness of BMI as an adequate obesity indicator is not proved in elderly individuals, as the fat-free mass decreases with age.[16] Waist circumference or abdominal girth helps in determining abdominal adiposity, which is a better indicator of risk to develop various metabolic diseases. By checking the correlation between BMI and abdominal circumference, it was proved that irrespective of the associated co-morbidity with CHF, HFRT significantly decreases general body mass as well as on abdominal adiposity, which correlated well in all subgroups of CHFpatients.

The study had a few limitations. The study assessment was done only after 30 days of HFRT, so long term effects of HFRT on the anthropometric parameters was not assessed. The study was of retrospective design, and so was dependent on the availability of patient data. Future research over a longer study period and with a prospective study design may be planned to generate more evidence for effect of HFRT on anthropometricmeasurements.

Conclusion

HFRT decreased BMI and abdominal circumference significantly in patients of CHF, irrespective of the presence of any other co-morbidity like HTN or DM. Both the anthropometric parameters correlated strongly in all the co-morbidity subsets of CHF patients.

Acknowledgements:

The authors thank the study participants and their families, without whom this study would not have been accomplished. We would also like to acknowledge Dr. KritarthNaman Singh for medical writing.

References

[1] Prabhakaran D, JeemonP, Roy A.

Cardiovascular Diseases in India Circulation.2016;133(16):1605-20.[2] Coronel R, de Groot JR, van LieshoutJJ Defining heart failure. Cardiovasc Res.2001;50:419-22.

[3] Seth S. Heart Failure in India: Need for Indian Guidelines. Cardiological Society of India. Accessed from www.csi.org.in/Cardio_pdf/21.pdf on 6th February 2018.

[4] Seth S, Ramakrishnan S, Parekh N, Karthikeyan G, Singh S, Sharma G. Heart failure guidelines for India: Update 2017. J Pract Cardiovasc Sci2017;3:133-8.

[5] KenchaiahS, Evans JC, Levy D Obesity and the risk of heart failure. New Engl J Med2002;347:305–13.

[6] Gierach M, Gierach J, Ewertowska M, Arndt A, JunikR. Correlation between Body Mass Index and Waist Circumference in Patients with Metabolic Syndrome. ISRN Endocrinology2014,1-6.

[7] Mishra LC, ed. In: Scientific basis for ayurvedic therapies. September. CRC Press;2003.

[8] Vinjamury SP, Vinjamury M, Suchanitakul S, Ziegler I, Panchakarma: ayurvedic detoxification and allied therapies—is there any evidence? In: Evidence-based practice in complementary and alternative medicine. Berlin, Heidelberg: Springer;2012:113–137.

[9] Mandole R, Sane R. A retrospective cohort to study the mortality and survival rate amongst chronic heart failure (CHF) patients after Ayurvedic SampurnaHrudayShudhikaran (SHS) therapy. J Clin Exp Cardiol. 2015;6:4.

[10] Sane R, Hanchate M Effect of the SampurnaHridayShuddhikaran (SHS) model in heart failure patientsin India: a prospective study Br J Med Med Res. 2014;4(1):564.

[11] Shields M, Tremblay MS, Connor SG, and Janssen I Abdominal obesity and cardiovascular disease risk factors within body mass index categories. Health Reports. 2012;23(2):7–15.

[12] Martinez S, BykuM, Novak E, Cedars A, Eghtesady P, Ludbrook P et al. Increased Body Mass Index Is Associated with Congestive Heart Failure and Mortality in Adult Fontan Patients. Congenital Heart Disease. 2015,11(1):71-9.

[13] Aune D, Sen A, Norat T, Janszkyl, RomundstadP, Tonstad S, Vatten LJ. Body Mass Index, Abdominal Fatness, and Heart Failure Incidence and Mortality: A Systematic Review and Dose-Response Meta-Analysis ofProspective Studies. Circulation.2016;133(7):639-49.

[14] Davy KP, Orr JS. Sympathetic nervous system behavior in human obesity. NeurosciBiobehav Rev. 2008;33(2):116-24.

[15] Thatte U, Kulkarni A, GhungralkarR, Panchal F, Vetale S, Teli P et al. Immunological & metabolic responses to a therapeutic course of Basti in obesity. Indian Journal of Medical Research 2015;142(1):53-62

[16] Chinedu SN, OgunlanaOO, AzuhDE, Iwcala EEJ, Afolabi IS, Uhuegbu CC et al. Correlation between body mass index and waist circumference in Nigerian adults: implication as indicators of health status. Journal of Public Health Research 2013;2(e16):93-98.

Efficacy of Low-Carbohydrate Diet (LCD) and Obesity Management Program on Obese Patients

Rohit Sane[1], Deepali Amin[2], Vaishali Koli[3], Rupali Kore[4], Prabha Acharya[5], Sneha Paranjpe[2], Rahul Mandole[1,*]

[1] Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India

[2] Madhavbaug Cardiac Care Clinics, Mumbai, India

[3] Madhavbaug Cardiac Care Clinics, Sangli, India

[*] VRT's Madhavbaug Institute of Preventive Cardiology, Thane, India

Abstract: The past two decades witnessed a rapid escalation in the prevalence of obesity. Ayurvedic physicians use a multi- faceted strategy to treat obesity which includes a combination of Low-Carbohydrate Diet and Obesity Management Procedure. The present study was conducted to demonstrate the efficacy of low carbohydrate diet and the Ayurvedic obesity management procedure in reducing obesity. A retrospective observational study was conducted in Madhavbaug Clinics from September 2017 to March 2018. All patients with BMI > 30 kg/m^2 were included in the study. During the study, the patients received seven sessions of obesity management procedure which included a combination of *Snehana* - external oleation or massage, *Swedana* - passive heat therapy and *Basti kadha*. Simultaneously, patients were prescribed supervised low carbohydrate diet daily for 90 days. The primary efficacy end point was reduction in body weight while secondary end points included changes in abdominal girth, systolic and diastolic blood pressure, heart rate after 90-day follow-up as compared to baseline. A total of 48 patients were enrolled and after screening, 31 were included in the study. Most of the patients were mid aged 51.35± 11.44 years and females (65.8%). The primary end point used in the present study (body weight) decreased significantly from 89.87± 18.58 kg on Day 1 to 82.01± 20.55 kg on day 90 ($p<0.001$). Such significant changes were also appreciable in the BMI, SBP, DBP, abdominal girth values measured on day 1 and day 90 respectively ($p<0.001$ for all). The present study demonstrates that the combination of low carbohydrate diet and Ayurvedic obesity management procedures are effective in reducing obesity.

Keywords: Ayurvedic Obesity Management, Basti Kadha, Low Carbohydrate Diet, Obesity, Snehana, Swedana

1. Introduction

Obesity is a major public health problem which results from an imbalance between energy intake and energy expenditure [1]. World health organization (WHO) defines an obese person as one with a BMI of 30 or more [2].

BMI was used as a criterion considering its strong correlation with cardiovascular mortality, diabetes and other comorbidities, mortality and disability. The worldwide obesity prevalence increased rapidly between 1980 and 2008. In 2008, 10% of men and 14% of women in the world were obese (BMI ≥ 30 kg/m^2), compared with 5% for men and 8% for women in 1980. An estimated 205 million men and 297 million women over the age of 20 were obese; a total of more than half a billion adults

Director
VRT's Madhavbaug Institute of Preventive Cardiology & Research Center

worldwide.

India is not exempted from this pandemic and recent studies reveal that 12% of the entire population is overweight or obese [3]. According to the National Family HealthSurvey (NFHS-4), the prevalence of BMI ≥ 25 kg/m^2 among Indian female is 20.7% and male is 18.6% [4]. Current socio- economic development has shifted dietary patterns towards energy-dense junk foods which coupled associated sedentary lifestyle have contributed to the rise in overweight/obesity [5]. Obesity is closely associated with increased incidence of non-communicable diseases like diabetes,cardiovasculardisease and hence appropriate management of obesity is a major public health challenge [3].

The current management protocol of obesity includes long term therapy with drugs like Phentermine, Orlistat, Sibutramine, Lorcaserin, Topiramate which have doubtful efficacy with serious safety concerns. Hence, the search for safe and effective alternative is of utmost importance in the management of obesity [6].

Ayurveda is an age old scientific medicinal system indigenous to India. Ayurveda means 'knowledge of life', which comprises of two Sanskrit words, Ayu(life) and Veda (knowledge or science). The principal aim of Ayurveda is to achieve equilibrium between the physiological and structural entities, which ultimately culminates in good health. Any disparity or unevenness because of external or internal factors may lead to disease development [7]. Ayurvedic treatment aims to restore the equilibrium through the utilization of different techniques, regimens, diet as well as medicines [8] Ancient Ayurvedic texts (Charakasamhita, Sushrutsamhita, AshtangSangraham, Ashtanga Hridayam) mention the clinical features and treatment of obesity (Sthaulyarog) indicating that the knowledge of the disease was present with the Ayurvedic physicians[9].

In our institute (Madhavbaug Hospital and clinics) the Ayurvedic physicians are using a multi-faceted obesity management protocol to treat obesity which includes a low- carbohydrate diet and combination of herbal treatment namely Snehana Swedana, Basti Kadha. However, a literature search revealed that there is a dearth of published literature to demonstrate the efficacy of this treatment modality in obese patients. In this backdrop, the present study was conducted to demonstrate the efficacy of low carbohydrate diet and Ayurvedic obesity management program in treatingobesity

2. Subject andMethods

Study Setting and Patient Selection

A retrospective observational study was conducted in Madhavbaug Clinics, for a period of six months starting from September 2017 to March 2018 to address the study objective. All patients with a BMI greater than 30 kg/m^2 were considered eligible to participate in the study. The case definition of obesity was defined as patients with BMI 30 kg m^2 [9] Patients were recruited after obtaining written informed consent from them The study was conducted according to the ethical principles mentioned in the Declaration of Helsinki, Good Clinical Practices, and applicable regulatory requirements.

