A STUDY ON ETIOLOGICAL AND RISK FACTORS FOR HEART FAILURE - A HOSPITAL BASED STUDY

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Abstract

Background

Heart failure (HF) is a common cardiovascular condition with increasing incidence and prevalence1. Several large clinical trials on use of pharmacological therapy and devices has resulted in an increasing use of evidence based therapy of heart failure. Despite these advances the morbidity and mortality of those afflicted with heart failure continues to remain high.

Aim

To assess the etiological and the risk factors for heart failure among the patients admitted in the hospital with heart failure

Methodology

A cross sectional study was undertaken at Vinayaka Missions Medical College Hospital, a tertiary care hospital in Salem district. 100 cases of newly diagnosed congestive heart failure were included in the study. Details regarding the chief and presenting complaints, socioeconomic status, family history, history related to chronic illnesses and lifestyle behaviors were collected from the patients.BMI and waist hip ratio was recorded do assess the obesity status. Blood pressure was recorded to assess the hypertension related heart diseases. Detailed physical and systemic examination was done and the signs and symptoms related to heart failure were recorded. Investigations like ECG and Echo were used to confirm the diagnosis.

Results

Among the various etiological factors for heart failure, coronary artery disease (CAD) was found to be the most common cause for heart failure followed by systemic hypertension and rheumatic heart disease (table 3). Cardiomyopathy and corpulmonale contributed 8% and 7% for the heart failure. Among the various risk factors hypertension, diabetes and dyslipidemia showed a statistical significant association for the heart failure (p<.05). The other risk factors like smoking, age, gender, BMI and family history had a strong association for heart failure with odds of more than 1 but did not had a statistical significant association (p>.05).

Conclusion

Though, the study shows that coronary artery disease and HT are the most common causes for cardiac failure, practitioners need to realize that CAD and HT are typically accompanied by other cardiovascular risk factors, especially dyslipidemia and hyperglycemia, and that control of all these factors with appropriate therapy will have a positive effect on progression of heart failure.

INTRODUCTION

Heart failure (HF) is a common cardiovascular condition with increasing incidence and prevalence1. Several large clinical trials on use of pharmacological therapy and devices has resulted in an increasing use of evidence based therapy of heart failure. Despite these advances the morbidity and mortality of those afflicted with heart failure continues to remain high.[1] Adherence to guidelines results in improved outcomes of heart failure patients. Education of caregivers on evidence based therapy is the cornerstone of a successful heart failure programme. Unlike western countries where heart failure is predominantly a disease of elderly, in India it affects younger age group. The important risk factors for heart failure include coronary artery disease, hypertension, diabetes mellitus, cardiotoxic drugs, valvular heart disease and obesity.[2,3] In India coronary artery disease, diabetes, hypertension, valvular heart diseases and primary muscle diseases are the leading causes for heart failure. Rheumatic heart disease is still a common cause of heart failure in Indians. Heart failure is third most common cardiovascular disease in the US affecting 2 per cent of the U.S. population, or almost 5 million people.[2,3] The prevalence of heart failure increases with the age from less than 1 per cent in the 20-39 yr old age group to over 20 per cent in the people age 80 yr or older.[4] The life time risk of developing heart failure is estimated at about 20 per cent both in men and women. The lifetime risk of developing HF at the age of 40 yr is 11.4 per cent for men and 15.4 per cent for women. More than 500,000 new cases are diagnosed each year.[5]

In India, we do not have data regarding the exact prevalence and incidence of heart failure. With higher propensity for cardiovascular diseases and ageing population the burden of CHF is likely to be higher in comparison to the western population. Therefore, there is an urgent need to have HF registries in the secondary, tertiary care centers and at the national level. These will help and provide us the detailed information related to heart failure incidence, prevalence, aetiology and thus guide for adopting management strategies.

There are 2 mechanisms of reduced cardiac output and heart failure: systolic dysfunction and diastolic dysfunction. The most common causes of systolic dysfunction (defined by a left-ventricular ejection fraction of _ 50%) are ischemic heart disease, idiopathic dilated cardiomyopathy, hypertension, and valvular heart disease. Diastolic dysfunction (defined as dysfunction of left-ventricular filling with preserved systolic function)may occur in up to
40–50% of patients with heart failure, it is more prevalent in women, and it increases in frequency with each decade of life. Diastolic dysfunction can occur in many of the same conditions that lead to systolic dysfunction. The most common causes are hypertension, ischemic heart disease, hypertrophic cardiomyopathy, and restrictive cardiomyopathy. Many patients who have symptoms suggestive of heart failure (shortness of breath, peripheral edema, paroxysmal nocturnal dyspnea) but also have preserved leftv entricular function may not have diastolic dysfunction; instead, their symptoms are caused by other etiologies, such as lung disease, obesity, or occult coronary ischemia.[6,7]

AIM

To assess the etiological and the risk factors for heart failure among the patients admitted in the hospital with heart failure.

