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ACUTE HEART FAILURE;

FREQUENCY OF THE MAJOR PRECIPITATING FACTORS AMONG THE PATIENTS PRESENTING WITH ACUTE HEART FAILURE

Jasia Reham Din[1], Shahid Maqbool[2], Shakeel ur Rehman[3], Naeem Hameed[4]

1. FCPS (Card)
Senior Registrar
Department of Cardiology
Faisalabad Institute of Cardiology,
Faisalabad, Pakistan.
2. FCPS (Med)
Senior Registrar
Allied Hospital Faisalabad, Pakistan.
3. FCPS (Med), FCPS (Card)
Assistant Professor
Department of Cardiology
Faisalabad Institute of Cardiology,
Faisalabad, Pakistan.
4. MBBS
Registrar
Faisalabad Institute of Cardiology,
Faisalabad, Pakistan.

Correspondence Address:
Dr. Jasia Reham Din
Senior Registrar
Department of Cardiology
Faisalabad Institute of Cardiology,
Faisalabad, Pakistan.

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ABSTRACT.... Objectives: To determine the frequency of the major precipitating factors among the patients presenting with acute heart failure. **Study Design:** Cross sectional study. **Setting:** Faisalabad Institute of Cardiology, Faisalabad. **Period:** July 2014 to January 2015. **Materials and Methods:** 190 patients of acute heart failure were included after obtaining informed consent from emergency department. Patients from age of 25 years to 80 years and of either sex either diabetic or non-diabetic were enrolled in study. ECG and CXR were taken in emergency with baseline investigations. Precipitating cause was identified from collected history, clinical examination and ECG, CXR and lab results. **Results:** Mean age of these patients were 54.4 + 8.92, 100 (52.6%) were male, 90 (47.4%) were females, 88 patients (46.3%) were diabetic, 102 patients (53.68%) were non-diabetic and 124 (65.3%) had previous history of heart failure and 66 (34.7%) had no past history of heart failure. ACS was the common precipitating factor of Acute Heart Failure (31.57%) among all the patients of the study with non-compliance of drugs 27.9% , arrhythmias 17.9% uncontrolled hypertension 17.36% and infections 5.3%. **Conclusion:** Young, male, diabetics and patients with history of chronic HF suffered more from AHF. ACS was the most common precipitating factor while in patients with de novo Acute Heart Failure; it was ACS and non-compliance with drugs.

Key words: Acute Heart Failure, Chronic Heart Failure, de Novo Heart Failure, Heart Failure.

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INTRODUCTION

Acute heart failure syndrome is defined as the development of signs and symptoms of heart failure either new onset or recurrence of previous symptoms requiring hospitalization for urgent or emergent treatment.[1] Acute heart failure (AHF) is associated with much bad prognosis whether of de novo onset or due to acute decompensation of chronic heart failure (ADCHF).[2-3]

Acute coronary syndrome (ACS), anemia, uncontrolled hypertension, infections, arrhythmias and non-compliance with drugs are the major precipitating factors of acute heart failure.[5] The frequency of these precipitating factors of AHF is different in different regions.[6] No large scale study has ever been carried out in Pakistan related to this specific syndrome and its precipitants. With this study we can identify precipitating factors of AHF especially the preventable ones. It will help to reduce re-admissions, morbidity and mortality of HF and in modifying treatment plan of identified precipitating factors of acute heart failure.[7]

MATERIALS AND METHODS

This Cross sectional study was conducted at Faisalabad institute of cardiology, from July 2014 to January 2015. AHF was characterized by the clinical features of dyspnea, bilateral basal chest crepitations on auscultation and chest X ray which shows any of the following features of pulmonary edema 1) septal or kerley B lines 2) reticular shadowing of alveolar edema 3) prominence of upper lobe vessels 4) enlarged hilar vessels or enlarged cardiac silhouette.

