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EFFICACY OF AYURVEDIC *PANCHAKARMA* IN IMPROVING THE EJECTION FRACTION IN CARDIAC PATIENTS – AN OBSERVATIONAL STUDY

Jyoti Dhondiram Kshirsagar[1]*, Asha Anil Lakariya[2], Sadik Mansoor Khan[3] and Sachin Ramkrishna Patil[4]

[1]Clinic Head of Pune Aundh Madhavbaug Cardiac Clinic.
[2]Compliance Doctor of Pune Aundh Madhavbaug Cardiac Clinic.
[3]Clinic Head of Ahmedabad Maninagar Madhavbaug Cardiac Clinic.
[4]Zonal Medical Head of Madhavbaug Cardiac Clinics and Hospital.

***Corresponding Author: Jyoti Dhondiram Kshirsagar**

Clinic Head of Pune Aundh Madhavbaug Cardiac Clinic.

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ABSTRACT

Background: Chronic heart failure is a prevalent clinical syndrome and a major global health concern. *Sampurna Hruyday Shudhikaran* (SHS) therapy, is a combination of *Panchakarma* and allied therapies. This observational study aimed to explore its efficacy in improving ejection fraction in cardiac patients. **Methods:** A retrospective, single-centre, observational, investigator-initiated study was conducted at Madhavbaug Clinic in Maharashtra from February 2022 to July 2024. Inclusion criteria were patients diagnosed with ischemic heart disease, chronic heart failure, and dilated cardiac myopathy with ≤50% ejection fraction. Exclusion criteria were acute myocardial infarction, heart block, and pacemaker implantation. Follow-up was conducted at 30, 60, and 90 days. Baseline and follow-up data were compared. **Results:** This study included 15 patients (mean age: 62.53 ± 9.80 years). Mean ejection fraction increased from 35.13 ± 10.61% to 42.20 ± 13.53% at the 90-day follow-up. Significant improvements were observed in VO_{2max} (day 1: 12.86 ± 2.08 mL/kg/min; day 30: 16.62 ± 1.59 mL/kg/min; day 60: 19.45 ± 1.80 mL/kg/min; day 90: 21.59 ± 2.04 mL/kg/min) and metabolic equivalent (MET) value (day 1: 3.69 ± 0.59; day 30: 4.75 ± 0.45; day 60: 5.56 ± 0.51; day 90: 6.17 ± 0.48). Additionally, the 6-minute walk test showed marked improvement, increasing from 288.67 ± 68.40 m on day 1 to 581.43 ± 60.26 m on day 90. **Conclusion:** The integration of Ayurvedic *Panchakarma* therapy with allopathic medication has proven effective in improving ejection fraction and key cardiac risk factors such as VO_{2max} while reducing patients' dependence on allopathic medications.

KEYWORDS: Ayurveda, alternative medicine, chronic heart failure, *panchakarma*, chronic heart failure, preserved ejection fraction.

INTRODUCTION

Chronic heart failure is a progressive and debilitating disease. The prevalence of heart failure is rising rapidly worldwide, including in India. It is estimated that more than 37 million individuals suffer from heart failure worldwide whilst in India the prevalence ranges from 1.3–23 million. It not only elevates the risk of mortality and morbidity while diminishing patients' quality of life but also places a significant strain on the healthcare system.[1] Currently, medications such as angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB), vasodilators, diuretics and beta-blockers are commonly prescribed for the treatment of chronic heart failure.[2] However, despite the availability of multiple treatment options, chronic heart failure mortality in India remains high, ranging from 20 –30%.[3] Thus, there is a need to explore newer treatment modalities to improve the prognosis of chronic heart failure.

