Treatment Of Heart Failure In A Teaching Hospital In Ghana, West Africa

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Citation

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Abstract

This study was done to compare the treatment of heart failure at the Komfo Anokye Teaching Hospital (KATH), Kumasi, with the European Society of Cardiology (ESC) guidelines for the treatment of heart failure.

Patients above twelve years admitted to the medical wards with heart failure were recruited. Detailed history was obtained. Clinical examination, and laboratory investigations were done. Treatments received by the patients whilst on admission were studied and compared with the ESC guidelines for the treatment of heart failure.

Hundred patients were studied; 52 males and 48 females, aged 14-100 years with mean 56.15 (18.50) years. Every patient received frusemide. ACE-I were used in 83.3%, 51.7 % and 55.4 % of the patients with NYHA classes II, III, and IV respectively. Beta-blockers were used in 33.3%, 20.7% and 12.3% of patients with NYHA classes II, III and IV respectively.

In conclusion, frusemide and ACE-I were the two most common drugs prescribed.

INTRODUCTION

Heart failure is a common [1, 2] condition encountered in clinical practice. It is recognized as a major and escalating public health problem [3], and it is one of the most important causes of morbidity and mortality in the world [4].

The prognosis of advanced heart failure is poor; with mortality rates reported in clinical trials [5, 6] and in community data [7] indicating that within 3-5 years, around half the patients with a diagnosis of heart failure will have died. The prognosis is even worse than that observed in many malignancies [8, 9]. The suffering involved in heart failure can be considerable, particularly in the later stage of the illness.

The economic burden of heart failure is high. Reports from several countries suggest that up to 3 % of the total healthcare budget is expended on the management of heart failure [10]. In the United Kingdom, the burden of cost to the National Health Service (NHS) was about 675 million dollars (United States) for diagnosis and management in a year [11], and in the United States the burden of cost is estimated as 20 billion dollars (United States) per year [12].

The therapeutic approach to heart failure has undergone considerable change. Current treatment is directed not just towards the relief of symptoms. There is a greater focus on preventing the onset or delaying the progression of heart failure [13]. Treatment also aims at improving the quality of life and prolongs the duration of life of patients suffering from heart failure. This approach stresses the role of ACE-I, beta-blockers, diuretics, and digoxin [13].

Non-pharmacological management should always be instituted. It involves general advice and measures such as weight control, salt restriction, fluid and alcohol intake reduction, smoking cessation, advice on sexual activity and drug counseling. Exercise training programmes are encouraged in stable patients [13].

The ESC recommends the use of both non-pharmacological and pharmacological therapies in the treatment of heart failure. The treatment guidelines stress the role of ACE-I in the treatment of both asymptomatic and symptomatic left ventricular dysfunction [13]. The guidelines recommend that all patients with symptomatic heart failure due to systolic left ventricular dysfunction should receive an ACE-I. ACE-I significantly improves survival and symptoms and reduces

hospitalization in patients with moderate and severe heart failure and left ventricular systolic dysfunction [5, 14]. In the absence of fluid retention, ACE-I should be given first. In patients with fluid retention it should be given together with diuretics. Asymptomatic patients with a documented left ventricular systolic dysfunction benefit from long-term ACE-I therapy. The consistency of data from the SOLVD Prevention Study [15], SAVE [16] and TRACE [17] have shown that asymptomatic patients, but with left ventricular dysfunction, will have less development of symptomatic heart failure and hospitalizations for heart failure.

Beta-blockers such as carvedilol, bisoprolol and metoprolol are of proven therapeutic benefit in patients with symptomatic systolic heart failure. There is now definitive clinical trial data from large-scale studies to support their use in this setting with the aim of decreasing morbidity and mortality [18].

Loop diuretics such as frusemide are essentially for symptomatic treatment when fluid overload is present and manifests as pulmonary congestion or peripheral oedema, although there are no controlled, randomized trials that have assessed the effect on survival of these agents. The use of diuretics results in rapid improvement of dyspnoea and increased exercise tolerance. Aldosterone antagonism with spironolactone is recommended in advanced heart failure (NYHA classes III-IV), in addition to ACE-I and diuretics to improve survival and morbidity [13].

Cardiac glycosides are indicated in atrial fibrillation and any degree of symptomatic heart failure, whether or not left ventricular dysfunction is the cause, in order to slow ventricular rate, thereby improving ventricular function and symptoms [13]. In general, calcium antagonists are not recommended for the treatment of heart failure due to systolic dysfunction. Verapamil in particular is not recommended in heart failure due to systolic dysfunction because of its negative inotropic effect, and is contraindicated in addition to beta-blockade. Newer calcium antagonists (felodipine, amlodipine) in addition to baseline therapy including ACE-I and diuretics do not provide a better effect on survival compared to placebo [13].