ACS is described as patients having central or left sided chest pain of characteristic quality and duration and ECG findings of either ST segment elevation or ST depression of 1mm or more in 2

contagious leads with cardiac troponins normal or raised (0.3ng/dl). Infection was present in case of fever, productive cough and raised white blood cell count (> 4-11x 10^9/ l) especially the neutrophilic leucocytosis (>75%). Uncontrolled HTN as patients with blood pressure >180/100 mmHg at presentation with or without any therapy. Patients with either tachyarrhythmias (pulse >100beats/minute) or bradyarrhythmias (pulse <60beats/minute) were labeled as having arrhythmias.

Male and female patients from age 25 to 80 years, either diabetic or non diabetic with or without previously established congestive heart failure were included in study. Patients with serum creatinine > 2 mg/ dl at presentation and with any other co-morbid medical illness e.g. respiratory disease, liver disease, malignancy, septicemia, psychiatric illness were excluded.

After approval from hospital ethical committee, cases were selected from the emergency department of FIC according to inclusion and exclusion criteria. All patients were explained the purpose and procedure of study and any risk involved was addressed in emergency department. Informed consent was taken. History of chest pain, fever, productive cough, compliance with drugs, diabetes mellitus and chronic heart failure was taken. Blood pressure and pulse rate will be noted. Portable X ray chest PA view was done by radiology department of FIC. 5 ml of blood was taken and sent to hospital laboratory for investigations like serum Troponin I (normal up to 0.3n g/ml) for ACS, complete blood count (normal 4-11 x 10^9/l) with neutrophils (40-75%) for respiratory tract infection, serum creatinine to exclude renal disease. ECG for arrhythmias was done in emergency department. All these information was collected through prescribed Performa.

Statistical Analysis

The data analysis was computer-based using SPSS ver.10. Descriptive statistics were calculated. The age was presented as Mean±SD. The categorical variables which include gender, ACS, non-compliance with drugs, infections, uncontrolled hypertension, anemia and arrhythmias were presented as frequencies and percentages. Effect modifiers like age, gender, diabetes mellitus congestive cardiac failure were controlled by stratification. Post stratification chi-square test was applied. P value ≤0.05 taken as significant

RESULTS

A total of 190 cases were enrolled fulfilling the inclusion and exclusion criteria. Mean age of these patients was 54.4 + 8.92 (Table No.1). 100 (52.6%) were male, 90 (47.4%) were females, 88 patients (46.3%) were diabetic, 102 patients (53.68%) were non-diabetic and 124 (65.3%) had previous history of heart failure i.e. ACDHF and 66 (34.7%) had no past history of heart failure i.e. de novo heart failure (Table-I).

Stratification of gender was done with respect to ACS, non compliance of drugs, uncontrolled hypertension, arrhythmias, and infection (Table-I) which showed the following results. 33% of male had ACS as compared to 30% of female (P-value 0.657). 25% of male had non compliance of drug as compared to 31.1% of female (P-Value 0.348). 19% of male had uncontrolled hypertension as compared to 15.6% female (P-Value 0.531). 17% of male had arrhythmias as compared to 18.9% female (P-Value 0.734).6% of male had infection as compared to 4.4% female (P-Value 0.632).

Stratification of history of diabetes mellitus was done with respects to ACS, non compliance of drug, uncontrolled hypertension, arrhythmias and infection (Table-I) which showed the following results .37.5 % of diabetics had ACS as compared to 26.5% of non-diabetics (P-value 0.103). 22.7% of diabetics had non compliance of drug as compared to 32.4% of non-diabetics (P-Value 0.14). 22.7% of diabetics had uncontrolled hypertension as compared to 12.7% non-diabetics (P-Value 0.07). 9.1% of diabetics had arrhythmias as compared to 25.5% non-diabetics (P-Value 0.003). 8% of diabetics had infection as compared to 2.9 % non-diabetics (P-Value 0.123).