Study Procedure

Patients with BMI 3kg/m were considered to be eligible in the 90-day study after initial screening The exclusion criteria were (i) severe cardiac, renal or hepatic disease (ii) pregnancy. On day 1 of the study, baseline clinical status of the patient was determined by measuring body weight, blood pressure, BMI, abdominal girth. Following this, low carbohydrate diet plan and obesity

management procedure were started on the patient. A supervised daily diet plan with calorific value 800 kcal was prescribed for the patient which consisted of 35% carbohydrate, 25% protein: 40% fat. The patient was asked to follow the diet plan for 90 days. In the study period of 90 days, the patient also received 7 sessions of obesity management procedure details of which are given below. The Obesity Management Program (OMP) is a combination of Panchakarma and allied therapies. OMP uses various decoctions and oils and constitutes of a 3-step procedurenamely:

a. Snehana / external oleation or massage (25-30 minutes): Massage or external oleation (centripetal upper strokes on thebody)

b Swedana / passive heat therapy (15 -20 minutes): Dashmoola (group of ten herbs) steam of temperature not more than 40 was then passed steadily for 10-15 minutes. After the treatment, patients were asked to relax for 3-4minutes.

c. Basti kadha: Medicated enema administered per-rectal, should be in body for > 15 minutes for maximum absorption.

At the end of 90 days, the patients were examined and Body weight, BMI, SBP, DBP, AG were again measured and compared with the baseline.

The detailed schedule of Ayurveda obesity management procedure is described below in Table 1

Table 1. Protocol of obesity management procedure

Step	Type of Therapy	Herbs used for therapy	Duration of therapy
Snehana	Massage or external oleation (centripetal upper strokes on thebody)	[illegible] processed in [illegible]	25-30 minutes
Swedana	Passive heat therapy (steam)	[illegible]	15-20 minutes [illegible]
Basti kadha	[illegible] for 15 minutes for maximum absorption	[illegible]	2 minutes

Statistical Analysis

Data was entered in MS excel and analyzed using R Version 3.5.0 software. The data of only those patients who

could complete the entire treatment of 90 days were considered for analysis. The primary efficacy end point was reduction in body weight while secondary end points include reduction in Abdominal Girth, SBP, DBP, HR after 90-day follow-up as compared to day 1 (baseline). Paired T test were3used to test statistical significance for Primary and Secondary End Point We also calculated Correlation between weight & BMI and weight and Abdominal Girth.

1. Results

During the study period, a total of 48 patients were enrolled and after screening 31 were included in the study.

All of them continued the treatment up to day 90 and were considered for analysis. There were no reports of serious adverse drug reaction in the study participants. Most of the enrolled patients were middle aged (51.35 ± 11.44 years) and female sex (65.8%). The baseline BMI of the patients(35.30

± 5.55) as measured on day 1 was well above WHO criteria of obesity. On day 1, the baseline abdominal girth, SBP, DBP were also measured and has been mentioned in Table2. *Table 2. Comparison of clinical parameters between baseline values and 90th day*

Variable (n=31)	Baseline (day 1)	After 90 days	Difference	*P value*
Weight	[illegible]	[illegible]	[illegible]	0.001***
BMI	[illegible]	[illegible]	[illegible]	0.001*
Abdominal Girth	[illegible]	[illegible]	[illegible]	0.001***
HR	[illegible]	[illegible]	[illegible]	0.001**

Obesity is related to several chronic diseases like hypertension, cardiovascular disease, and diabetes mellitus and hence obese patients are prescribed medicines for these co-morbidities. In our study, the concomitant medications consumed by the patients on day 1 include Angiotensin receptor blockers, Calciumchannel blockers, Statins, Diuretic, Beta-blockers, Sulfonylurea, Biguanides and Antiplatelet drugs. However, at the end of day 90, there was an appreciable decrease in themedication use by the patients, which has been shown in table 3, figure2 *Table 3. Consumption of allopathic medicines on days 1 and 90*

Drugclass	Day1	[illegible]	Day90	[illegible]
Angiotensin receptor blocker	12	[illegible]	10	32.26
Statins	[illegible]	[illegible]	[illegible]	29.35
Calciumchannel blocker	[illegible]	[illegible]	[illegible]	9.35
NSAID	[illegible]	[illegible]	[illegible]	6.13
Diuretic	[illegible]	[illegible]	[illegible]	6.13
Beta-blocker	[illegible]	[illegible]	[illegible]	16.13
Antiplatelet	[illegible]	[illegible]	[illegible]	3.23
Biguanide	[illegible]	[illegible]	[illegible]	9.68
Sulfonylurea	[illegible]	[illegible]	[illegible]	6.45
No medicine	[illegible]	[illegible]	[illegible]	32.26

Figure 2. Consumption of allopathic medicines at days 1 and 90 days (N – 31).

The primary end-point used in the present study (body weight) decreased significantly from 89.874 ± 18.58 kg on Day 1 to 82.01 ± 20.35 kg at day 90 ($p<0.001$). Such significant changes were also appreciable in the BMI, abdominal girth values measured on day 1 and day 90 respectively ($p<0.0001$) details of which is shown in table 2, figure 1. We also explored the association between body weight and abdominal girth at day 1 and day 90. Abdominal girth and body weight showed perfect correlation both at day 1 ($r=0.865$) and at day 90 ($r=0.91$).

Table 1. Correlation between Weight and BMI (Gr at 1 day and 90 Day

Correlations table

1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]
4	[illegible]	[illegible]

In addition our study also proved the efficacy of obesity management program in reducing Systolic Blood Pressure and Diastolic Blood Pressure in 23 patients, which is a new finding. In these 23 patients (SBP>130 mmHg), SBP was reduced by 22.17 mmHg (from 144.78 ± 13.77 to 122.61 ± 13.85; $p<0.001$), DBP by 11.96 mmHg (from 89.13 ± 9.06 to 77.17 ± 8.13; $p<0.001$) and Weight by 8.16 Kg (from 93.2 ± 19.32 to 85.04 ± 22.04; $p<0.001$), at the end of the 90-day follow-up as compared to baseline.

4. Discussion

In Ayurvedic texts, obesity is referred to as "Medoroga" and is considered to be a disease of "Medadhatu" meaning a disorder of lipid metabolism. A variety of different types of obesity have been mentioned in the Ayurveda classics along with the treatment for the same [8]. In the present study, we have combined low carbohydrate diet with certain Ayurvedic procedures (OMP) to treat obesity [8]. A critical review of published literature reveals that while some researchers have separately demonstrated the efficacy of diet in reducing obesity, some have explored the efficacy of Ayurvedic procedures only [11-15]. To our knowledge, the present study is the first one to demonstrate the combined effect of LCD and Ayurvedic procedure as a treatment modality to treat obesity.

In the present study, majority of the patients were of middle aged with age (51.35 ± 11.44 years). This is in concordance with earlier studies conducted in India by Nair SS (50-60 years), Parampe [11, 12]. The female outnumbered the males (64.3%) as per the earlier study conducted by Nair.

carbohydrate-rich diets, it is no wonder that obesity is on the rise in the country. Management of obesity requires reduction in calorie intake without compromising nutrition. In order to lose 0.5-1 kg per week, one needs to reduce calorie intake by 500-1000 kcal per day. It is noted that as per National Sample Survey Office's (NSSO) 2011-12 data on Nutritional Intake per capita consumer expenditure 2099 kilocalories per day in rural areas and 2058 kilocalories per day in urban areas while the average metabolic rate of person with sedentary lifestyle is 1400-1500 kcals [16, 17]. Hence creating a negative energy balance plays central role in weight loss. Negative calorie balance refers to reducing excess calorie intake and include required amount of nutrient which will help reduce desire weight. Ayurvedic texts mention that altered function of Agni or digestive process leads to production of Ama which [illegible] amount of Kapha of fatty tissue and [illegible] formation of further tissues [9].

15]. Accumulated fat alters movement of Vata which leads to increase in appetite. Person therefore eats more and the entire food is then converted into5

proper fat tissue. As per the line of treatment of obesity, the diet prescribed should be Apatarpana(no nourishing). The Apatarpana quality of food will help in the reduction of fat in thebody[9,15].Thishasalsobeenreiteratedinrecen tstudies which indicate diets lower in carbohydrate have shown promise for weight loss when compared to typical reduced energy and fat diets [13, 14]. In particular, multiple studies indicate that a low carbohydrate diet may produce greater weight loss than a traditional low fat diet over 6 months and may be comparable to a low fat diet over 12 months. In the present study also, low carbohydrate diet exerted a beneficial effect in reducing body weight,BMI.

In the present study, we have combined three Ayurvedic procedures in our obesity management procedure namely Snehana, Swedana and Basti kadha .Ayurvedic texts clearly mention role of each of these procedures in reducing obesity. Swedana is an important preparatory measure for the management of obesity [9, 15]. It liquefies the vitiated Dosha which are spread through the body. Snehana is an important Poorvakarma which is administered prior to Samshodhana procedure. Because of application of Swedana, the vitiated Doshas are expelled out of the body [9, 15].

Basti has got an important place in Panchakarma therapy and is indicated for the treatment of obesity. It is having not only curative action but also preventive actions. The Basti by its virtue of its Lekhana property reduces the Meda and simultaneously pacifies the Vata [9, 11, 15]. This may be attributable to the lipid lowering properties of the herbs usedin Basti namely Kulattha (*Dolichosbiflorus*), Nagavalli (*Piper betle* and Meshashringi (*Gymnemasylvestre*) [18]. Decreasing the formation of new adipose tissue and formation of fat reserves through inhibition of differentiation of pre-adipocytes into mature adipocytes is considered as an effective strategy to controladipogenesismediateddiseases,especially obesity[19]. Modulation of adipogenesis and lipolysis in humans may thus lead to a reduction in the burden of obesity. Extracts from kulatthai(*Dolichosbiflorus*), Nagavalli(*Piper betle*and Meshashringi (*Gymnemasylvestre*) exhibited potent anti- adipogenicand lipolysis promoting activities in earlier studies [19]. In an earlier clinical study conducted by AutiSS (2013), Lekhana Basti was administered to study participants which reduced body weight of patients by 3.34% and BMI by 3.36% as compared to baseline[11].

1. Conclusion

The present study demonstrates that combination of low carbohydrate diet and Ayurvedic obesity management procedures acted in synergy to cause significant reduction in body weight, BMI, abdominal girth, without any adverse effect. Further studies with longer duration can offer more meaningful evidence on efficacy of this treatment modality.

Acknowledgements

We are thankful to Dr. Jagdish Hiremath, Chair Professor of Madhavbaug Institute of Preventive Cardiology for

guiding us through this concept and Data Analysis.

