(e) ISSN Online: 2321-9599
(p) ISSN Print: 2348-6805
SJIF (Impact factor) 2017= 6.261
Index Copernicus value = 80.90

ORIGINAL ARTICLE

Evaluation of ACE inhibitors and ARNI in heart failure patients

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ABSTRACT:
Background: The inability of the heart to pump enough blood to meet the body's needs is known as heart failure. The present study was conducted to compare ACE inhibitors and ARNI (Sacubitril Valsartan) in heart failure patients. **Materials & Methods:** 74 patients of heart failure of both genders were recruited. There were two groups of 37 patients each. Patients in groups I and II were given ACE inhibitors and ARNI, respectively. SBP, DBP, potassium, urea, and creatinine levels were measured in both groups. The results of the 2D echo at baseline and at the 6-month follow-up were compared. **Results:** Group I had 20 males and 17 females and group II had 19 males and 18 females. The mean SBP at baseline and at 6 months was 124.5 and 119.5 in group I and 128.8 and 121.2 in group II respectively. DBP was 82.9 and 75.4 in group I and 85.1 and 79.4, creatinine was 1.02 and 1.08 in group I and 1.09 and 1.08 in group II. The mean urea level was 31.1 and 37.2 in group I and 31.4 and 31.6 in group II. The mean potassium level was 4.31 and 4.92 and 4.38 and 4.25 in group I and II at baseline and 6 months respectively. The difference was non- significant (P> 0.05). At baseline and at 6 months, LVEF was 24.4 and 29.1 and 33.4 and 26.2 in group I and II respectively. LVIDD was 6.9 and 6.5 and 5.2 and 5.6. LVISD was 5.7 and 5.6 and 5.1 and 4.5 in group I and II respectively. LV systole mass (gram) was 217.7 and 212.5 and 206.4 and 203.4 in group I and II respectively. LV diastole mass (gram) was 242.4 and 234.1 and 230.3 and 216.5 in group I and II respectively. The difference was significant (P< 0.05). **Conclusion:** When ARNI was used instead of ACEI, improvements were seen in LVEF, systolic function, LVIDD, six-minute walk, and functional NYHA class, indicating the drug's significant reverse remodeling potential.
Keywords: ACEI, ARNI, systolic function

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This article may be cited as: Kushwaha SK. Evaluation of ACE inhibitors and ARNI in heart failure patients. J Adv Med Dent Scie Res 2017;5(11):191-194.

INTRODUCTION

The inability of the heart to pump enough blood to meet the body's needs is known as heart failure. It is a long-term, progressive illness that can impair the heart's capacity to pump blood enriched with oxygen to the body's tissues and organs. Systolic and diastolic heart failure are the two primary forms of heart failure. Systolic heart failure results in diminished pumping capacity because the heart muscle weakens and becomes unable to contract efficiently.[1] When the heart muscle stiffens and is unable to relax adequately, it hinders the heart's capacity to fill with blood, resulting in diastolic heart failure.[2]

Both abroad and in India, the number of heart failure cases is increasing. By 2030, the number of heart failure (HF) patients is expected to rise by 25%. Heart failure increases mortality and morbidity and has an impact on the patient's quality of life.[3] The mortality rate is expected to be 50% five years following the initial HF diagnosis. HF is a major cause of hospitalization, accounting for 1–5% of all hospitalizations. About 2–17% of hospitalized HF patients will pass away. It is estimated that between 1.3 and 23 million people in India have heart failure.[4] It has been shown that heart failure cases with a lower ejection fraction (HFrEF) are more common.Angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin-receptor blockers (ARBs), mineralocorticoid receptor antagonists (MRAs), and beta blockers (BBs) are among the pharmacological treatments for HFrEF that are now accessible and adhere to standards. These treatments have been shown to reduce mortality and morbidity. The new pharmacological class, which includes angiotensin receptor neprilysin inhibitors (ARNI), has been included to the most recent HF guidelines. It seems to improve symptoms and prognosis even more.[5]The present study was conducted to compare ACE inhibitorsand ARNI(SacubitrilValsartan)inheartfailurepatientswithreducedejectionfraction.