Stratification of pervious history of heart failure (ACDHF) was done with respects to ACS, non

compliance of drugs, uncontrolled hypertension, arrhythmias, and infection which showed the following results. 33.1% of patients with pervious history of heart failure (ACDHF) had ACS as compared to 28.8% of without pervious history of heart failure (de novo heart failure). 27.4% of patients with pervious history of heart failure (ACDHF) had non compliance of drug as compared to 28.8% of without pervious history of heart failure (de novo heart failure). 17.7% of pervious history of heart failure (ACDHF) had uncontrolled hypertension as compared to 16.7% without pervious history of heart failure (de novo heart failure). 19.4% of pervious history of heart failure (ACDHF) had arrhythmias as compared to 15.2% without pervious history of heart failure (de novo heart failure). 2.4% of pervious history of heart failure (ACDHF) had infection as compare to 10.6% without pervious history of heart failure (de novo heart failure) (Table-I).

Stratification of age distribution was also evaluated (Table-II). Most of the enrolled patients were between age group of 46 to 55 years with mean age of 54+ 8.92 (Table-I). Among 139 patients of this age group 24 (24.5%) had ACS (P-Value 0.262), 28 (28.6%) had non-compliance of drugs (P-Value 0.904). 20(20.4%) had un-controlled hypertension (P-Value 0.348). 20 (20.4%) patients had arrhythmias (P-Value 0.716) and 6 (6.1%) had infections (P-Value 0.952).

ACS was the common precipitating factor of Acute Heart Failure (31.57%) among all the patients of the study group irrespective of gender, diabetes and history of Heart Failure and frequency of others were non compliance of drugs 27.9%, arrhythmias 17.9% uncontrolled hypertension 17.36% and infections 5.3% (Figure-1).

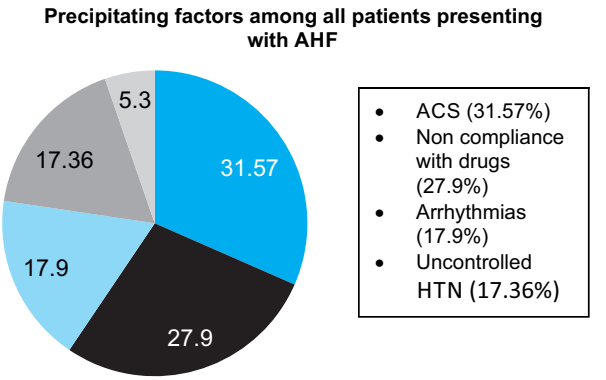

Figure-1. Pie chart showing different precipitating factors of heart failure with frequency

Characteristics	n=190	ACS	Non Compliance of Drugs	Uncontrolled HTN	Arrhythmias	Infections
Age	54.4±8.92					
Gender Male Female	 100(52.6%) 90 (47.4%)	 33 (33.1%) 27 (30%)	 25(25%) 28(30.1%)	 19(19%) 14(15.5%)	 17(17%) 17(8.9%)	 6(6%) 4(4.4%)
Diabetes	88 (46.3%)	33(37.5%)	20(22.7%)	20(22.7%)	8(9.1%)	7(8%)
De novo HF	66(34.7%)	19(28.8%)	19(28.8%)	11(16.7%)	10(15.2%)	7(10.6%)
Previous h/o heart failure	124(65.3%)	41(31.1%)	34(27.4%)	22(17,4%)	24(19.4%)	3(2.4%)

Table-I. Basic demographic characteristics and AHF precipitants

Characteristics	ACS	Non Compliance of Drugs	Uncontrolled HTN	Arrhythmias	Infections
Age	26-35 2(28.6%) 36-45 7(41.2%) 46-55 24(24.5%) 56-65 17(41.5%) 65-75 11(37%)	26-35 3(42.9%) 36-45 4(23.9%) 46-55 28(28.6%) 56-65 11(26.8%) 65-75 7(25.9%)	26-35 0 36-45 2(17.6%) 46-55 20(20.4%) 56-65 5(12.2%) 65-75 6(22.2%)	26-35 2(28.6%) 36-45 3(17.6%) 46-55 20(20.4%) 56-65 6(14.6%) 65-75 3(11.1%)	26-35 0 36-45 1(5.9%) 46-55 6(6.1%) 56-65 2(4.9%) 65-75 1(3.7%)