Heart failure reversal therapy (HFRT) also known as *Sampurna Hruyday Shudhikaran* (SHS) therapy, is a blend of herbal treatment with *panchakarma* and allied therapeutic modalities. This therapy employs techniques such as *Snehana*, *Swedana*, and *Basti*. However, there is a dearth in data on the effect of this therapy on chronic heart failure patients. Thus, the current study aimed to explore the efficacy of SHS therapy in improving ejection fraction in chronic heart failure patients. The efficacy of HFRT therapy was assessed through variables such as VO_{2max}, metabolic equivalent (MET), body mass index, and adherence to concomitant medication.

METHODS

Study design and patient population

A retrospective, single centre, observational, investigator-initiated study was conducted at Madhavbaug Clinic in Maharashtra from February 2022 to July 2024. The inclusion criteria were patients diagnosed with ischemic heart disease, chronic heart failure, and dilated cardiac myopathy with ≤50% ejection fraction and patients administered HFRT. The exclusion criteria were acute myocardial infarction, heart block, and pacemaker implantation. All patients provided written informed consent for the collection and analysis of the data for research purposes.

Heart failure reversal therapy

The HFRT therapy is an amalgamation of *panchakarma* as well as allied therapies and is elaborated in **Table 1**.

Data collection

Patient data such as age, gender, weight, abdominal girth, heart rate, and blood pressure, were recorded on day 1 and day 90. Additional variables, such as VO_{2max} and MET value, were also recorded. On day 1 patients underwent cardiac stress testing by Modified Bruce Protocol.[4] Their maximum work load was evaluated in terms of metabolic equivalents (MET) which represents a modest, practical, and easily understood technique for stating the energy cost of physical activities as a multiple of the resting metabolic rate.[5] This MET was multiplied by 3.5 to calculate peak VO_{2max}. This process was repeated at the 90-day follow-up. Measurements from day 1 were compared with those from day 90. Patient records with incomplete treatment or follow-up details, as well as cases where treatment was modified, were excluded from the analysis. Medication adherence on day 1 and day 90 was also documented and compared during follow-up.

Statistical analysis

All patient data were collected and coded in a Microsoft Excel sheet. Software R 3.4.4 was used to analyze data. Continuous data are expressed as the mean ± standard deviation, whereas categorical data are expressed as number (frequency). Paired t-test was used to analyze the difference in various parameters at day 1 and day 90. A p-value <0.05 was considered as statistically significant.

RESULTS AND DISCUSSION

Baseline characteristics of study population

The mean age of the study population was 62.53 ± 9.80 years which comprised 8 (53.3%) males. The mean VO_{2max} (day 1: 12.86 ± 2.08 mL/kg/min, day 30: 16.62 ± 1.59 mL/kg/min, day 60: 19.45 ± 1.80 mL/kg/min and day 90: 21.59 ± 2.04 mL/kg/min) and MET value (day 1: 3.69 ± 0.59, day 30: 4.75 ± 0.45, day 60: 5.56 ± 0.51, and day 90: 21.59 ± 2.04) improved significantly. The 6-minute walk test also improved significantly (day 1: 288.67 ± 68.40, day 30: 417.33 ± 52.21, day 60: 512.14 ± 60.26, and day 90: 581.43 ± 60.26) at the 90-day follow-up. Other variables such as weight, body mass index, abdominal girth, systolic blood pressure, diastolic blood pressure, and heart rate also improved at the 90-day follow-up as detailed in **Table 2.** Mean ejection fraction increased from 35.13 ± 10.61% to 42.20 ± 13.53% at the 90-day follow-up as displayed in **Figure 1**. The findings of ejection before and after treatment is outlined in **Table 3** revealing increase in ejection fraction.

Hospitalization

Before treatment 6 patients were hospitalized due to cardiac causes, this reduced to 2 patients after treatment. Before treatment 8 patients were not hospitalized, this increased to 13 patients after treatment. The details of hospitalization are outlined in **Table 4**.

Medication

Adherence to anticoagulants (day 1: 13 patients and day 90: 8 patients, change: -38.46%), antiplatelets (day 1: 12 patients and day 90; change: -58.33%), statins (day 1: 12 patients and day 90: 5 patients; change: -58.33%), beta blockers (day 1: 9 patients and day 90: 2 patients; change: -77.78%) decreased at the 90-day follow-up. The details regarding patient adherence are given in **Table 5**.