MATERIALS & METHODS

The present study was carried out on74 patients of heart failure of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Standard transthoracic echocardiogram (TTE) measurements, vital signs, clinical history, physical examination, and routine investigations were performed. There were two groups of 37 patients each. Patients in groups I and II were given ACE inhibitors and ARNI, respectively. SBP, DBP, potassium, urea, and creatinine levels were measured in both groups. The results of the 2D echo at baseline and at the 6-month follow-up were compared.Data

thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I (37)	Group II(37)
Drug	ACE inhibitors	ARNI
M:F	20:17	19:18

Table I shows that group I had 20 males and 17 females and group II had 19 males and 18 females.

Table II Assessment of parameters

Parameters	Group I		Group II		PValue
	Baseline	6 months	Baseline	6 months	
SBP	124.5	119.5	128.8	121.2	0.32
DBP	82.9	75.4	85.1	79.4	0.19
Creatinine	1.02	1.08	1.09	1.08	0.56
Urea	31.1	37.2	31.4	31.6	0.05
Potassium	4.31	4.92	4.38	4.25	0.47

Table II, graph I shows that mean SBP at baseline and at 6 months was 124.5 and 119.5 in group I and 128.8 and 121.2 in group II respectively. DBP was 82.9 and 75.4 in group I and 85.1 and 79.4, creatinine was 1.02 and 1.08 in group I and 1.09 and 1.08 in group II. The mean urea level was 31.1 and 37.2 in group I and 31.4 and 31.6 in group II. The mean potassium level was 4.31 and 4.92 and 4.38 and 4.25 in group I and II at baseline and 6 months respectively. The difference was non- significant (P> 0.05).