References

[1] Mehrabani J, Ganjifar ZK. Overweight and Obesity: A Brief Challenge on Prevalence, Complications and Physical Activity among Men and Women. MOJ Women Health 2018; 7 (1): 00161.

[2] World Health Organisation. Fact sheet on obesity and overweight. Download from http://www.who.int/en/news-room/fact sheets/detail/obesity-and-overweight.(Last accessed August 16,2018).

[3] Siddiqui MZ, Donato R. Overweight and obesity in India: policy issues from an exploratory multi-level analysis. Health Policy Plan. 2016; 31:582-91.

[4] National Family Health Survey - 4. Fact Sheet. 2015-16. Available at http://www.rchiips.org/ NFHS/ pdf/ NFHS4/ India .pdf. Accessedon15August2018).

[5] Misra A, Shrivastava U. Obesity and dyslipidemia inSouth Asians. Nutrients. 2013; 5:2708-33.

[6] Wyatt HR. Update on treatment strategies for obesity. JClin Endocrinol Metab. 2013; 98 (4):1299-1306.

[7] Department of Ayurveda, Siddha, Unani and Homeopathy (AYUSH). Ayushin India. Department of Ayurveda, Siddha, Unani and Homeopathy (AYUSH), Ministry of Health & Family Welfare, Govt of India;2007.

[8] S. P. Vinjamury, M. Vinjamury, S. Sucharitakul, I. Ziegler. Panchakarma: ayurvedic detoxification and allied therapies - is there any evidence? Evidence-based practice in complementary and alternative medicine. Springer, Berlin, Heidelberg 2012,113-137.

[9] Sinha K, Gaikwad S, Prabhakar M, Lohith BA. Critical review on role of panchakarma in sthaulya with special reference to obesity. Int J Res Ayurveda Pharm. 2017;8(6):4-7.

[10] http:/ www philspenonlinejournal .com/01_BMI_Asian_WHO

criteria_0005.pdf (accessed on 16th August 2018)

[11] Auti SS, Thakar AB, Shukla VJ, Ravishankar B. Assessment of Lekhana Basti in the management of hyperlipidemia. Ayu2013; 34:339-45.

[12] ParanjpeP, PatkiP, and Patwardhan B (1990) Ayurvedic treatment of obesity: a randomized double-blind, placebo- controlled clinical trial. J Ethnopharmacol 29:1-11.

[13] Brehm BJ, Seeley RJ, Daniels SR, D'Alessio DA. A randomized trial comparing a very low carbohydrate diet and a calorie-restricted low fat diet on body weight and cardiovascular risk factors in healthy women. J Clin Endocrinol Metab. 2003, 88 (4): 1617-1623. 10.1210/jc.2002-021480

[14] Foster GD, Wyatt HR, Hill JO, McGuckin BG, Brill C, Mohammed BS, Szapary PO, Rader DJ, Edman JS, Klein S. A randomized trial of a low-carbohydrate diet for obesity. N Engl J Med. 2003, 348 (21):2082-2090.

[15] Swati S. Deshpande Et Al. Panchakarma Approach ToSthoulya. International Ayurvedic Medical Journal 2017. Available from:http:/ www.iamj.in/posts/images/upload/3 534 3539.pdf[16] Annual Report. National Sample Survey Office. Downloaded from:http: www.mospi.gov.in/national-sample-survey-office-nsso (Last accessed 16th August2018)

[17] Narasinga Rao BS. Nutrient requirement and safe dietary intake for Indians. NFI Bull 31: 1-5,2010.

[18] Vagbhata, Ashtanga Samgraha, Kalpasthana Bastikalpa

Adhyaya, 5:68 In Vaidya Anant Athavale., editor. 8th edition. Pune: Shrimad AtreyaPrakashana; 1980. p. 30.

[19] Sengupta K, Mishra A T, Rao M K, Sarma K V, Krishnaraju A V, Trimurtulu G. Efficacy of an herbal formulation LI10903F containing Dolichosbiflorus and Piper betle extracts on weight management. Lipids Health Dis. 2012; 11:176.

Impact of Comprehensive Diabetes Care (CDC) Management Program in Type II Diabetes Mellitus: A Retrospective Study

Rohit Sane[1], Pravin Ghadigaonkar[2], Rekha Chaure[3], Sangeeta Jain[4], Shweta Wahane[4], Manisha Ghurde[6], Aarti Nadapude[4], AaratiBadre[3], Prabha Acharya[7],Rahul Mandole[1,7]

[1]Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India [2]Department of Medical Operations, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India [3]Madhavbaug Cardiac Care Clinics, Mumbai, India

[4]Madhavbaug Cardiac Care Clinics, Nagpur, India [5]Madhavbaug Cardiac Care Clinics, Latur, India [6] VRI's Madhavbaug Institute of Preventive Cardiology,Thane, India

Email address: cromilagro(at)gmail.com(R. Mandole)

Corresponding author

Abstract: Globally, Diabetes mellitus (DM) prevalence has created menace, being a major culprit of increased mortality and morbidity and health care expenditures. India is the 2nd country with maximum number of diabetic patients, with an estimated prevalence of around 10%. Comprehensive Diabetes Care (CDC) is a combination of *Panchakarma* and Diet management. This study was conducted to evaluate the effect of CDC on glycosylated haemoglobin (HbA1c), body mass index (BMI), body weight, abdominal girth and dependency on conventional therapy in DM Patients. This retrospective study was conducted from July 2017 to January 2018, wherein the data of elderly male type 2 DM patients (HbA1c >6.5%) who attended *Madhavbaug clinics* in *Maharashtra*, India were identified. Data of patients who were administered CDC (60-75 minutes) with minimum 6 sittings over 90 days (± 15 days) were considered. Variables were compared between day 1 and day 90 of CDC. Out of 48 enrolled elderly male patients, 34 were included for analysis. CDC showed significant improvement in HbA1c from 8.27 ± 0.96to 7.1 ± 1.30, p< 0.0001). BMI from 27.65 ± 3.20 to 25.91 ± 3.29, p< 0.0001), weight from 73.75 ± 10.76to 69.46 ±10.39, p< 0.0001). Abdominal girth (from 100.0 ± 9.08 to 95.36 ± 9.10; p< 0.0001), also showed significant reduction. Dependency on concomitant medicines was reduced, with number of patients on no concomitant medicines increasing from 3% to 15%. CDC and allopathy both are found to be efficacious; but CDC acts dually, by reducing HbA1c, as well as reducing dependency on allopathic medications.

Keywords: Comprehensive Diabetes Care, CDC, Panchakarma, HbA1C, BMI, DM, Alternative Medicine

1. Introduction

Diabetes mellitus type II (DM) prevalence has reached epidemic levels in global scale. International diabetes federation quotes that number of diabetics in 2030 will rise by estimated 200 million rise in number of cases, as compared to prevalence in 2011 [1]. This is far more concerning in India, where it is estimated that around 1/10th of the population is inflicted by DM, with significantlyhigh mortality rates [2, 3]. Historically, fastingblood sugar level <126 mg/dl and post-meal blood sugar level <140 mg/dl, which together constitute an oral glucose tolerance test is used for diagnosis of DM. Nowadays, glycosylated hemoglobin (HbA1c) is used for diagnosis of DM, as it depicts blood glucose levels over preceding 2-3 months. HbA1c levels >6.5% is diagnostic of DM, while levelslessthan 6.5 but more than 5.7% are dietary

considered as prediabetics. Most of the guidelines suggest target HbA1c as < 6.5% [4]. Plethora of complications of DM, grouped as macrovascular and microvascular, short term and long term, makes the disease more dangerous. Stroke, myocardial infarction, peripheral vascular disease are some of the macrovascular complications, while retinopathy, neuropathy and nephropathy are grouped under microvascular complications. However, major culprit for morbidity and mortality in diabetic patients is cardiovascular diseases (CVD) [5]. Foot ulcers, amputations are some of the after effects of diabetic neuropathy, while diabetic nephropathy is one of the major cause of morbidity and mortality in diabetic patients after CVD [6-9]. Diabetes is presently managed by advocating dietary corrections and regular physical exercise along with treatment with oral antidiabetic drugs oral hypoglycemic agents (OADs). It is recommended to start OAD only when diet management and other measures are unable to bring down levels of HbA1c to < 6.5%, after 2 months. The majority of the OADs act by either, reducing the intrinsic glucose production, increasing tissue uptake or increasing excretion. Sulphonylureas, thiazolidinedione, biguanides, etc. are some of the examples of conventional class ofantidiabetic drugs. When 1 OAD is unable to reduce the HbA1c below 7.5% or if baseline HbA1c is too high, it is recommended to use combination of OADs from different class [10]. But, major issues faced withthe use of OADs are a plethora of adverse effects which include hypoglycemia, pancreatitis, anemia, etc [11]. These adverse effects along with the increased cost of therapy has found to drastically reduce medication adherence in patients of DM [12]. Despite the availability of numerous classes of OADs and extensively laid down guidelines, number of cases ofDM are consistently increasing [12]. Thus, an effective alternative therapy is needed, that will counteract these adverse effects of conventional medicines and increase patient adherence to medications for optimal outcome. OADs act by reducing blood sugar levels in the body. Various herbal drugs have shown similar effects in clinical studies, including significant reduction in HbA1c [13-15]. This makes Ayurveda a potential therapeutic alternative in patients of type 2 DM. Ayurvedic physicians advocate Panchakarma- a multi-step body detoxification process in the chronic phase of disease. *Panchakarma* and diet therapy is combined in Comprehensive Diabetes Care (CDC) Management Program. Three techniques are used in *Panchakarma* in CDC- *Snehana*i.e. oleation, *Swedana*i.e. passive heat therapy and *Basti* i.e. per rectal drug administration. *Panchakarma* is a well-known procedure for internal detoxification of the body [16-17]. Since reduction in quality of life, depression are associated with DM,we planned this retrospective study in elderlymale
patients of type 2 DM, to assess the efficacy of CDC on various parameters like HbA1c, BMI, reduction in body weight, abdominal girth and reduction in dependency on conventional medications after completion of CDC.

2. Subjects and Methods

Study Design

Retrospective record based study.