Heart failure patients with preserved ejection fraction have been found to be at higher risk of death and heart failure hospitalizations emphasizing the need to explore novel therapeutic options. The current study was conducted to assess the effect of HFRT, chronic heart failure patients. Study findings revealed an improvement in ejection fraction from 35.13 ± 10.61% to 42.20 ± 13.53% at the 90-day follow-up supporting the efficacy of the HFRT therapy.

Anthropometric obesity indicators, such as body mass index and abdominal girth play a crucial role in assessing the risk and progression of chronic heart failure. Body mass index is a key indicator of a sedentary lifestyle and both existing and potential obesity. Studies have shown that chronic heart failure patients with a high body mass index face an increased risk of mortality.[6, 7] The current study observed body mass index improved from 25.95 ± 6.02 at baseline to 25.31 ± 6.05 at the 90-day follow-up. In line with these findings, another similar documented a decrease in body mass index from 26.69 ± 4.97 at baseline to 25.16 ± 5.05 at the 30-day follow-up.[8] Abdominal obesity has also been found to be correlated with cardiovascular risk factors such as diabetes mellitus and hypertension. The current study observed a decrease in abdominal girth from 90.20 ± 12.17 cm at baseline to 86.07 ± 11.13 at the 30-day follow-up and 83.00 ± 10.34 cm at the 90-day follow-up. Similarly, another study revealed a decrease in abdominal girth from 98.82 ± 12.74 cm to 93.68 ± 12.36 cm at the 30-day follow-up.[8]

The VO_{2max} improved from 12.86 ± 2.08 mL/kg/min at baseline to 21.59 ± 2.04 mL/kg/min at the 90-day follow-up. This observation correlates with other studies assessing HFRT.[9, 10, 11] The MET value also improved

from 3.69 ± 0.59 at baseline to 6.18 ± 0.59 at the 90-day follow-up. This is in line with similar studies assessing the HFRT therapy.[9]

In economically challenged countries like India, the heavy reliance of chronic heart failure patients on conventional allopathic medications significantly drives up healthcare costs. Additionally, the increased adverse effects of these drugs often lead to poor adherence, further complicating the situation. Considering this, we examined the impact of HFRT on patients' dependence on allopathic medicines. After 90 days, there was a notable reduction in reliance on nearly all classes of drugs, with a greater number of patients discontinuing allopathic medications.

Study limitations

This study is limited by its retrospective design and single-center setting. Furthermore, the small sample size reduces the generalizability of the findings to the broader population.

Table 1: Treatment plan.