Patients may also need procedures to treat conditions, such as coronary artery disease or mitral valve prolapse that contribute to heart failure. Heart transplantation is the most important surgical procedure for severe heart failure that fails to respond medical treatments. A number of procedures and left ventricular assist devices are now available for patients waiting for transplantations. Some may even offer permanent alternatives [13].

This study was done in order to determine how the current treatment for heart failure at KATH compares with the ESC guidelines for the treatment of heart failure. The overall objective of this study was to improve the management of patients with heart failure seen at KATH. It is hoped that this study may provide baseline data for future comparisons and monitoring of the management of patients with heart failure seen at KATH, Kumasi.

METHODS

This was a prospective study carried out at the Department of Medicine, KATH, from March 2004 to August 2004. Informed consent was obtained from each study participant and KATH ethical committee approved the study.

Patients aged thirteen years and above who were admitted to the medical wards with clinical diagnosis of heart failure were recruited. Detailed history including patients' socio-demographic characteristics, past medical history, and drug history were obtained from each patient through a standard questionnaire. Common symptoms of heart failure such as dyspnoea on exertion or at rest, fatigue, orthopnoea, paroxysmal nocturnal dyspnoea, palpitation and ankle swelling were sought.

Clinical examination included general assessment to look for dyspnoea at rest, pedal oedema or generalized swelling, cyanosis, fever, and pallor of mucous membrane. The pulse rate, rhythm, volume and the character were noted. Jugular venous pressure, the blood pressure, the apex beat, the heart sounds (S_1, S_2, S_3 and S_4) and murmurs were also examined. The chest was auscultated for crackles, and the presence of hepatomegaly and ascites were also noted.

A 12 lead standard ECG was obtained from each patient according to standard procedure, and evaluated by the author. Chest X-rays were obtained from each patient and examined for increased cardiac size as judged by a cardiothoracic ratio more than 0.5, and the presence of pulmonary upper lobe blood diversion and/or alveolar oedema and/or pleural effusion.

Diagnosis of heart failure was confirmed, using the following modified Framingham criteria for the diagnosis of heart failure[1]:

Major criteria: Paroxysmal nocturnal dyspnoea, raised jugular venous pressure, clinical cardiomegaly, basal

crepitations, S3 gallop, clinical acute pulmonary oedema, pulmonary upper lobe blood diversion on chest X-ray (or pulmonary oedema on chest X-ray).

Minor criteria: tachycardia, orthopnoea, exertional dyspnoea, nocturnal cough, hepatomegaly, pleural effusion, diuretic use.

Heart failure was diagnosed if the patient had two major and one minor or one major and two minor criteria. Severity of heart failure on admission was assessed using the NYHA functional classification [18].

INCLUSION CRITERIA

Patients aged thirteen years and above admitted to the medical wards for the first time, with the clinical diagnosis of heart failure who met the modified Framingham criteria for the diagnosis of heart failure, were included in the study.

EXCLUSION CRITERIA

The following patients were excluded from the study:

- Patients admitted with suspected heart failure but could not meet the diagnostic criteria.
- Those who died within 24 hours before full clinical evaluation were undertaken.

STATISTICS

Data from the standard questionnaire were entered into a Microsoft Excel (2000) sheet. Data were cleaned and abnormal variable and wrong entry removed or changed by reference to the standard questionnaire. Data were then exported into Stata Version 8.0 statistical software for analysis.

Descriptive analysis of baseline parameters was provided. Measure of central tendency using means and median, measure of spread using standard deviation and range were calculated.

The chi squared test was used to test for association between categorical variables. The student t-test was used to compare means of two variables, whilst the ANOVA was used in the comparison of means of more than two variables.

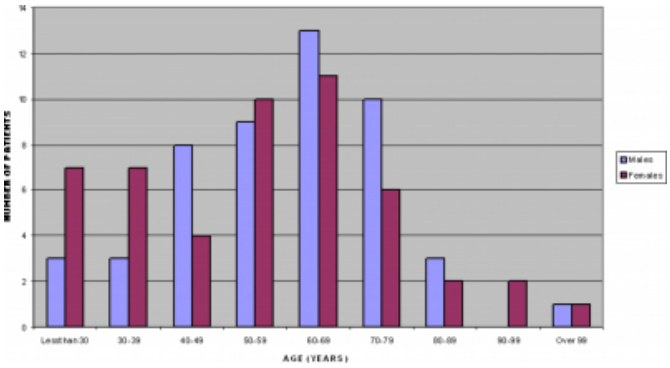
The level of significance was set at $p < 0.05$, and a 95 % confidence interval was applied to the numerical variables which are normally distributed.