Study Site

Madhavbaug Clinics from all over Maharashtra

Study Period

July 2017 to January 2018

Study Participants

Elderly male (>60 years), suffering from type 2 DM (HbA1c >6.5%), who attended *Madhavbaug clinics* across *Maharashtra*

Methodology

The data of patients who had been administered CDC with minimum 6 sittings over a span of 90 days (± 15 days) were considered for the study, out of which 4 sittings were done in the 1st month, and 1 sitting per month for next 2 months. These patients

were maintained on a diet plan of 800-1000 calories intake per day, according to patient medical records. The diet plan consisted of low carbohydrates, moderate proteins, and low fats. Cases were identified, and data was assessed from the records of *Madhavbaug clinics* in *Maharashtra*. The selection was based upon the availability of complete relevant baseline data (day 1 of CDC) and final day data (day 90 of CDC) of the patients. The information about prescribed concomitant medicines, if any, was also noted down. On day 1 of CDC, the patients had undergone HbA1c, weight, BMI, abdominal girth measurements as per guidelines [18]. This readings were considered as baseline reading. This process was repeated on day 90 of CDC to calculate the change from baseline reading. The BMI for day 1 and day 90 of the patients was calculated by checking the weight and the height from the medical data sheets of patients and using the formula *weight in kilograms/ (height in meters)*. The dependency on standard medication was calculated both on day 1 and day 90 of CDC as the percentage of patients out of the total enrolled ones who required a conventional allopathic therapeutic agent during the study period of 90days.

The CDC is a 3-step procedure which was performed on the patients of type 2 DM after a light breakfast. One sitting of the procedure took 65-75 minutes, as described in table 1 [19-20]

Table 1. *Study Treatment: Comprehensive Diabetes Care (CDC)*

Step of CDC	Type of Therapy	Herbs used for therapy	Duration of Therapy
Snehana/Sweda na	Massage or external oleation (centripetal upper strokes on the body) Passive heat therapy to the body	100 ml Azadirachtaindica neem extract processed in sesame oil Dashmoola (group of ten herbal roots) with steam at ~40 degrees celsius	25-30 minutes 15-20 minutes + 3-4 minutes
Step of CDC	**Type of Therapy**	**Herbs used for therapy**	**Duration of Therapy**
Basti karma	Per-rectal drug administration should be in body for ~15 minutes for maximum absorption	Mixture of 40% Guduchi (Cocculushirsutus), 20% Daruharidra (Berberisaristata), and 40% Yashtimadhu (Glycyrrhizaglabra)	of relaxation after procedure 10 minutes

Statistical Analysis

Data were pooled and coded in Microsoft Excel spreadsheet. R Version 3.4.1 software was used to analyze the data. Categorical data were represented in the frequency form and continuous data were represented as the Mean ± SD. Paired t-test was used to assess the difference between baseline values and 90th day after treatment. The histogram were used to represent the graphs.

1. Results

Study population

A total of 48 patients' data was screened for inclusion in the study. However, based on the availability of data (Day 1 and Day 90) and the inclusion criteria, 34 patients were selected, and their data was considered for analysis. The present study involved a total of 34 male patients with more than 60 years age having a diabetic history and HbA1c > 6.5. The mean age of the patients was 66.32 ± 4.86 years and mean height was 163.34 ± 6.53 cm. Clinical parameters compared between baseline values and after 90 day was as shown in Table 2. After 90 days of treatment there was significant reduction in the HbA1c ($P < 0.0001$, *Figure 1*). There was significant reduction in weight ($P < 0.0001$, Figure 2), BMI ($P < 0.0001$, Figure 3) and Abdomen girth ($P < 0.0001$; Figure 4) post treatment of 90 days.

Table 2. Comparison of clinical parameters between baseline values and 90th day

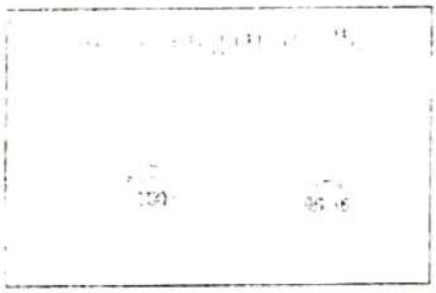
Variable (n=34)	Baseline	After 90 days	t statistic	p-value
HbA1c	8.27 ± 0.96	7.1 ± 1.30	4.71	0.0001
Weight (Kg)	73.75 ± 10.76	69.46 ± 10.39	10.964	<0.0001
BMI	27.65 ± 3.20	25.91 ± 3.29	7.35	<0.0001
Abdomen girth (n=25)	100.0 ± 9.08	95.56 ± 9.30	8.1	<0.0001

HbA1c: Glycated haemoglobin, BMI: Body mass index

Table 3. Correlation of BMI and Abdomen girth with HbA1c at 1st day and after 90 days

Correlation between	Baseline		After 90days	
	R	p-value	r	p-value
BMI and HbA1c	0.05	0.76	0.07	0.69
Abdomen girth and HbA1c	-0.049	0.82	0.05	0.81

Figure 2. Comparison of weight at the point at baseline and after 90 days



We also assessed the correlation between the BMI and HbA1c, abdominal girth and HbA1cb (table 3). There was a weak positive correlation between BMI and HbA1c (r = 0.05) on the 1st day of the treatment and it was not statistically significant (p=0.06), the same is shown in figure 5a. After 90 days of treatment we found nearly same positive relationship between BMI and HbA1c (r = 0.07, p = 0.70) which is shown in figure 5b.

We found a negative relationship between HbA1c and abdomen girth (r = -0.049) on the 1st day of the treatment which was not statistically significant (p = 0.82) (figure 5c). We found a weak positive relationship between them after the treatment (r = 0.051) on day 90, and it was not statistically significant (p = 0.81) (figure 5d).

a : BMI & HbA1c at 1st day

b : BMI & HbA1c at 90th day

c : HbA1c & Abdomen Girth at 1st day

d : HbA1c & Abdomen Girth at 90th day

Allopathic medicines consumption on day 1 and after the 90th day of therapy were as shown in Table 4. Most of the enrolled subjects were treated with biguanides (55.56%), sulfonylurea (38.24%), nonsteroidal anti-inflammatory drugs (35.29%), statin (29.41%). All the subjects who were allopathic medicines before therapy was decreased after study. However, the subjects with nonsteroidal anti-inflammatory drugs were not varied after the therapy. An illustration is given in figure 6

Table 4

Medicine	Day 1	After 90 days
Sulfonylurea	[illegible]	[illegible]
Biguanide	[illegible]	[illegible]
Thiazolidinediones	[illegible]	[illegible]
DPP-4 inhibitor	[illegible]	[illegible]
Alpha glucosidase inhibitors	[illegible]	[illegible]
Insulin	[illegible]	[illegible]
SSRI	[illegible]	[illegible]
Statin	[illegible]	[illegible]
ARB	[illegible]	[illegible]
Beta blocker	[illegible]	[illegible]
CCB	[illegible]	[illegible]
Aspirin	[illegible]	[illegible]
Nitrate	[illegible]	[illegible]
Nonmedicine	[illegible]	[illegible]

TRUE COPY

Director
VRT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

control of blood sugar levels is the utmost important factor in diabetic patients, since it has been established that poor blood sugar level control is associated with increased incidence of complications [24]. CDC can help in reducing complications of DM since it showed sustained reduction in all parameters like HbA1c, BMI, body weight,etc.

Another major issue with the use of conventional drugs is increased cost of therapy along with increased incidence of adverse effects associated with use of these drugs [25]. Hence, we assessed the effect of CDC on dependency on conventional medications. In our present study, we found that there was an overall reduction in dependency of patients on conventional medications at the end of the study period. Also, the number of patients who went off the conventional drugs increased at the end of 90th day.

In order to generalize the findings of our study to the larger population, we recommend conduction of similar studies with dual arms, to allow direct comparison with conventional therapy, prospective design, and long follow up period with larger samplesize.

1. Conclusion

Major parameters of the body deranged in DM are BMI, body weight, abdominal girth all of which worsen complication rate. Although conventional correct these parameters to some extent, cost of therapy and adverse effects offset their beneficial effects and decrease patient compliance. CDC corrected all these parameters effectively and also reduced dependency on conventional drugs, all of which have positive contributory effect on enhancing patient compliance. Thus it is safe to conclude that CDC canbeconsidered as effective and safe therapeutic option for treatment of DM

Acknowledgements

The authors thank the study participants and their families, without whom this study would not have been accomplished

References

[1] Unwin N, Whiting D, GuariguataL, GhyootG, Gan D (Eds) The IDF Diabetes Atlas, 5th edition Brussels, Belgium: International Diabetes Federation, 2011. pp.7-12

[2] Vijayakumar G, Arun R, KuttyV. High Prevalence of Type 2 Diabetes Mellitus and Other Metabolic Disorders in Rural Central Kerala. JAPI. 2009;57 563-7.

[3] Singh PS, Sharma H, Zafar K, et al. Prevalence of type 2 diabetes mellitus in rural population of India- a study from Western Uttar Pradesh. Int J Res Med Sci 2017;5:1363-7.

[4] Verma M, PaneriS, BadiP, et al. Effect of increasing duration of diabetes mellitus type 2 on glycated hemoglobin and insulin sensitivity. Indian Journal of Clinical Biochemistry. 2006, 21 (1) 142-146

[5] KaveeshwarSA, Cornwall J. The current state of diabetes mellitus in India. AMJ 2014, 7, 1,45-48

[6]. Ramachandran A. Type 2 diabetes in India: Challenges and possible solutions. Retrieved from http://www.apiindia.org/medicine_update_2013/chap40.pdf [last accessed on 3 June2018]

[7] Tripathi K, Srivastava A. Diabetes mellitus: Complications and therapeutics. Med Sci Monit. 2006; 12 (7):RA130-147.

[8] Silva E, FerrieraC, Pinhol.. Risk factors and complications in type 2 diabetes outpatients. Rev Assoc Med Bras 2017; 63 (7):621-627.

[9] Complications of diabetes mellitus Retrieved from http://semmelweis.hu/belgyogyaszat3/files/2017/05/Complications-of-diabetes-mellitus.pdf [last accessed on April 21, 2018]

[10] Matthaei S, Bierwirth R, FritscheA, et al. Medical Antihyperglycaemic Treatment of Type 2 Diabetes Mellitus. Exp Clin Endocrinol Diabetes 2009; 117: 522 557

[11] Meneses M, Silva B, Sousa M, et al. Antidiabetic Drugs: Mechanisms of Action and Potential Outcomes on Cellular Metabolism. Current Pharmaceutical Design. 2015; 21 (25) 3606-3620.

