



CLINICAL FEATURES, ECG AND ECHOCARDIOGRAPHIC PROFILE IN PATIENTS WITH HEART FAILURE PRESERVED EJECTION FRACTION

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ABSTRACT

Background: Heart failure is a growing epidemic condition and nearly half of the patients have preserved ejection fraction (EF>50%)(1). It is a major public health problem that is associated with increased mortality and morbidity. Heart Failure (HF) has classically been considered to be a Clinical Syndrome associated with Cardiac dilation and impaired cardiac contractility(2). Many studies showed that the majority of patients with heart failure have normal Ejection fraction. This has variously been labeled as Diastolic Heart Failure, "Heart Failure with Preserved Ejection Fraction"(HFpEF)(1) or "Heart Failure with normal Ejection Fraction"(HFnlEF)(6) and is attributed to abnormalities of Diastolic function although the exact mechanism is debated(4,5). Although there is increase in prevalence of HF with preserved Ejection Fraction, studies on Indian population are few, so we conducted a study in our hospital to know the clinical, ECG and Echo profile in HF with Preserved Ejection Fraction over a period of two years. **Aim:** To study the clinical features, risk factors, ECG and Echo profile in patients with suspected HFpEF **Objectives:** 1) To study about the clinical Features and risk factors of patients with symptoms suggesting Heart Failure with Preserved Ejection Fraction. 2) To study the echocardiographic changes in patients presenting with symptoms suggesting Heart Failure with Preserved Ejection Fraction. **Study Design:** Prospective observational study. **Place Of Study:** Department of General Medicine, Kamineni institute of medical sciences, Marketpally. **Duration Of Study:** October 2020 to September 2022.

KEYWORDS : Heart Failure with Preserved Ejection Fraction (HFpEF), Diastolic Heart Failure, Heart Failure with normal Ejection Fraction (HFnlEF)

INTRODUCTION:

Heart failure is a growing epidemic condition and nearly half of the patients have preserved ejection fraction (EF>50%)(1).

It is a major public health problem that is associated with increased mortality and morbidity. Heart Failure (HF) has classically been considered to be a Clinical Syndrome associated with Cardiac dilation and impaired cardiac contractility(2).

Many studies showed that the majority of patients with heart failure have normal Ejection fraction. This has variously been labeled as Diastolic Heart Failure, "Heart Failure with Preserved Ejection Fraction"(HFpEF)(1) or "Heart Failure with normal Ejection Fraction"(HFnlEF)(6) and is attributed to abnormalities of Diastolic function although the exact mechanism is debated(4,5). In epidemiological surveys, the prognosis of HFpEF is nearly as poor as for heart failure with reduced ejection fraction (HFrEF)(1).

The EF threshold (or "cutoff") value used to differentiate the Heart Failure patients as Reduced EF and Normal or Preserved EF ranged from 40% to 50% in a variety of studies. What is the ideal threshold value? Data indicate that patients with an EF between 40% and 50% behave more like patients with EF 40%. The major conclusions of Smith et al.(7) would not be changed if the EF cutoff was >50% instead of >40%. Therefore, it is reasonable to conclude that the ideal cutoff to differentiate Reduced EF from Preserved EF is 50%.

Although there is increase in prevalence of HF with preserved Ejection Fraction, studies on Indian population are few, so we conducted a study in our hospital to know the clinical and echo profile in HF with Preserved Ejection Fraction over a period of two years.

AIM:

To study the clinical features, risk factors, ECG and Echo profile in patients with suspected heart failure with preserved ejection fraction.

OBJECTIVES:

1. To study about the clinical Features and risk factors of patients with symptoms suggesting Heart Failure with Preserved Ejection Fraction.
2. To study the echocardiographic changes in patients presenting with symptoms suggesting Heart Failure with Preserved Ejection Fraction

Inclusion Criteria:

1. All patients with Signs and Symptoms of Heart Failure who fulfill the Framingham Criteria.
2. All age groups more than 12 yrs.

Exclusion Criteria:

- All confirmed cases of
- Valvular Heart Disease
 - Congenital Heart Disease
 - Patients with Cor Pulmonale

METHODOLOGY:

After taking approval from the institutional ethics committee and prior informed consent from the patients the study was conducted. A detailed history was elicited & thorough general physical examination of patient was done. Cases were subjected to routine investigation such as Chest X-Ray, ECG, 2DECHO, Complete Blood Count, Renal Function Test, Fasting Blood Sugar, Lipid Profile, Serum Albumin & Pulmonary Function Test.