RESULTS

Hundred (100) patients qualified to be included into the study; they were aged between 14-100 years with the mean age of 56.15 (18.50) years. There were 52 males and 48 females. Females appeared to develop heart failure at a younger age with the minimum age of 14 years, and a mean age of 53.90 (20.23) years. The minimum age of males was 24 years, with a mean age of 58.40 (16.48) years. The difference in age between the males and the females was not statistically significant (p=0.23). The age and sex distribution of the patients is shown in figure 1. The age group 61-69 years had the highest incidence of heart failure.

Figure 1

Figure 1: Age And Sex Distribution Of The Heart Failure Patients.



All the patients presented with fluid overload either as systemic oedema, pulmonary oedema, or both. Exertional dyspnoea was the second most common presenting symptom of the heart failure patients. Table 1 shows the presenting symptoms of the patients.

Figure 2

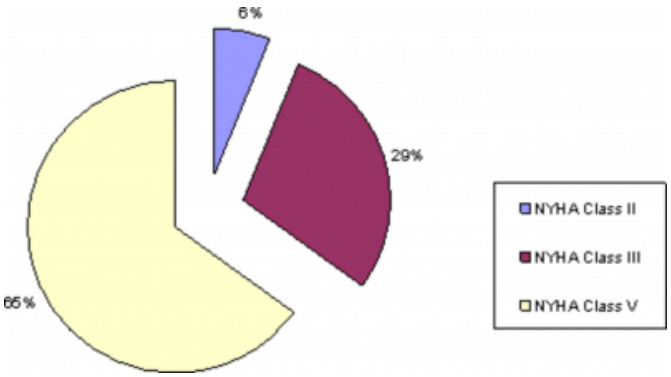
Table 1: Presenting symptoms of the heart failure patients.

PRESENTING SYMPTOMS	% OF PATIENTS
Oedema (pulmonary/systemic)	100
Dyspnoea (exertional/ at rest)	97
Fatigue	92
Othopnoea	90
Paroxysmal nocturnal dyspnoea	73
Palpitation	47
Chest pain	13

Figure 2 illustrates the severity of heart failure at presentation. Majority (65%) of the patients presented with severe heart failure (NHYA functional class IV).

Figure 3

Figure 2: Severity Of Heat Failure Patients At Presentation



Hospital stay by the patients ranged from 1-28 days, with the mean hospital stay of 6.25 (4.16) days. Females stayed longer at the hospital than the males. The mean hospital stay of females was 6.72 (4.99) days, and that of males was 5.78 (3.11) days. The difference in hospital stay between the males and the females was not statistically significant (p=0.26). Mean hospital stay increased with increasing severity of heart failure. Eighty-five percent (85%) of the patients were discharged home, whilst 15% died on admission. The highest in-hospital mortality occurred in patients who were admitted with NYHA class IV. None of the patients with NYHA II died on admission. Table 2 shows the outcome of admission of the patients.

Figure 4

Table 2: Patient outcome following admission for heart failure.

NYHA CLASS	MEAN HOSPITAL STAY (DAYS)	DISCHARGED ALIVE		IN-HOSPITAL MORTALITY	
		NUMBER	%	NUMBER	%
II n = 6	4.17 (± 1.72) range (2-7)	6	100	0	0
III n = 29	5.98 (± 2.69) range (2-15)	26	89	3	11
IV n = 65	6.59 (± 4.78) range (1-28)	53	81	12	19

Figure 3 and table 3 illustrate the pharmacological treatment of the patients. All the patients received frusemide. Spironolactone in doses between 50-100mg daily, orally, was given to 33.3 %, 17.2 % and 12.3 % of patients with NYHA class II, III and IV respectively. ACE-I were used in 83.3%, 51.7 % and 55.4 % of the patients with NYHA classes II, III, and IV respectively. Lisinopril (2.5mg-20mg daily) and captopril (12.5mg bid) were the ACE-I used to treat the patients.

Beta-blockers were used in 33.3%, 20.7% and 12.3% of patients with NYHA classes II, III and IV respectively. The main beta-blockers used were carvedilol and atenolol. Digoxin and nitrates were given to a third of the patients. Aspirin was the third most common drug used, after frusemide and ACE-I.