[12]. EgedeL., Axon R, Gebregziabher M, et al Medication Nonadherence in Diabetes. Diabetes Care. 2012; 35:2533–2539.

[13] Elder C, Aickin M, Bauer V et al. Randomized Trial of a Whole-System Ayurvedic Protocol for Type 2 Diabetes. Alternative Therapies in Health and Medicine. 2006; 12 (5): 24-30.

[14] Vidyashree K, Prasad K, Shilpa A. Role of Panchkarma in madhumehaw.s.r. to type 2 diabetes mellitus: a review. International Ayurvedic Journal. 2018; 6 (4):835-840.

[15] Choudhary U, Pandey A. A clinical assessment of the role of panchakarma therapy in the care of young prediabeties. International Journal of General Medicine and Pharmacy. 2013; 2 (1):15-24.

[16] GiriS, Patnaik S, Kumar K, et al. Potential of ayurvedic panchakarma in prevention and management of lifestyle disorders with special reference to madhumeha. J of Ayurveda and HolMed (JAHM) 2015; 3(5):82-91

[17] Nair D. Understanding the Role of Ayurveda Panchakarma Therapy W. S. R. to Vasthi(Enema) in the Management of Type II Diabetes Mellitus- A Case Review. Int J Complement Alt Med. 2017; 8 (6):00276

[18] Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia. Retrived from http://www.who.int/diabetes/publications/Definition%20and%20diagnosis%20of%20diabetes_new.pdf [Last accessed on Dec 21 '2017].

[19] UebabaK, Xu F, Ogawa H, et al. Psychoneuroimmunologic effects of ayurvedic oil dripping treatment. J Altern Complement Med. 2008;14:1189–1198

[20] Sane R, AklukarA, Patil A, Mandole R. - on therapy in patients with chronic heart failure: A randomized, open-label study. Indian Heart Journal. 2017; 69 (3):299-304.

Effect ofheart failure reversal treatment as add-on therapy in patients with chronic heart failure: A randomized, open-label study. Indian Heart Journal 2017; 69 (3):299-304

[21] "Clinical importance of Glycosylated hemoglobin (HbA1c) in diabetes mellitus patients". Retrieved from https://www.researchgate.net/publication/26575867_Clinical_Importance_Of_Glycosylated_Hemoglobin_HbA1c_In_Diabetes_Mellitus_Patients [Last accessed on march 11' 2018]

[22] Dua S, Bhuker M, Sharma P, Dhall M, Kapoor S. Body mass index relates to blood pressure among adults. North Am J Med Sci 2014;6:89-95.

[23] DanasekaranR, Vinoth R. A study on relation between BMI and hypertension among adolescents in Kancheepuram district, Tamil Nadu IJAR 2015; 1 (2):8-12.

[24] Chaudhury A, Duvoor C, Reddy V, et al. Clinical Review of Antidiabetic Drugs: Implications for Type 2 Diabetes Mellitus Management. Front. Endocrinol. 2017; 8(6):1-12

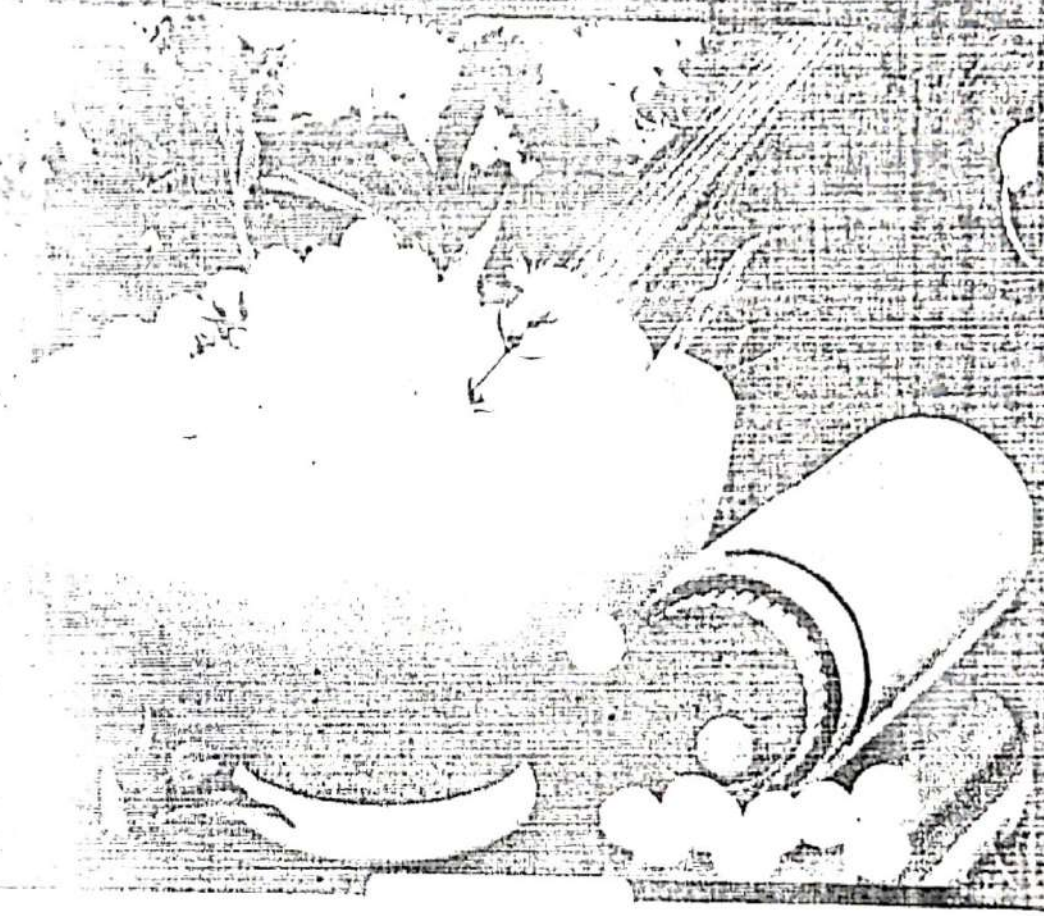
[25] PerwitasariD, UrbayatunS. Treatment Adherence and Quality of Life in Diabetes Mellitus Patients in Indonesia. Sage Open. 2016;1-7.

ISSN 2278 - 8646
RNI. No. MAHMUL/2007/19492

THE CLASSICAL SCIENCE

INTERNATIONAL MULTIPLE MEDICAL JOURNAL

Vol.13 , Issue No 10 OCTOBER 2019 Rs. 25/-



TRUE COPY

Director
VMT's Madhavbaug Institute of
Preventive Cardiology &
Research Center

Dear Subscribers

Hurry

Book your copy now....
New Subscription rates of
The Classical Science are as follows.

Single Copy -	Rs.	25/-
One Year Subscription -	Rs.	250/-
Three Year Subscription -	Rs.	750/-
Life Membership –	Rs.	2000/-

Send your D.D. in Favour of
'Chief Editor, The Classical Science'
Payable at Satara

Address

Chief Editor,
The Classical Science
Sawkar Homoeopathic Medical College
AM 1/1, Additional M.I.D.C.,
Degaon Road, Satara 415 004 (MS)
E mail -hmcsatara@gmaii.com

Published on - 10th of every month
posted on- 15th of every month

SAMARTH EDUCATIONAL TRUST
SAWKAR INSTITUTES
SATARA

A.M. 1/1 : Additional M.I.D.C., Degaon Road Satara - 415 004
Ph.: (02162) 240036, 240063
web site : www.samaratheducationaltrust.com

SAWKAR HOMOEOPATHIC MEDICAL COLLEGE, SATARA.
B.H.M.S.

SAWKAR PHARMACY COLLEGE, JAITAPUR, SATARA
D. PHARM

ARVIND GAVALI COLLEGE OF PHARMACY, JAITAPUR, SATARA
B. PHARM, M. PHARM

ARVIND GAVALI COLLEGE OF ENGINEERING, PANMALEWADI, SATARA.
POLYTECHNIC, B.E., M.E.

Edited by : Dr. Ravindra N. Bhosale
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

Published & Owned by : Dr. Ravindra N. Bhosale

Printed at : Yashwant Offset, 668 Mangalwar Peth, Dastagir Colony, Satara (MAH)

Published at : Sawkar Homoeopathic Medical College, Satara.
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

Director
VK's Madhavbaug Institute of Preventive Cardiology & Research Center

TRUE COPY

Impact of Comprehensive Diabetes Care on Glycaemic Control with Reduction in Dependency of Oral Hypoglycaemic Medicines in Diabetic Patients: A Retrospective Study

Rohit Sane[1], Minal Naik[2], Manisha Ghurde[1], Karishma Khair[2], Harsha Mahajan[2], Diwakar Pawar[3], Prabha Acharya[4], VaidehiRevandkar[2] and Rahul Mandole[1]*

[1]*Department of Research and Development, Madhavbaug Cardiac Care Clinics and Hospitals, Mumbai, India*

[2]*Madhavbaug Cardiac Care Clinics, Mumbai, India*

[3]*Madhavbaug Cardiac Care Clinics, Nagpur, India*

[4]*VRT's Madhavbaug Institute of Preventive Cardiology, Thane, India*

**Corresponding author*

Abstract

Although multiple new drugs are coming out in the market, India has the 2nd highest number of diabetics in the world. The aim of this study was to evaluate effects of Comprehensive Diabetes Care (CDC) on Glycosylated haemoglobin (HbA1c) and metabolic parameters in pre-obese diabetic patients. In this retrospective study, data of pre-obese DM patients who had received 6 CDC sittings over 90 days in the out patient departments (OPDs) at *Madhavbaug* clinics was collected between May 2013 to April 2018. Demographic and co-morbidity details were noted. HbA1c, body mass index (BMI), abdominal girth, systolic and diastolic blood pressure (SBP, DBP), dependency on medications were assessed on days 1 and 90 of CDC. The patients followed a specific low-calorie diet plan during the study. 89 participants, (52 males, 37 females) were enrolled. Mean HbA1c measured at day 90 was significantly lower than that on day 1 (6.86 ± 1.24 vs 9.02 ± 1.79, p<0.001). Mean BMI was significantly reduced on day 90 when compared to baseline (25.39 ± 1.53 vs 27.24 ± 1.33, p<0.001). Abdominal girth was significantly decreased on day 90 compared to baseline (91.64 ± 6.26 vs 97.12 ± 7.03, p< 0.001). SBP (122.83 ± 13.56 vs 131.60 ± 16.10, p< 0.001) and DBP (77.02 ± 6.81 vs 81.75 ± 9.43, p<0.001) were also significantly decreased after 90 days. Dependency on concomitant medicines was reduced.