RESULTS:

A total of 50 Patients with HFpEF were analyzed and the following results were obtained.

Table - 1: Age And Gender Distribution

AGE GROUP	GENDER DISTRIBUTION IN HFpEF(n=50)	
	Male (n=33)	Female (n=17)
25 - 35	3	0
36 - 45	7	4

46 - 55	5	4
56 - 65	14	6
66 & above	4	3
Total	33	17
Mean Age (in years)	48.63±11.3	48.58±10.7
Mean Age (in years)	48.62±11.3	

- Men aged more than 56 years were more commonly affected (32%).
- Mean age of HFpEF - 48.62±11.3 years.

Table - 2: Distribution Of Symptoms

SYMPTOMS	HF WITH PRESERVED EF (n=50)	PERCENTAGE %
Breathlessness	49	98%
Orthopnea	28	56%
H/O Oedema	44	88%
Palpitation	18	36%
Chest Pain	11	22%

- Exertional breathlessness was the most common presenting Symptom, seen in 98% of patients. Edema (88%) and Orthopnea (56%) are the next most common symptoms.

Table - 3: Distribution Of Physical Signs

PHYSICAL SIGNS	HF WITH PRESERVED EF (n=50)	PERCENTAGE %
Pedal Edema	45	90%
JVP	41	82%
LV-S3	6	12%
Murmur	5	10%
Rales	21	42%
Hepatomegaly	6	12%
PULSE AF	5	10%
PULSE ST	7	14%
PULSE VPC	2	4%
PULSE NORMAL	36	72%
SBP	144.2±29 mmhg	
DBP	86.8±15 mmhg	

- Pedal edema was present in 90 % of HF patients, Elevated JVP was 2nd most common sign (82%).
- Mean SBP was 144.2±29 mmhg in HFpEF patients.
- Mean DBP was 86.8±15 mmhg in HFpEF patients.

Table - 4: Distribution Of Risk

RISK FACTORS	HF WITH PRESERVED EF (n=50)	PERCENTAGE %
SHT	43	86%
DM	15	30%
CAD	18	36%
CRF	12	24%
Alcoholism	23	46%
Smoking	15	30%
Obesity	17	34%

- SHT was the most common risk factor in HFpEF seen in 86% of patients, followed by Alcoholism (46%) and CAD (36%).

Table - 5: Distribution Of ECG Findings

ECG FINDINGS	HF WITH PRESERVED EF (n=50)	PERCENTAGE %
LVH	29	58%
LAE	5	10%
AF	5	10%
LBBB	0	0
RBBB	1	2%
IHD	13	26%

- LVH was most common manifestation in ECG (58%) in HFPEF patients. Next most common was IHD (26%).

Table – 6: Distribution Of Chest X-ray Findings

CXR FINDINGS	HF WITH PRESERVED EF(n=50)	PERCENTAGE %
Cardiomegaly	36	72%
Pulm.VHT	44	88%
Pl.Eff	17	34%

- Pulmonary venous HTN on CXR was the most common finding in HFpEF patients.

Table – 7: Distribution Of Echocardiographic Findings

HF WITH PRESERVED EF (n=50)	PERCENTAGE %
Concentric LVH	41 82%
LAE	29 58%
Hypokinesia	12 24%
DD	48 96%

- Mean Ejection fraction was 58±4.1 %.
- Mean LVEDD was 49.6±4.9 mm.
- Mean LVESD was 36.4±5 mm.
- Hypokinesia of left ventricle was seen in 24% patients.
- Diastolic dysfunction was seen in 96% patients.
- Observed E/A ratio were reduced to below one in HFPEF (Mean is 0.83).

DISCUSSION:

Detailed study was done in all HFpEF patients with regards to the clinical features, Risk factors and echocardiographic profile.

Most of the patients had similar presentations, the most common presenting symptom was breathlessness.

Men >56years of age were more affected, unlike other studies where female predominance was reported .AF did not show significance in HFPEF (10%) whereas *Theophilus E Owan et al.*⁽⁸⁾ studies showed that it was significant in HFPEF(41%).

SHT, CAD and DM were the most common risk factors in HFpEF patients. Highest being Systolic HTN seen in 86 % of patients.