Steps involved	Product	Mechanism of action	Duration (mins/sitting)	Probable adverse effects
Centripetal oleation	ARJ oil Vatex Oil Abhyang oil (Til Tail) Vatari Oil L-Abhyanga Oil	ARJ Oil acts as a negative chronotropic and positive inotropic agent, reducing palpitations and improving chronic heart failure. It has diuretic, anti-inflammatory, and antihypertensive properties, enhances endothelial function, and calms the hyperactivated sympathetic nervous system. Vatex/Vatari Oil is a potent *Vatashamak* used for all types of *Vata Vyadhi*, particularly effective in pacifying *Vyan Vayu*. Abhyanga/ L Abhyanga Oil: Til oil is *Ushna, Snigdha, Sukshma, Srotogami, Kapha-Vata Hara*—soothes the hyperactivated sympathetic system, enhances blood vessel elasticity, circulation, and congestion relief, while reducing inflammation. Essential oils of lemon, rose, and lavender are effective in promoting vasodilation, improving circulation, and reducing blood pressure while also acting as anxiolytics. Lavender oil enhances coronary circulation and is beneficial for ischemia. Rose oil has anxiolytic, antihypertensive, and sedative properties, helping to promote restful sleep.	20–25 mins Twice weekly	Irritation of skin or skin allergy,
Thermal Vasodilatation	Dashmula Kadha	It softens the skin, dilates blood vessels, enhances peripheral circulation, reduces congestion, eliminates metabolic waste and toxins through sweat, and helps reduce edema.	15–20 min Twice weekly	Fainting, fatigue, excessive thirst, burning sensation, and weakness in the voice and limbs.
PRDA	ARJ Basti Amalaki extract & Til Oil G.H.A. Kadha PLS Kwath	ARJ Basti contains phenolic compounds like terminic acid and arjunolic acid, along with glycosides such as arjunetin and arjunosides I-IV, which offer cardioprotective benefits. It enhances blood circulation to heart tissue, strengthens cardiac function, and exhibits antiarrhythmic, anti-anginal, anti-atheromatic, antihyperlipidemic, antithrombotic, and antihypertensive properties. Punarnava, rich in active phytochemicals like punarnavoside and punarnavine, serves as an excellent diuretic and anti-inflammatory agent. Amalaki possesses hypolipidemic, antioxidant, and cardioprotective properties. It helps reduce endothelial dysfunction and the risk of coronary artery disease while providing protective effects on the endothelium and internal body tissues. GHA enhances intrinsic and extrinsic nitric oxide secretion in coronary blood vessels. It acts as a diuretic, hypolipidemic, cardioprotective, analgesic, antispasmodic, anti-inflammatory, and anticoagulant. By reducing endothelial inflammation, improving vascular dilation, protecting against oxidative damage, and promoting healing, GHA helps alleviate edema and congestion, making it beneficial for ischemic heart disease. Kalmegh & Shallaki both exhibit strong hypolipidemic activity.	8–25 mins	Abdominal discomfort, bloating, or cramping during or after the procedure

		Kalmegh is known for its antithrombotic and thrombolytic effects, while Shallaki has demonstrated calcium dislocation properties in experimental studies, making them valuable in the management of coronary artery disease and other heart conditions.		
Hrudaydhara	Dashmula Kadha	This therapy nourishes, strengthens, and balances heart function.	7 mins	Palpitation, burning sensation, and fatigue may occur.

Table 2: Baseline characteristics of study population.

Variable	Day 1 (n=15)	Day 30 (n=15)	Day 60 (n=15)	Day 90 (n=15)	p value
Age, years	62.53 ± 9.80				
Males	8 (53.3%)				
VO_{2max}, mL/kg/min	12.86 ± 2.08	16.62 ± 1.59	19.45 ± 1.80	21.59 ± 2.04	0.00
MET value	3.69 ± 0.59	4.75 ± 0.45	5.56 ± 0.51	6.18 ± 0.59	0.00
6 min walk test	288.67 ± 68.40	417.33 ± 52.21	512.14 ± 60.26	581.43 ± 60.26	0.00
Weight, kg	61.53 ± 11.80	59.88 ± 11.50	59.33 ± 11.27	57.17 ± 11.27	0.02
Body mass index	25.95 ± 6.02	25.31 ± 6.05	25.31 ± 6.21	24.93 ± 5.61	0.00
Abdominal girth, cm	90.20 ± 12.17	86.07 ± 11.13	83.87 ± 10.16	83.00 ± 10.34	0.00
Systolic blood pressure, mmHg	123.07 ± 19.50	121.40 ± 18.04	118.13 ± 16.87	118.67 ± 13.48	0.21
Diastolic blood pressure, mmHg	74.93 ± 10.87	73.20 ± 10.90	73.33 ± 9.62	76.07 ± 6.95	0.67
Heart rate, bpm	77.00 ± 11.42	76.40 ± 7.79	75.33 ± 6.46	75.53 ± 6.77	0.08
Ejection fraction, %	35.13 ± 10.61	-	-	42.20 ± 13.53	0.00

Data are expressed as number (percentage) or mean ± standard deviation.