Glycaemic control and metabolic parameters significantly improved after 90-day CDC treatment. Reduction in blood pressure and intake of concomitant medications were also noted.

Keywords

Comprehensive diabetes care, CDC, Panchakarma, Diabetes mellitus, HbA1c, Body mass index, Ayurveda, Alternativemedicine

Introduction

Diabetes mellitus (DM) is a known global health-hazard, affecting millions of people worldwide. According to World Health Organization (WHO), the number of diabetic patients has increased from

108 million in 1980 to a staggering 422 million in 2014 (WHO, 2018) The International Diabetes Federation (IDF) has mentioned that about 1 in 11 adults belonging to the age group of 20 years to 79 years are suffering from DM worldwide. (International Diabetes Federation, 2018) It is interesting to note that 3/4th of the patients suffering from DM worldwide belong to the low-income and middle-income countries, and India is one of them. (Tripathi *et al.*, 2017) It is estimated that in 2015, India had more than 69 million DM patients, which is considered to be the second highest number in the world, next to only China. (International Diabetes Federation, 2018) The DM prevalence is expected to double after 20 years, because of the elevating age-expectancy, increasing obesity as well as the increased exposure of population to various risk factors. The patients suffering from DM also are at a risk of developing various dangerous complications like retinopathy, neuropathy and various microvascular and macrovascular diseases. Current management of DM aims to render a good glycaemic control and prevent the development or progression of complications. There are multiple treatment modalities for the management of DM which include parenteral insulin preparations and oral hypoglycaemic agents like metformin, sulfonylureas, sodium glucose transport inhibitors, thiazolidinediones. Despite the presence of these multiple classes of drugs, the prevalence of DM is on an upswing. Literature reveals glycated haemoglobin (HbA1c), the main indicator of long term diabetes control, is in the normal range in only 50% of the DM patients. (Del Cañizo- Gómez and Moreira-Andrés, 2004) The various drugs used for the management of DM are also associated with multiple adverse effects. (Goodman *et al.*, 2011) Hence, there is a need for new or alternative therapeutic modalities for the treatment of DM.

Ayurveda is a commonly practiced ancient art of alternative medicine in India, which simply means 'Science of Life'. The main purpose of *Ayurveda* is to keep an equilibrium between the physiological and structural entities, which indicates good health. (AYUSH, 2007) The description of DM (*Madhumeha*) is present in the ancient Ayurvedic literature, indicating that the knowledge of the disease was present with the Ayurvedic physicians. (Upadhyay and Kamla, 1984) The Ayurvedic physicians are using a multi-faceted management approach to treat DM in India, which include the usage of *Panchakarma*, herbal preparations, yoga and breathing exercises along with diet modifications. Comprehensive diabetes care program (CDC) is one such alternative treatment modality, which includes a combination of herbal treatment with *Panchakarma* and allied therapies. The techniques used in *panchakarma* are *Snehana*(Centripetal oleation), *Swedana*(Thermal vasodilation) and *Basti* (per rectal drug administration), which are known to remove toxins from the body. (Mishra, 2003; Uebaba *et al.*, 2008) However, there is a paucity of literature which indicates that this alternative treatment modality is efficient in controlling DM.

Hence, a retrospective study was planned to assess the effect of CDC in the treatment of patients with DM.

HbA1C, the main indicator of DM control, was the primary outcome measure in this study. The body mass index (BMI) appears to have a direct

relationship with the relative risk of several chronic conditions, including DM, hypertension, coronary heart disease, and cholelithiasis (Willett *et al.*, 1999) Therefore, those DM patients who had a pre-obese BMI range were enrolled to assess the effect of CDC onvarious metabolic parameters like BMI, weight and abdominal girth along with the effect onHbA1c.

Subjects and Methods

This was a retrospective study conducted between May 2013 to April 2018, wherein we identified the data of patients who had attended the out-patient departments (OPDs) at multiple *Madhavbaug*clinics located in various cities of Maharashtra in India and were suffering from DM. The data of patients having an HbA1c level above 7% were included in the study. Theother main inclusion criterion was that the included patients must have a baseline BMI between 25 $kg/m^2$to 29.9 kg/m^2, as the study intended to include pre-obese patients with DM. The patients were administered CDC once a week in the 1stmonth, followed by once a month in the next two months. Data of only those patients were included who had received the scheduled 6 sitting in a span of 90 days. Cases were identified, and data were assessed from the records of *Madhavbaug*clinics in Maharashtra. The selection was based upon the availability of complete relevant baseline data (day 1 of CDC) and final day data (day 90 of CDC) of the patients. The information about prescribed concomitant allopathic medicines was also noted down. The CDC is a 3-step procedure which lasts for about an hour per sitting. The details of the regimen have been mentioned in table 1. Various procedures of the CDC regimen were carried out on a single day for one singlepatient.

On day 1 of CDC the fasting serum HbA1C of the patients was assessed along with the assessment the weight, height and the abdominal girth. The details of the concomitant anti-hyperglycaemic treatment were also noted down on day 1. These details were again noted down on day 90 of CDC, for comparison with the baseline (day 1) findings. The BMI for day 1 and day 90 of the patients was calculated by checking the weight and the height from the medical data sheets of patients and using the formula *weight in kilograms/(height in meters)*^{2}. Diabetic diet plan, based on the principle of low-calorie and low-carbohydrate diet, was followed by the patients throughout the 90 days studyperiod.Data were pooled and coded in Microsoft Excel spreadsheet. R Version 3.4.1 software was used to analyze the data. Categorical data were expressed in the form of frequency (%) and continuous data were expressed in the form of Mean ± SD. The paired t-test was used to assess the statistical difference between baseline and 90th day values. The correlation between abdominal girth and HbA1c as well as between abdominal girth and BMI was calculated using Pearson correlation coefficient. Scatter plot and bar graphs were used to represent the results.

Results and Discussion

The study comprised of 89 participants with striking male predominance (58.43%). Baseline characteristics of the study participants were as given in Table 2. Nearly three-fourth of the study participants had past-history of diabetes mellitus, while the second highest morbidity history

reported was hypertension (43.82%). The major baseline characteristics are mentioned in table2.

The comparison of clinical parameters between baseline values and those noted at 90th day are given in Table 3. The BMI was significantly reduced ($P < 0.001$) along with the measured abdominal girth ($P < 0.001$). HbA1c ($P < 0.001$), systolic blood pressure ($P < 0.001$) and diastolic blood pressure ($P < 0.001$) were also found to be significantly reduced after 90 days of treatment as compared to the respective mean baseline values.Figures
2 to 5 represent the graphical representation of the comparison between baseline and 90th day mean parameters. The correlation between abdominal girth and HbA1c, abdominal girth and BMI as well as between HbA1c and BMI was calculated using Pearson correlation coefficient (table 4). There was a weak positive correlation between abdominal girth and HbA1c (r=0.018) on the 1st day of the treatment and it was not statistically significant (p=0.87), the same is shown in figure 5.1. After 90 days of treatment we found stronger positive relationship between abdominal girth and HbA1c which was approaching to statistical significance (r=0.18, p=0.084) as showed in figure5.2.

There was a positive correlation between abdominal girth and BMI (r=0.28) on the 1st day of the treatment and it was statistically significant (p=0.007), the same is shown in figure 5.3. After 90 days of treatment we found a highly significant positive relationship between abdominal girth and BMI (r=0.48, p<0.001) same is shown in figure 5.4.
The study participants were on various concomitant medications for DM as well as other co-morbidities. We compared the consumption of the allopathy medications by the participants, on day 90 and day 1, to check whether there was any reduction in the dependency on these standard medications by CDC. Table 5-Figure 6 gives the comparison between the consumption of allopathic medicines at day 1 and day 90.

Ayurvedic practitioners have been treating DM using various preparations like *Gudūchi* (*Tinospora cordifolia*) since a long time. It is hypothesized that Ayurvedic medicines may be acting via various potential pancreatic and extra-pancreatic effects. Comprehensive diabetes care (CDC) is one such Ayurvedic intervention which consists of 3 main components, *Snehana*(Centripetal oleation), *Swedana*(Thermal vasodilatation) and *Basti* (per rectal drugadministration).

We assessed the effects of this treatment technique on HbA1c, weight, BMI and abdominal girth. All these parameters were significantly reduced in the patients on CDC management, at the end of 90 days. HbA1c is a significant indicator of long-term glycaemic control in DM patients, with the capability to reflect the cumulative glycaemic control in the previous two to three months (Sherwani *et al*., 2016). Therefore, HbA1c was our primary parameter and the reduction in HbA1c by CDC gives a good evidence. Literature search revealed that even a mildly increased BMI can increase the chances of developing complications in DM (Guh *et al*., 2015) the positive effect of CDC in decreasing BMI can help prevent the potential complications too. Research articles have mentioned that abdominal girth is the best

parameter to assess adiposity and predict the outcome of DM. (Ghosh and Bandyopadhyay, 2012) Hence, we measured the effect of CDC over abdominal girth, which revealed positive outcome. We also found a strong positive correlation between BMI and HbA1c at the end of CDC treatment. This goes in sync with a research by Gummessonet *al*., which mentioned that weight loss in the overweight population is consistently associated with HbA1c, in a dose dependent manner. (Gummessonet *al*., 2017) We also found a reduction in the patients who were on these allopathic drugs. This indicates that CDC may be one of the factors associated with the decrease in load of medications in DM patients, and also helps them in avoiding the potential adverse effects of the allopathic medications.