MATERIALS & METHOD

A cross sectional study was undertaken at Vinayaka Missions Medical College Hospital, a tertiary care hospital in Salem district. 100 cases of newly diagnosed congestive heart failure were included in the study. Patients under anti-failure treatment, children less than 12 years of age and pregnant females were excluded from the study.

Details regarding the chief and presenting complaints, socioeconomic status, family history, history related to chronic illnesses and lifestyle behaviors were collected from the patients.BMI and waist hip ratio was recorded do assess the obesity status. Blood pressure was recorded to assess the hypertension related heart diseases. Detailed

physical and systemic examination was done and the signs and symptoms related to heart failure were recorded. Investigations like ECG and Echo were used to confirm the diagnosis.

All the data's were entered and analysed using SPSS version 17. Mean, standard deviation and percentage were calculated for all the parametric variables. Chi-square test, correlation and logistic regression tests were used for deriving statistical significance.

RESULTS

Table 1 shows the age and sex wise distribution among the study population and it is inferred from the table that majority of the patients were males and were in the age group of between 60 – 70 years. The heart failure was classified as systolic dysfunction, diastolic dysfunction and both (table 2) and majority of them were having systolic dysfunction rather than diastolic dysfunction or both. Patients aged more than 70 years were tend to have diastolic dysfunction or both (systolic and diastolic dysfunction). Among the various etiological factors for heart failure, coronary artery disease (CAD) was found to be the most common cause for heart failure followed by systemic hypertension and rheumatic heart disease (table 3). Cardiomyopathy and corpulmonale contributed 8% and 7% for the heart failure. The precipitating factors for systolic, diastolic and both (systolic and diastolic dysfunction) heart failure was shown in table 5, 6 and 7. It is inferred from the table that uncontrolled hypertension and vascular causes are the major precipitating factors, followed by arrhythmias for the heart failure. Infections and metabolic causes were the other factors. Table 7 shows the multilogistic regression for the various risk factors for the heart failure. Among the various risk factors hypertension, diabetes and dyslipidemia showed a statistical significant association for the heart failure (p<.05). The other risk factors like smoking, age, gender, BMI and family history had a strong association for heart failure with odds of more than 1 but did not had a statistical significant association (p>.05).

DISCUSSIONS

Heart failure is increasing in prevalence in many areas of the world. It can be defined as a progressive complex clinical syndrome characterized by inadequate systemic perfusion to meet the body's metabolic demands as a result of impaired cardiac function.[8] HT and ischemic heart disease are the two cardinal causes of heart failure and they commonly coexist. The relative contributions of hypertension and ischemic heart disease to heart failure have been difficult to disentangle.[9] The mechanisms involved in progression from HT to heart failure have been the focus of many recent studies. HT should not be considered in isolation because other risk factors such as plasma lipid levels, cigarette smoking and presence of diabetes mellitus, obesity and family history of cardiovascular disease have also been a considerable impact on the progression of heart failure.[10]

The quality of risk that HT represent has to be thoroughly compared with other factors. This could have significant implications for primary prevention strategies including drug treatment in the progression of heart failure. The framingham heart study demonstrated HT to be the most common and one of the strongest risk factors for heart failure, especially in patients aged between 60-70 years.[11] In the present study, HT was found to be a major risk factor for the progression of heart failure in 76.6% of cases. This was followed by dyslipidemia, diabetes, smoking, obesity and family history of cardiovascular diseases. A study done by Verdecchia 2000, had suggested that the risk of developing heart failure is 0.9% in the presence HT but if diabetes and dyslipidemia coexist then the risk of heart failure rises to 5.1%. Although, the contribution of HT in the progression of heart failure is high when compared to other risk factors, the absolute risk in individuals with HT remains low in the absence of other risk factors. HT clusters with other risk factors including hyperglycemia and hyperlipidemia, all of which have been implicated in intimal thickening and worsening after load.[12]

Though there are a large number of studies evaluating precipitating factors for heart failure, there is currently little information about the relative frequency of these precipitating factors in systolic and diastolic heart failure.[13] The frequency of precipitating factors for heart failure and the aetiologies of cardiac disease differ from country to country.[14] Precipitating factors, left ventricular dysfunction types, and aetiologies seen in the present study were in keeping with those noted in reports from developing countries.[15]

In the present study, the most frequent aetiologies noted for systolic heart failure were uncontrolled hypertension (34%) followed by ischaemic heart disease (27.2%%) and arrhythmias (27.2%) and for diastolic heart failure it was almost the same etiological factors. Ischaemic heart disease can cause systolic or diastolic heart failure;

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rheumatic heart disease, depending on the degree of valvular or myocardial involvement may also cause systolic or diastolic heart failure.[16,17,18]