Table 3: Ejection fraction before and after treatment.

Variable	Day 1 (%)	Day 30 (%)	Percent change
Cardiac hospitalization (n=2)	27.50	30.0	9.09
No hospitalization (n=13)	36.31	44.08	21.40

Data are expressed as number (percentage).

Table 4: Hospitalization.

Variable	Before treatment	After treatment	Percent change
Cardiac hospitalization	6	2	-66.7
No hospitalization	8	13	-62.5
Non-cardiac hospitalization	1	0	-100.0

Data are expressed as number.

Table 5: Medication adherence.

Variable	Day 1 (n=15)	Day 90 (n=15)	Percent change (%)
Anticoagulant	13	8	-38.46
Antiplatelet	12	5	-58.33
Statins	12	5	-58.33
Beta blocker	9	2	-77.78
Diuretics	8	5	-37.50
Calcium channel clockers	3	2	-33.33
Angiotensin converting enzymes	2	0	-100.00

Data are expressed as number or percentage.

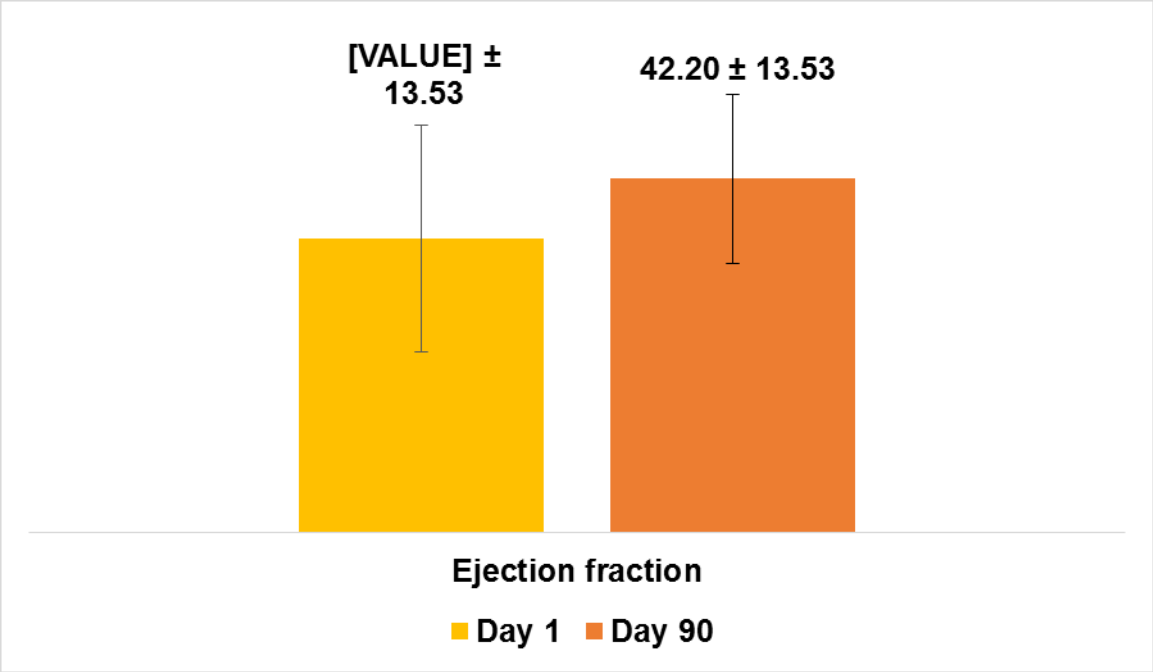

Figure 1: Ejection fraction pre and post treatment.

CONCLUSION

The integration of Ayurvedic *Panchakarma* therapy with allopathic medication has proven effective in improving the ejection fraction as measured by 2D echocardiography, and key cardiac risk factors such as VO_{2max} and lipid profile, and while reducing patients' dependence on allopathic medications.

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