Table-II. Age related precipitants of acute heart failure

DISCUSSION

Heart failure, one of the major forms of cardiovascular disease may cause a debilitated life if not optimally treated. For optimal treatment we need to know its pathophysiology, causative mechanisms and its precipitating factors. Among cardiovascular diseases, it is the major cause of readmissions of patients and also of mortality.[7-11]

Once heart failure develops due to any underlying disease, the next step is to avoid its recurrence. Recurrence is prevented by optimizing medicine use and by controlling its precipitants. Various factors play a role in precipitating heart failure even when medicine is optimal. These include acute coronary syndrome, arrhythmias, infection, anemia and uncontrolled hypertension. Few patients presenting with heart failure may not be compliant to drugs. Factors precipitating heart failure vary from community to community depending upon education, awareness and socioeconomic status.

In this study in Pakistani population we enrolled 190 patients with heart failure. They include both de novo and acute on chronic heart failure. It was conducted on both genders as separate groups. 64.2% patients were older than 55 years and 52.6% were male, 46.3% were diabetics. Most patients were those (65.3%) already having chronic heart failure now presenting with acute precipitation. This is because most patients either uneducated or due to lack of awareness could not follow the instructions properly.

While considering both genders, ACS was common among male (33%) and non-compliance of drugs in female. Male are more prone to have ischemic heart disease as compared to female. Female gender is more non-compliant to dugs due to less access to health care facilities as compared to male and also less environmental exposure. Hypertension was found to be common factor in one study among female.[12] Diabetics were having ACS as common factor. Diabetics have ischemic heart disease due to poor control and lack of awareness.

In de-novo heart failure patients most common was acute coronary syndrome and 2nd being non-compliance to drugs. Acute coronary syndrome is quite common in this population and patients usually don't consider it an important entity especially when pain is atypical. And due to lack of exercise and physical activity, heart doesn't have enough collaterals to compensate for any blocked vessel. Non-compliance of drugs being 2nd most common is either due to lack of awareness or due to difficult access to health care facilities. 2nd group including acute on chronic heart failure had acute coronary syndrome as the common cause (33%), and non-compliance to drugs as 2nd one (27.41%).

We compared our study to Euro Heart failure survey which included 61% male and 33% diabetics.[13] In that survey, ACS was most common and 2nd cause was arrhythmias in de-novo heart failure patients and arrhythmias (32.5%) and non-compliance to drugs (31.8%) as the 2nd one in acute on chronic heart failure patients. Other studies also found ACS and poor compliance of medication as common factors.[14-16]

The most common precipitating factor of AHF among all the patients irrespective of gender, diabetes and history of HF was ACS (31.57%) while two other important precipitating factors were uncontrolled hypertension and non-compliance of medications.

CONSLUSION

In conclusion Heart failure is serious medical emergency with mortality rate of 4% to 7%.[17] By identifying the common precipitating factors in this particular population, it will help the physicians to think on this line while evaluating the patients. By improving education, awareness and socioeconomic status of society many factors can be controlled. Controlling diabetes, with better compliance to drugs, timely diagnosis and management of ACS, and control of hypertension can lead to much better response to optimal treatment of heart failure and minimizing hospital visits and admissions which would be very cost effective if implemented.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Jasia Reham Din	Manuscript Writing	
2	Shahid Maqbool	Data collection	
3	Shakeel ur Rehman	Drafting	
4	Naeem Hameed	Guidance in manuscript writing	