Patient non-compliance, iatrogenic causes, or uncontrolled hypertension were factors precipitating acute decompensation in 38.5% of patients with systolic heart failure and 47% of patients with diastolic heart failure.It is almost in par with the study done by O Erk.[19] As these factors are preventable, patient education and better management of hypertension may decrease admissions for acute cardiac decompensation

CONCLUSION

Though, the study shows that coronary artery disease and HT are the most common causes for cardiac failure, practitioners need to realize that CAD and HT are typically accompanied by other cardiovascular risk factors, especially dyslipidemia and hyperglycemia, and that control of all these factors with appropriate therapy will have a positive effect on progression of heart failure. Effective control of the risk factors by educating the patients about early screening and regular monitoring of BP, blood sugar and serum cholesterol levels; the importance of compliance with the therapy and lifestyle modification will have a pivotal role in reducing the morbidity and mortality due to heart failure.

Tables :

Table 1 : Age and sex wise distribution of the study population

Age group	Gender		Total
	Male	**Female**	
50-55 yrs	2 (0.03%)	0	2 (2%)
56 – 60 yrs	14 (21.5%)	9 (25.7%)	23 (23%)
61 -65 yrs	17 (26.1%)	12 (34.2%)	29 (29%)
66 – 70 yrs	19 (29.2%)	8 (22.8%)	27 (27%)
71 – 75 yrs	11 (16.9%)	6 (17.1%)	17 (17%)
>75 yrs	2 (0.03%)	0	2 (2%)
Total	65 (100%)	35 (100%)	100 (100%)

Table 2 : Type of heart failure and the age group among the study population

Age group	Type of heart failure		
	Systolic dysfunction	**Diastolic dysfunction**	**Both**
50-55 yrs	2 (4.5%)	0	0
56 – 60 yrs	13 (29.5%)	10 (29.4%)	0
61 -65 yrs	16 (36.3%)	11 (32.3%)	2 (9%)
66 – 70 yrs	9 (20.4%)	4 (11.7%)	14 (63.6%)
71 – 75 yrs	4 (9%)	9 (26.4%)	4 (18.1%)
>75 yrs	0	0	2 (9%)
Total	44 (100%)	34 (100%)	22 (100%)

Table 3 : Age and etiological factors among the study population

Age group	Etiological factors				
	CAD	SHT	RHD	Cardiomyopathy	Corpulmonale
50-55 yrs	0	2 (6.4%)	0	0	0
56 – 60 yrs	13 (37.1%)	7 (22.5%)	3 (15.7%)	0	0
61 -65 yrs	12 (34.2%)	9 (29%)	4 (21%)	2 (25%)	2 (28.5%)
66 – 70 yrs	7 (20%)	6 (19.3%)	7 (36.8%)	4 (50%)	3 (42.8%)
71 – 75 yrs	3 (8.5%)	7 (22.5%)	5 (26.3%)	1 (12.5%)	1 (14.2%)
>75 yrs	0	0	0	1 (12.5%)	1 (14.2%)
Total	35 (100%)	31 (100%)	19 (100%)	8 (100%)	7 (100%)

Table 4 : Precipitating factors in systolic heart failure among the study population

Precipitating factors	Number	Percentage
Uncontrolled hypertension	15	34%
Arrhythmias	12	27.2%
Vascular factors	12	27.2%
Infection	1	2.2%
Metabolic factors	2	4.5%
Unknown	2	4.5%
Total	44	100%

Table 5 : Precipitating factors in diastolic heart failure among the study population

Precipitating factors	Number	Percentage
Uncontrolled hypertension	14	41.1%
Arrhythmias	6	17.6%
Vascular factors	10	29.4%
Infection	0	0%
Metabolic factors	2	5.8%
Unknown	2	5.8%
Total	34	100%

Table 6 : Precipitating factors in both (Systolic and diastolic) heart failure among the study population

Precipitating factors	Number	Percentage
Uncontrolled hypertension	10	45.4%
Arrhythmias	3	13.6%
Vascular factors	8	36.3%
Infection	0	0%
Metabolic factors	1	4.5%
Unknown	0	0%
Total	22	100%

Table 7 : Multilogistic regression analysis of the various risk factors

Independent variables (Risk factors)	Reg . Coeff. "b"	P value	Odds ratio	95% CI
Age	0.034	0.214	1.236	0.934 – 1.438
Sex	0.186	0.098	1.878	1.634 – 2.132
BMI> 30kg/m^2	0.932	0.185	2.124	1.923 – 2.430
Hypertension	1.530	0.002	3.834	3.612 – 4.123
Diabetes	0.386	0.047	2.945	2.754 – 3.178
Dyslipidemia	0.934	0.045	3.186	2.957 – 3.324
Smoking	0.423	0.423	1.732	1.543 – 1.953
Family history	0.262	0.428	1.054	0.813 – 1.321

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