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THE COMPARISON OF 1ST DOSE HYPOTENSION WITH ACE (CAPTOPRIL) IN NORMOVOLEMIC AND HYPOVOLEMIC PATIENTS WITH CARDIAC FAILURE

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Abstract:

Angiotensin-converting enzyme inhibitors are preferred drugs in congestive heart failure. The incidence of congestive heart failure is increasing today.

Objective: *The aim of this study was to determine the incidence of first dose hypotension (captopril) with ACE inhibitors in patients with chronic heart failure (CHF).*

Place and Duration: *In the Medical Units of Mayo Hospital, Lahore for one-year duration from January, 2017 to December, 2017.*

Methods: *Hundreds of newly diagnosed or previously diagnosed but not ACE therapy patients with congestive heart failure were admitted to Medical Units of Mayo Hospital, Lahore. Statistical analysis using SPSS 18.0 was done.*

Results: *Expressed as mean ± standard deviation. Each continuous parameter between the two groups, patients with hypovolemia / hyponatremia, and patients without hypovolemia / hyponatremia, was analyzed by unpaired two-tailed Student's t test.*

Conclusion: *Congestive heart failure is a major problem and a common disease. ACE inhibitors have become the standard therapy for heart failure.*

Key words: *Hypotension, heart failure, hypovolemia and normovolemic.*

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INTRODUCTION:

Angiotensin-converting enzyme inhibitors are preferred drugs in congestive heart failure. The incidence of congestive heart failure is increasing today [1-3]. The morbidity and mortality of patients with heart failure is still high, even with the best available techniques and treatment methods [4]. With the presence of drugs such as ACE inhibitors, it is now possible to antagonize neurohormonal abnormalities caused by compensatory activation of the renin angiotensin aldosterone system (RAS) and stimulation of the sympathetic nervous system (SNS) in patients with chronic heart failure. Clinical studies have shown that treatment regimens containing these agents together with diuretics reduce the risk of death and hospitalization due to worsening of the disease. Unfortunately, these drugs, especially those with captopril, are miscarried because they fear hypotension of the first dose, the most common side effect [5-6].

PATIENTS AND METHODS:

Hundreds of newly diagnosed or diagnosed patients with congestive heart failure without ACE treatment were admitted to Medical Units of Mayo Hospital, Lahore for one-year duration from January, 2017 to December, 2017. The patients were divided into two groups: Group A and Group B normovolumic, salt-free and Group B hyponatremic patients, the volume decreased due to previous aggressive treatment with diuretics. Control blood pressure values were recorded. The test dose of captopril (6.25 mg) was then administered. Blood pressure measurements were recorded at 30 minutes, 60 minutes and 90 minutes. Hypotension of the first dose was observed after a maximum effect of captopril (90 min) or after a decrease in systolic blood pressure, while a decrease in systolic blood pressure greater than 20 mmHg was observed from the control systolic blood pressure reading. Below 90 mmHg regardless of control reading. Patients with a known history of hypersensitivity to ACE inhibitors and contraindicated for ACE inhibitors were excluded from the study.

RESULTS:

Statistical analysis with SPSS 17.0. Results were expressed as mean ± standard deviation. Each continuous parameter between the two groups, patients with hypovolemia / hyponatremia, and patients without hypovolemia / hyponatremia, was analyzed by unpaired two-tailed Student's t test. Categorical data were examined using chisquarec2 test. Hypotension of the first dose (FDH) of 100 patients was observed in 36 (36%) patients after 30 minutes, in 40 (40%) patients after 60 minutes, and in 50 (50%) patients after 90 minutes. Only 10 of 50 patients in group A had hypotension of the first dose and 50 of group B had hypotension, 40 of them had hypotension of the first dose as shown in Table 1.

Table 1: Correlation between serum electrolyte levels and first dose hypotension (n=100)

		SBP Before Captopril Administration	Serum Electrolytes	Drop in SBP at 30 minutes	Drop in SBP at 60 minutes	Drop in SBP at 90 minutes
SBP before captopril administration	Pearson correlation Sig. (2 tailed)	1.000 NA***	-.321* .023	-.134 .353	.085 .556	-.336* .017
Serum electrolytes	Pearson correlation Sig. (2 tailed)	-.321* .023	1.000 NA***	.371** .008	.242 .091	.520** .000
Drop in SBP at 30 minutes	Pearson correlation Sig. (2 tailed)	-.134 .354	.371** .008	1.000 NA***	.551** .000	.536** .000
Drop in SBP at 60 minutes	Pearson correlation Sig. (2 tailed)	NA***	NA*** .091	.551** .000	1.000 NA***	.564** .000
Drop in SBP at 90 minutes	Pearson correlation Sig. (2 tailed)	-.336* .017	.520** .000	.536** .000	.564** .000	1.000 NA***