Figure 5

Figure 3: pharmacological treatment of the patients

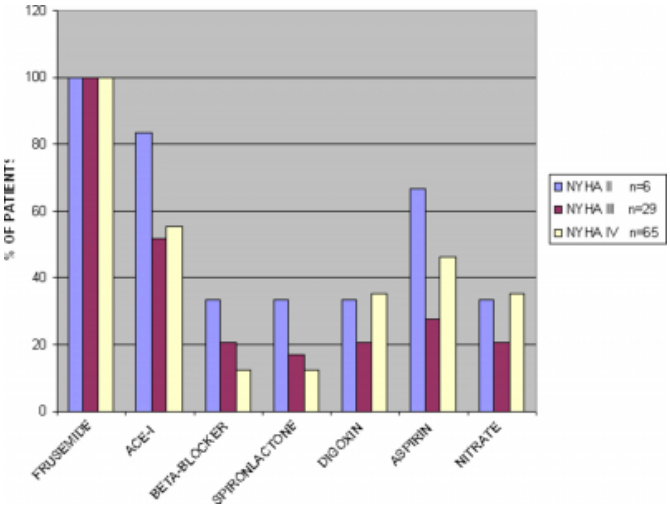


Figure 6

Table 3: comparison of treatment for heart failure at kath with the esc treatment guidelines.

	NYHA CLASS II	NYHA CLASS III	NYHA CLASS IV
DIURETICS			
ECS Recommendation	Indicated	Indicated	Indicated
Treatment at KATH**	100 %	100 %	100 %
ACE-I			
ECS Recommendation	Indicated	Indicated	Indicated
Treatment at KATH	83.3 %	51.7 %	55.4 %
BETA-BLOCKERS			
ECS Recommendation	Indicated	Indicated	Indicated
Treatment at KATH	33.3 %	20.7 %	12.3 %
SPIRONOLACTONE			
ECS Recommendation	Not Indicated	Indicated	Indicated
Treatment at KATH	33.3 %	17.2 %	12.3 %
DIGOXIN			
ECS Recommendation	Indicated (with AF***)	Indicated	Indicated
Treatment at KATH	33.3 %	20.7 %	35.4 %
ISOSORBIDE DINITRATE (ISDN)			
ECS Recommendation	Not Indicated	Not Indicated	Not Indicated
Treatment at KATH	33.3 %	20.7 %	35.4 %
HYDRALAZINE / ISDN			
ECS Recommendation	Not Indicated	--------If ACE-I or ARB**** unavailable----	
Treatment at KATH	0 %	0 %	0 %
ASPIRIN			
ECS Recommendation	Not Indicated	Not Indicated	Not Indicated
Treatment at KATH	66.7 %	27.6 %	46.2 %
CALCIUM ANTAGONIST (NIFEDIPINE)			
ECS Recommendation	Not Indicated	Not Indicated	Not Indicated
Treatment at KATH	3 %	9 %	23 %

** Percentage of patients who received the drug

*** Atrial fibrillation

**** Angiotensin receptor blocker

Only 27% of the heart failure patients were reported to have received non-pharmacological treatment. The various non-pharmacological measures used are shown in table 4. Dietary salt reduction was the most common measure used. Others included fluid restriction, frequent blood pressure and weight monitoring.

Figure 7

Table 4: Documented Non-Pharmacological Treatment Of Heart Failure

NON-PHARMACOLOGICAL	(%) OF PATIENTS
Daily weighing	1
Paracentesis	1
Low salt diet	18
Low salt diet, daily weighing and fluid restriction	4
Low salt diet, low cholesterol and diabetic diet	1
Low salt diet and daily weighing	2
No documented non-pharmacological treatment	73
Total	100

DISCUSSION

The mean age of the patients (56.15 18.50 years) in this study is similar to the mean age of 53 (12.1) years reported by Isezuo et al [19] among Gambians and Nigerians with heart failure. Oyoo and Ogola in Nairobi, Kenya also found three quarters of their patients with hypertensive heart failure to be above the age of 50 years [20]. The mean age of the patients in this study is also lower than the 74 years and the 70 (10.8) years reported in the general European population [13]and in the Framingham Heart Study [1]respectively.

It is clear from these data that heart failure occurs early in life in Africa than in the developed world. This could be explained by the differences in the aetiology of heart failure. In Africa, rheumatic heart disease and endomyocardial fibrosis, usually occurring in the adolescent account for a considerable number of cases whereas in the developed world rheumatic heart disease and endomyocardial fibrosis are uncommon; ischaemic heart disease is the main cause of heart failure. Many people with myocardial infarction in the developed world are surviving because of advances in treatment. These patients eventually end up with heart failure. Again, in the developed world, the proportion of the population that is elderly is increasing [1, 13].