Table.1 Study Treatment: Comprehensive Diabetes Care (CDC)

Table.1 Study Treatment: Comprehensive Diabetes Care (CDC)

Step of CDC	Type of Therapy	Herbs used for therapy	Durationof Therapy
Snehana	Massage or external oleation (centripetal upper strokes on the body)	100 ml *Azadirachtaindica*(neem) extract processed in sesame oil	20 minutes
Swedana	Passive heat therapy to the body	*Dashamoola*(group of ten herbal roots) with steam at <40 degrees Celsius)	15-20 minutes + 3-4 minutes of relaxation after procedure
Basti kalha	Per-rectal drug administration should be in body for ≥ 15 minutes for maximum absorption	Mixture of 40% *Guduchi*(*Tinosporacordifolia*), 20% *Daruharidra*(*Berberis aristata*) and 40% *Yashtimadhu*(*Glycyrrhiza glabra*)	10 minutes

Table.2 Baseline characteristics of the study participants

Variable	N=89
Age (Years)	56.19 ± 10.98
Gender n (%)	
Male	52 (58.4)
Female	37 (41.6)
Co morbidities n (%)	
Hypertension	39 (43.82)
Obesity	15 (16.85)
Dyslipidemia	10 (11.24)
Ischemic heart disease	8 (8.99)
Coronary artery disease	5 (5.62)
Chronic heart failure	3 (3.37)
Hypothyroidism	3 (3.37)
Chronic kidney disease	1 (1.12)
H/O Coronary angioplasty	1 (1.12)

Age is expressed in mean ± SD and X² test

Table.3 Comparison of various body parameters at the 1st day and after 90 days of the treatment

Variable	Baseline	After 90 days	t-statistic	p-value
HbA1c	9.02 ± 1.79	6.86 ± 1.24	12.78	<0.001***
BMI (Kg m²)	27.24 ± 1.33	25.39 ± 1.53	15.242	<0.001***
Abdominal girth	97.12 ± 7.03	91.64 ± 6.26	10.68	<0.001***
SBP (mmHg)	131.60 ± 16.10	122.83 ± 13.56	5.65	<0.001***
DBP (mmHg)	81.75 ± 9.45	77.02 ± 6.81	5.23	<0.001***

****Highly significant; BMI- Body Mass Index, HbA1c- Haemoglobin A1c, SBP- Systolic blood pressure, DBP- Diastolic blood pressure***

Table.4 Correlation between Abdominal Girth, HbA1c & Abdominal Girth, BMI

Correlation between	Baseline		After 90 days	
	r	p-value	r	p-value
Abdominal girth and HbA1c	0.018	0.87	0.183	0.084
Abdomen girth and BMI	0.28	0.007	0.48	<0.001
HbA1c and BMI	-0.008	0.94	0.12	0.26

Table.5 Consumption of medicines at baseline and after 90 days

Medicine	Day 1	After 90 days
Sulfonylurea	39 (43.82)	22 (24.72)
Biguanide	54 (60.67)	33 (37.08)
Alpha-glucosidase inhibitor	13 (14.61)	7 (7.87)
DPP -4 inhibitor	17 (19.1)	2 (2.25)
Thiazolidinedione	2 (2.25)	9 (10.11)
Insulin	7 (7.87)	1 (1.12)
Beta blocker	11 (12.36)	6 (6.74)
ACE inhibitor	2 (2.25)	0 (0)
ARB	20 (22.47)	14 (15.73)
CCB	14 (15.73)	7 (7.87)
Diuretic	9 (10.11)	4 (4.49)
Statin	26 (29.21)	10 (11.24)
NSAID	14 (15.73)	8 (8.99)
No medicine	13 (14.61)	40 (44.94)

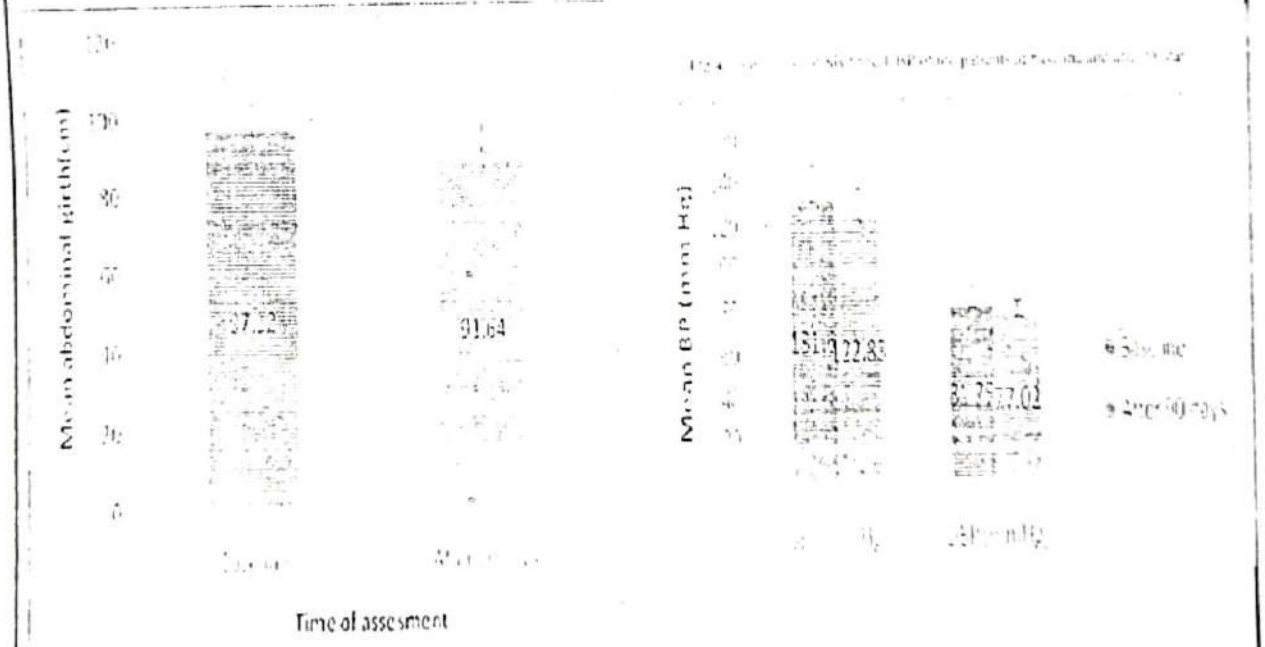
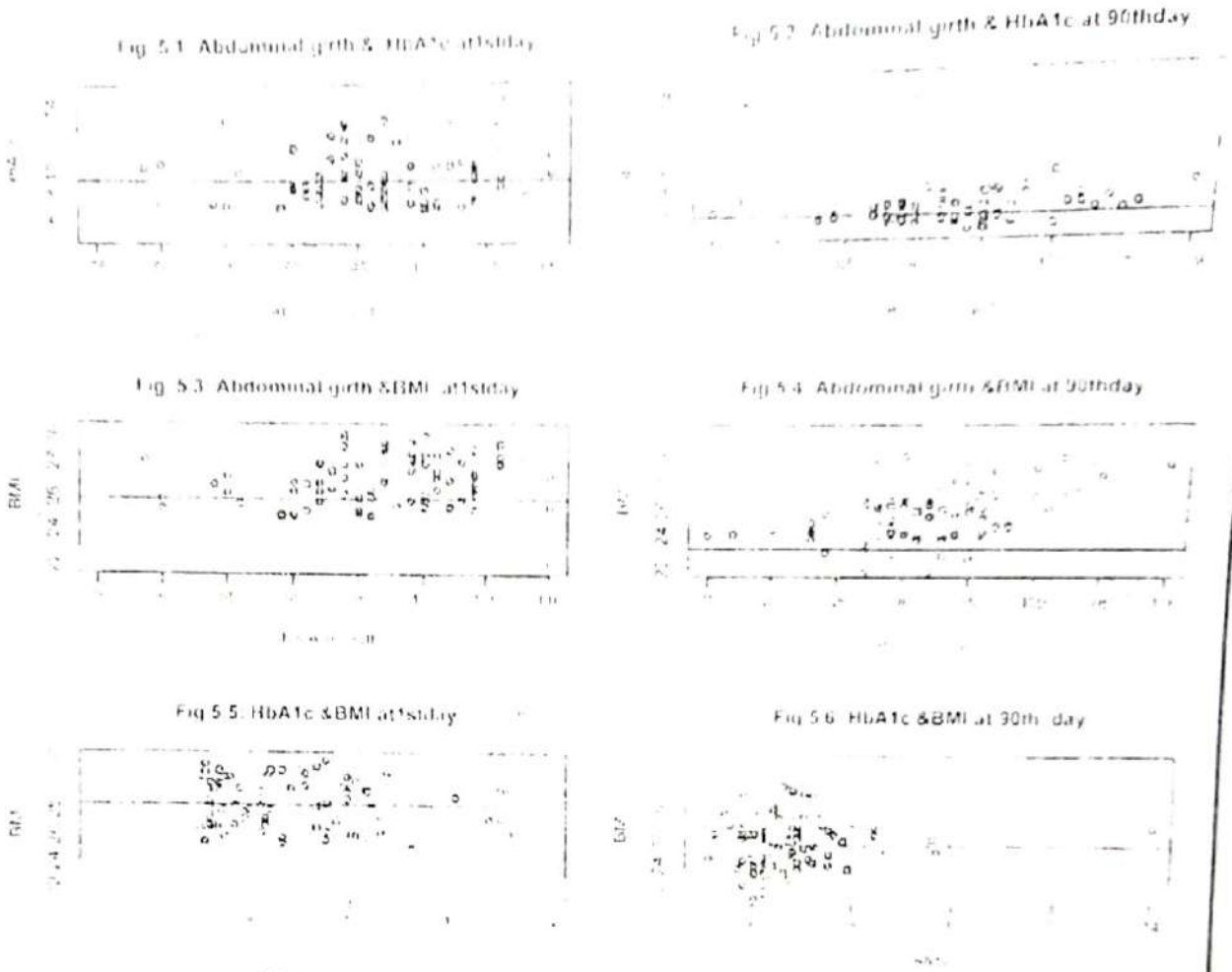