DISCUSSION:

The aim of our study was to determine the percentage of patients with heart failure who developed hypotension with ACE inhibitor (captopril). Medical units at Mayo Hospital are treated with a large number of patients with heart failure, and ACE inhibitors are usually given as primary treatment without taking into account the main side effects of the first dose of hypotension induced by these drugs. Another aim of this study was to know the incidence of first-dose hypotension in high-risk patients (hyponatremia, decreased volume) and to compare it with normovolemic patients. Ischemic heart disease was the most common cause of congestive heart failure in this study of 50 patients who applied to medical services [7-9]. It was similar to other studies showing that ischemic heart disease in developing countries such as Pakistan is the leading cause of congestive heart failure. The ratio of male to female was 1.4: 1 in the 100 patients studied, of which 58 were male, 42 were female. This value was different from other studies, which were 4: 1 compared to the general research rate

in the West. 100 patients and 20 patients (20%) were diabetic [10]. This was slightly higher than in another study with a 17% incidence of diabetes in CHF patients. In this study, idiopathic dilated cardiomyopathy (DCM) was the second most common cause of CCF. It was present in 40 patients (40%). In other studies, the incidence of DCM was quite low, with 21% and 5% in other studies. Western countries may be better because of research techniques. Hypertension was another common cause of CCF, as was the case in 12 patients (12%) in this study [11].

In another local study, the prevalence was 5/1000. Hypertensive heart failure is more common in another study than in this study in Hong Kong. Heart valve disease caused CCF in 20 patients (20%). It shows that this disease is very common in Pakistan, as opposed to other studies showing that heart valve disease causes CCF in 15%, 13% and 4%. The diagnosis of CCF was made by history and clinical examination and confirmed by ECG and echocardiography. Echocardiography can detect ischemia / myocardial infarction, myocardial hypertrophy / dilatation and valvular lesions. In the first 90 minutes, first dose hypotension was observed in 50 patients (50%). It was similar to another study where the mean decrease in BP after captopril administration was greater than 20 mmHg, approximately 50% of patients [12]. The first dose of hypotension occurred in 40 patients (40%) after 1 hour. The first dose (38%) is slightly different from other studies where the maximum decrease in BP 1 hour after captopril. However, the initial hypoptension within three hours is very contrary to another study in which the dose of hiptoptension is only 18%. First dose hypotension was also observed in normotensive normovolemic patients (10%). This was similar to another study showing incidence of approximately 15%. In this study, the first dose of hypotension was less common in hypertensive patients (20%). It is similar to another study in which the first dose of hypotension was observed to be less in hypertensive patients [12]. In other studies, high-dose ACE inhibitors (captopril, lisinopril) were equally well tolerated compared to low doses. In this study, low-dose captopril (6.25 mg) caused first-dose hypotension in only 10% of normovolemic and normotensive patients [13]. It was not very contrary to other studies. In our study, we also observed that if hyponatremia was corrected before captopril (group A), ACE inhibitors (captopril) were well tolerated and improved even if the blood pressure was lower. Other studies have shown that ACE inhibitors cure patients with low blood pressure [14]. In addition, some studies favouring higher doses and better tolerability than lower doses. We conducted this study with the view that captopril is equally well tolerated and effective in the treatment of CCF compared to other ACE inhibitors such as enalapril [15]. It was similar to other studies showing that Captopril was as good as other ACE inhibitors in terms of tolerance and efficacy.

CONCLUSION:

Congestive heart failure is a major problem and a common disease. ACE inhibitors have become the standard therapy for heart failure. For example, a few trials. CONSENSUS, SOLVD, SAVE have provided the benefit of treatment with ACE inhibitors in heart failure; However, these drugs should be given with caution to patients with heart failure due to the risk of hypotension in the first dose. Patients with heart failure are particularly susceptible to this phenomenon due to pre-existing hyper-reninemia and hyperaldosteronism. Captopril is the initially preferred agent because of its predictable onset and short duration of action. Treatment starts with a small test dose (6.25 mg), especially in high-risk patients (patients receiving high diuretics and hyponatremic therapy). If diuretic is stopped at least 12-24 hours before introduction of Captopril and hyponatremia previously corrected, then the risk of hypotension in the first dose can be adequately prevented.

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