The severity of heart failure at presentation using the NYHA functional classification in this study was similar to the

findings of Oyoo and Ogola in Nairobi [19]; 62 % of their patients were in NYHA functional class IV, 31.9 % were in class III and 3.3 % were in class II.

The most common presenting symptom among the heart failure patients was fliud overload. All the patients had fluid overload either as pulmonary oedema, peripheral oedema or both. No wonder they all received frusemide which was used to treat the fluid overload (oedema).

Fifty-six percent (56%) of the heart failure patients received an ACE- I. It is not clear why ACE-I was used more in patients with NYHA class II and less in those with class III. The ESC guidelines for the treatment of heart failure recommend that all patients with symptomatic heart failure due to systolic left ventricular dysfunction should receive an ACE-I [13]. The study showed that ACE-I was not used as recommended by the ESC, and its use must be encouraged in patients with left ventricular systolic dysfunction. Even though some of the patients might have had a diastolic dysfunction, diastolic dysfunction is usually associated with a systolic dysfunction and pure diastolic dysfunction tends to be uncommon [13]especially in the young. One factor that might account for the low usage of ACE-I may be due to the high cost of ACE-I in Ghana.

Beta–blockers are indicated in all stages of heart failure [13, 15]. However, only 33.3 % of patients with NYHA class II and 12.5 % of those with class IV received the drug. Overall only 17 % of the heart failure patients received it. Together with ACE-I, beta-blockers are able to reverse left ventricular remodelling, improve morbidity, reduce hospitalisation and reduce mortality [13 15]. Therefore it is recommended that all patients with left ventricular dysfunction irrespectve of NYHA classification, should be given both ACE-I and beta-blockers[13 15].

Spironolactone in high doses between 50-100mg daily, orally, was given to 33.3 % of patients with NYHA class II and 17.2 % of those with class III. Only 12.3 % of those with NHYA class IV who needed spironolactone most received the drug. In fact, spironolactone is not indicated in mild heart failure. Although spironolactone was developed as a diuretic agent at a higher dose level, it is now understood that aldosterone has an important role in the pathophysiology of heart failure. It promotes vascular and myocardial fibrosis, potassium and magnesium depletion, sympathetic activation, parasympathetic inhibition and baroreceptor dysfunction [21, 22]. ACE-I insufficiently suppress circulating aldosterone levels [24]. The RALES mortality trial showed that low dose spironolactone on top of an ACE-I and a loop diuretic markedly and progressively improved survival of patients in advanced heart failure (NYHA class III or IV), irrespective of aetiology[24].

Thirty-one percent (31 %) of the heart failure patients received isosorbide dinitrate. Hydralazine-isosorbide dinitrate combination is an alternative therapy when ACE-I are contraindicated or cannot be tolerated. Daily doses of hydralazine, up to 300mg, in combination with isosorbide dinitrate 160mg in the presence of cardiac glycosides and diuretics have been found to reduce mortality of patients with chronic heart failure [26]. Unfortunately, no patient received this combination. There is no evidence of proven benefit when either nitrates or hydralazine are used alone, but nitrates are often prescribed without hydralazine.

Digoxin was given to about a third of the patients, majority of who had atrial fibrillation. Digoxin has been found to reduce symptoms and improve clinical status, and thereby decrease the risk of hospitalization for heart failure without an impact on survival [26]. In addition to positive inotropy, digoxin has important neurohormonal-modulating effects in patients with chronic heart failure, including a sympathoinhibitory effect that cannot be ascribed to its inotropic action [26]. Therefore, the use of digoxin in heart failure must not be restricted to atrial fibrillation alone. It should be considered for symptomatic treatment of heart failure caused by left ventricular systolic dysfunction [13].

Nifedipine was the calcium antagonist which was most commonly used to treat arterial hypertension in heart failure. This may be due to the fact that nifedipine is readily available in Ghana and it is cheaper than the newer calcium antagonists such as felodipine and amlodipine. However, the ESC guidelines for the treatment of heart failure recommend the use of the newer calcium antagonists instead of nifedipine as additional therapy for concomitant arterial hypertension or angina.

Aspirin was used quite often in the treatment of heart failure especially in patients with NYHA classes II and IV. Indications for its use in these patients were not clear. It is a common practice for physicians to use aspirin for primary prevention against thromboembolic complications. There is little evidence to show that antithrombotic therapy modifies the risk of death, or vascular events in patients with heart failure other than in the setting of atrial fibrillation when anticoagulation is firmly indicated[28].

In conclusion, frusemide and ACE-I were the most common drugs prescribed for the heart failure patients. Despite the limitations in study design, this study provides baseline data for future comparisons and monitoring of the management of patients with heart failure seen at KATH, Kumasi.

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