Fig.5 Correlation Between Abdominal Girth, HbA1c & Abdominal Girth, BMI



Snehanam is provided using *Neem* (*Azadiractaindica*) oil all over the body. Oleation is an anxiolytic procedure which decreases the sympathetic stress. The reduced sympathetic action decreases the hepatic glucose production, which can be helpful to reduce blood sugar levels. *Azadiractaindica*has antibacterial and antifungal action that can also help to reduce skin infections in DM patients. (Subapriya and Nagini, 2005) *Swedanam* is a process wherein diabetic patients get sleep inside a wooden box full of steam with head and neck outside the box, temperature being maintained around 40-45-degree Celsius. After 15-20 min patient is asked to come outside the box. It is hypothesized that hot fomentation, which is a relaxing process, induces sweating and decreases the excess of sodium and water which comprehensively helps to improve vascular health of DM patient to keep them away from probable vascular complications. *Basti* involves per rectal administration of ayurvedic herbal extracts like *Gudmar* (*Gymnemasylvestre*), *Daruharidra*(*Berberis aristate*) and *Yashtimadhu*(*Glycyrrhiza glabra*) *Gymnemasylvestre*has been found to stimulate insulin release, which may be responsible for its possible anti-hyperglycaemic action. (Persaud, 1999) The insulin release may be due to the possible regeneration of islet of Langerhans, as mentioned in a study conducted on streptozotocin -diabetic rats. (Shanmugasundaram*et al.*, 1990) An animal study assessed the anti-hyperglycaemic action of *Berberis aristate* and found strong potential in regulating homeostasis. (Singh and Kakkar, 2009) A clinical study conducted in type 2 DM patients found that *Berberis aristate* can reduce HbA1c efficiently. (Di Pierro*et al.*, 2013) In a pre-clinical study, *Glycyrrhiza glabra* has been found to prevent the deleterious effects of DM on learning and memory. (Hasanein, 2011) It is, however, important to note that low carbohydrate diet of 800 calories/day was advised to these patients throughout the 90 days period that could have add on benefit to this intervention.

Diabetes is known to be associated with poor dietary choices. Dietary choices is a key driver for insulin resistance, especially in an aging and sedentary population. Increased consumption of calorie-dense foods like fast food, meats and other animal fats, highly refined grains, and sugar-sweetened beverages, are thought to play a critical role in the rising rates of type 2 diabetes worldwide. Dietary changes like intake of low calories & high consumption of complex carbohydrates like high intake of fruits and vegetables, legumes, nuts, good quality fat can help in reducing insulin resistance. As per one of the studies, beta cell failure & insulin resistance can be alleviated by acute negativeenergy balance. Fasting blood glucose and hepatic insulin sensitivity reduced to normal & intrahepatic lipid decreased by 30% over 8 weeks and beta cell function elevated towards normality. (Lim, 2011; Yancy, 2005; Sami, 2017; McMacken and Shah, 2017)

For weight loss one should reduce to around

1000kcal/day which will help reduce 1 kg of body weightper week & 4kg per month Low calorie and low carbohydrate diet helps in utilization of intra organ fat and reduces insulin resistance which will help in the reversal of diabetes. Diet plan recommended to the patients was based on this principle of low-calorie and low-carbohydrate diet, which is to be followed for 12 weeks. It is based on pulse protein, complex carbohydrates, consumption of fruits and vegetables as well as good quality fats. As the diet plan is low in calories, it can lead to normalise insulin secretion and controldiabetes.

This study had a few limitations. It was a single-arm, retrospective study due to which the results were not compared with the standard care. However, this study was a proof-of-concept research, and future cohort studies with larger sample size and longer duration follow-up may be conducted, to generate a stronger evidence.

Treatment with CDC showed a significant decrease in the HbA1c levels of diabetic patients. CDC also showed significant reduction in the metabolic parameters of weight, BMI and abdominal girth of the diabetic patients. Moreover, CDC also decreased the dependency of the diabetic patients on the standard allopathicmedications.

Acknowledgment

The authors thank the study participants and their families, without whom this study would not have been accomplished.

References

Del Cañizo-Gómez FJ, and Moreno-Andrés MN. Cardiovascular risk factors in patients with type 2 diabetes. Do we follow the guidelines? Diabetes Res Clin Pract 2004; 65:125-33.

Department of Ayurveda, Siddha, Unani and Homeopathy (AYUSH) Ayush in India. Department of Ayurveda, Siddha, Unani and Homeopathy (AYUSH), Ministry of Health & Family Welfare, Govt of India,2007 Di Pierro F, Putignano P, Montesi L, Moscatiello S, Marchesini Reggiani G, Villanova N. Preliminary study about the possible glycemic clinical advantage in using a fixed combination of Berberis aristata and Silybummarianum standardized extracts versus only Berberis aristata in patients with type 2 diabetes. Clinical Pharmacology: Advances and Applications. 2013;5:167-74.

Ghosh JR, and Bandyopadhyay AR. Abdominal circumference as a screening measure for Type 2 Diabetes. Kathmandu Univ Med J (KUMJ) 2012; 10(40):12-5.

Goodman L, Brunton L, Chabner B, Knollmann B. Goodman & Gilman's pharmacological basis of therapeutics. New York: McGraw-Hill; 2011.

Gray N, Picone G, Sloan F, Yashkin A. Relation between BMI and Diabetes Mellitus and Its Complications among US Older Adults. Southern Medical Journal. 2015; 108(1):29-36.

Gummesson A, Nyman E, Knutsson M, Karlsson M. Effect of weight reduction on glycated haemoglobin in weight loss trials in patients with type 2 diabetes. Diabetes, Obesity and Metabolism. 2017; 19(9):1295-1305.

Hasanein P. Glabridin as a major active

isoflavan from *Glycyrrhiza glabra* (licorice) reverses learning and memory deficits in diabetic rats. Acta Physiologica Hungarica 2011;98(2):221-30

International Diabetes Federation IDF Diabetes Atlas — 7th Edition Diabetes Atlas Accessed from http://www.diabetesatlas.org/ on 16th May, 2018.

Lim EL. Reversal of type 2 diabetes: normalisation of beta cell function in association with decreased pancreas and liver triacylglycerol. Diabetologia 2011; 54(10):2506-14.

McMacken M, and Shah S. A plant-based diet for the prevention and treatment of type 2 diabetes. J GeriatrCardiol. 2017;14(5):342-54.

Mishra LC, ed. In: Scientific basis for ayurvedic therapies. September CRC Press; 2003

Persaud S. Gymnemasylvestre stimulates insulin release in vitro by increased membrane permeability. Journal of Endocrinology. 1999; 163(2):207-12

Sami W. Effect of diet on type 2 diabetes mellitus: A review. Int J Health Sci (Qassim). 2017;11(2):65-71.

Shanmugasundaram E, Gopinath K, Shanmugasundaram K, Rajendran V. Possible regeneration of the islets of langerhans in streptozotocin-diabetic rats given gymnemasylvestre leaf extracts. Journal of Ethnopharmacology. 1990;30(3):265-79

Sherwani S, Khan H, Ekhzaimy A, Masood A, Sakharkar M. Significance of HbA1c Test in Diagnosis and Prognosis of Diabetic Patients. Biomarker Insights. 2016;11:95-104.

Singh J, and Kakkar P. Antihyperglycemic and antioxidant effect of Berberis aristata root extract and its role in regulating carbohydrate metabolism in diabetic rats. Journal of Ethnopharmacology. 2009;123(1):22-6.

Subapriya R, and Nagini S. Medicinal properties of neem leaves: a review. Curr. Med. Chem. Anticancer Agents. 2005,5(2):149-160.

Tripathy J, Thakur J, Jeet G, Chawla S, Jain S, Pal A *et al*. Prevalence and risk factors of diabetes in a large community-based study in North India: results from a STEPS survey in Punjab, India. Diabetology & Metabolic Syndrome. 2017;9(1):1-8.

Uebaba K, Xu FH, Ogawa H. Psychoneuroimmunologic effects of ayurvedic oil dripping treatment. J Altern Complement Med. 2008; 14:1189-98.

Upadhyay, V.P. and Kamla, P. Ayurvedic approach to diabetes mellitus and its management by indigenous resources. In: Bajaj, J.S., editor. Diabetes Mellitus in developing countries. Interprint; New Delhi: 1984. p.375-7.

WHO. Diabetes Factsheet. Accessed fromhttp://www.who.int/en/news-room/fact-sheets/detail/diabetes on 15th May, 2018

Willett WC, Dietz WH, Colditz GA. Guidelines for healthy weight. N Engl J Med 1999; 341:427-33

Yancy WS Jr. A low-carbohydrate, ketogenic diet to treat type 2 diabetes. NutrMetab(Lond). 2005;2:34

Dear Subscribers

Hurry

Book your copy now....
New Subscription rates of
The Classical Science are as follows.

Single Copy -	Rs.	25/-
One Year Subscription -	Rs.	250/-
Three Year Subscription -	Rs.	750/-
Life Membership -	Rs.	2000/-

Send your D.D. in Favour of
'Chief Editor, The Classical Science'
Payable at Satara

Address

Chief Editor,
The Classical Science
Sawkar Homoeopathic Medical College
AM 1/1, Additional M.I.D.C.,
Degaon Road, Satara 415 004 (MS)
E mail - hmcsatara@gmail.com

BY HAND TAR. GHATEKAR SIR

Published on - 10th of every month
posted on- 15th of every month

SAWKAR INSTITUTES

A.M. 1/1 : Additional M.I.D.C., Degaon Road Satara - 415 004
Ph.: (02162) 240036, 240063
web site : www.samaratheducationaltrust.com

SAWKAR HOMOEOPATHIC MEDICAL COLLEGE, SATARA.
B.H.M.S.

SAWKAR PHARMACY COLLEGE JAITAPUR, SATARA.
D. PHARM

ARVIND GAVALI COLLEGE OF PHARMACY, JAITAPUR, SATARA.
B. PHARM, M. PHARM

ARVIND GAVALI COLLEGE OF ENGINEERING, PANMALEWADI, SATARA.
POLYTECHNIC, B.E., M.E.

Edited by : Dr. Ravindra N. Bhosale
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

Published & Owned by : Dr. Ravindra N. Bhosale

Printed at : Yashwant Offset, 668 Mangalwar Peth, Dastagir Colony, Satara. (MAH)

Published at : Sawkar Homoeopathic Medical College, Satara.
A.M. 1/1 Addi. M.I.D.C., Degaon Road, Satara - 415004. (MAH)

Director
VKS Madhavbaug Institute of Preventive Cardiology & Research Center

TRUE COPY