Vasan et al⁽⁵⁾ studies showed mean SBP was 143±24 mmHg and DBP was 73±13mmHg in HFpEF whereas present study showed mean SBP was 144±29mmHg and mean DBP was 86.8±15mmHg in patients with HFPEF.

Left ventricular hypertrophy was the most common ECG finding seen in 58 % of patients. ECG evidence of IHD was 26% in patients with HFpEF.

Pulmonary venous hypertension on CXR was present in 80% of patients with HFpEF.

Table - 8: Comparison Of Symptom Profile With Other Study.

Symptom Profile	Mayank Jain et al (1)	Our Study
Breathlessness	97%	98%
Orthopnea	12.8%	56%
chest pain	25%	22%

Table - 9: Comparison Of Risk Factors With Other Study.

Major Risk Factor	Mayank Jain et al (1)	Our Study
Systolic HTN	78%	86%
Obesity	56%	34%
Diabetes	47%	30%
CAD	18%	36%
CRF	19.95%	24%
Smoking	34%	30%

CONCLUSION:

- 50 Patients of Heart failure with preserved ejection fraction were analyzed.
- Mean age of patients in HFpEF was 48± 10.7 for males,

45.5 ± 11.36 for females.

- Men with the age of 56 years and above (32%) were mostly affected with HFpEF.
- Exertional Breathlessness was the most common presenting symptom (86%). Pedal edema was seen in 90% of patients, next most common sign was raised JVP seen in 82% .
- SHT was the most common risk factor in HFpEF (86%) of patients followed by Alcohol (46%) and CAD (36%).
- LVH was the most common manifestation seen in ECG in 58% of HFpEF patients. Evidence of IHD is seen in 26% and AF is seen in 10% of patients with HFpEF.
- Pulmonary venous hypertension on CXR was seen in 88% , followed by cardiomegaly seen in 72% .
- Observed E/A ratio were reduced to below one in HFpEF (Mean was 0.83).
- Diastolic dysfunction was seen in 96 % of patients, most of them had Grade I diastolic dysfunction.
- Left Atrial enlargement which serves as surrogate marker for increased LVEDP was seen in 52% of patients with HFpEF.
- Mean Ejection fraction in HFpEF patients was 58 ± 4.1%

Future Direction:

An ideal therapeutic agent should target the underlying mechanisms that cause diastolic heart failure. Diastolic heart failure is now recognized as an important problem, guidelines for diagnosis have been developed. Three trials are now under way. Two of these trials target neurohumoral activation. The third study targets intracellular calcium homeostasis.

REFERENCES:

1. Jain M, Kiyawat P, Kiyawat S. Heart Failure with Preserved Ejection Fraction: A Study of Clinical Profile in Indian Patients. *International Journal of Contemporary Medical Research [IJCMR]*. 2018;5(6).
2. Libby, Bonow, Mann, Zipes : Heart Failure with Normal Ejection Fraction, *Braunwald's Heart Disease – Textbook of Cardiovascular Medicine*, 8th Ed, Part IV, Chapter 26.
3. Bozkurt B, Coats A, Tsutsui H, et al. Universal definition and classification of heart failure: a report of the Heart Failure Society of America, Heart Failure Association of the European Society of Cardiology, Japanese Heart Failure Society and Writing Committee of the Universal Definition of Heart Failure. *European Journal of Heart Failure*. 2021;23(3):352-380.
4. Vasan RS, Levy D: Defining diastolic heart failure: a call for standardized diagnostic criteria. *Circulation* 2000;101:2118-21.
5. Zile MR, Gaasch WH, Carroll JD, et al. Heart Failure with Normal Ejection Fraction: Is measurement of Diastolic function Necessary to make the Diagnosis of Diastolic Heart Failure?. *Circulation* 2001;104:779-782.
6. J E Sanderson: Heart Failure with a Normal Ejection Fraction. *Heart* 2010;96:791.
7. Smith GL, Masoudi FA, Vaccarino V, Radford MJ.: Outcomes in Heart Failure patients with Preserved Ejection Fraction: mortality, readmission, and functional decline. *J Am Coll Cardiology* 2003;41:1510-1518.
8. Theophilus E. Owan, M.D., David O. Hodge, M.S., et al.: Trends in Prevalence and Outcome of Heart Failure with Preserved Ejection Fraction. *NEJM* 2006;355:251-9.