Graph I Assessment of parameters

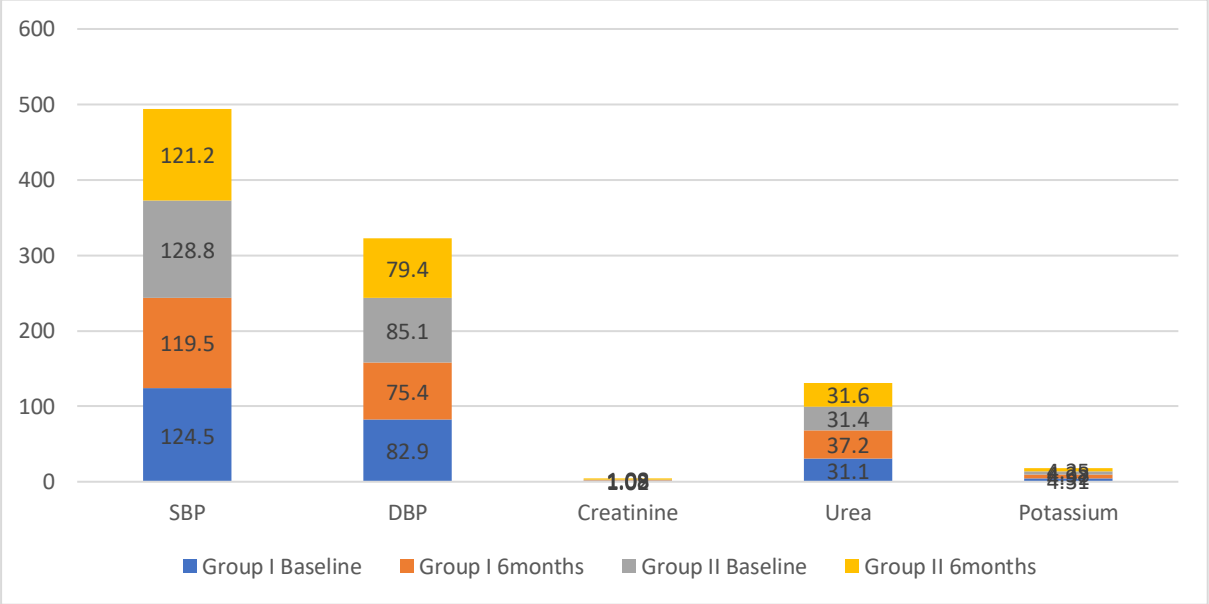

Table III Comparison of 2D echo findings

Parameters	Group I		Group II		P Value
	Baseline	6 months	Baseline	6 months	
LVEF	24.4	29.1	33.4	26.2	0.05
LVIDD	6.9	6.5	5.2	5.6	0.02
LVISD	5.7	5.6	5.1	4.5	0.01
LVsystole mass (gram)	217.7	212.5	206.4	203.4	0.62
LVdiastole mass (g)	242.4	234.1	230.8	216.5	0.95

Table III shows that at baseline and at 6 months, LVEF was 24.4 and 29.1 and 33.4 and 26.2 in group I and II respectively. LVIDD was 6.9 and 6.5 and 5.2 and 5.6. LVISD was 5.7 and 5.6 and 5.1 and 4.5 in group I and II respectively. LV systole mass (gram) was 217.7 and 212.5 and 206.4 and 203.4 in group I and II respectively. LV diastole mass (gram) was 242.4 and 234.1 and 230.3 and 216.5 in group I and II respectively. The difference was significant (P< 0.05).

DISCUSSION

There are reasons of heart failure. Narrowing of the coronary arteries, which provide blood to the heart muscle, is the most frequent cause of heart failure. A heart attack may result from this, which weakens and destroys the heart muscle.[6] Over time, thickening and stiffness of the heart muscle might result from the heart having to work harder due to uncontrolled high blood pressure. Diseases of the heart muscle known as cardiomyopathy can weaken the heart and affect its capacity to pump blood.[7] Numerous variables, including heredity, infections, alcoholism, and drug usage, can contribute to cardiomyopathy. Heart failure can result from malfunctioning heart valves that obstruct the heart's blood flow. Heart failure can result from the heart pumping inefficiently due to abnormal cardiac rhythms.[8]The present study was conducted to compare ACE inhibitorsand ARNI (Sacubitril Valsartan) in heart failure patients with reduced ejection fraction.

We found that group I had 20 males and 17 females and group II had 19 males and 18 females. We found that mean SBP at baseline and at 6 months was 124.5 and 119.5 in group I and 128.8 and 121.2 in group II respectively. DBP was 82.9 and 75.4 in group I and 85.1 and 79.4, creatinine was 1.02 and 1.08 in group I and 1.09 and 1.08 in group II. The mean urea level was 31.1 and 37.2 in group I and 31.4 and 31.6 in group II. The mean potassium level was 4.31 and 4.92 and 4.38 and 4.25 in group I and II at baseline and 6 months respectively. Lillyblad et al[9]evaluated the clinical role of sacubitril/valsartan, a novel angiotensin-neprilysin inhibitor, for the treatment of chronic heart failure with a reduced ejection fraction (HFrEF).HFrEF remains a disease of high morbidity and mortality. Natriuretic peptide (NP) augmentation has emerged as a most promising neurohormonal target in HFrEF. NPs provide vasodilatory, natriuretic, diuretic, and antiproliferative actions to help support the failing heart. Neprilysin, a neutral endopeptidase, is a primary pathway for NP metabolism. Combined inhibition of the renin angiotensin aldosterone system and neprilysin augments the beneficial natriuretic peptide pathway while providing direct antagonism to increases in angiotensin II. In the landmark PARADIGM HF trial, the neprilysin inhibitor sacubitril added to valsartan significantly improved morbidity and mortality over enalapril, a standard of care in HFrEF. Application of these results to clinical practice requires careful considerations of trial design, study patient population, and clinical monitoring.Sacubitril/valsartan significantly improved morbidity and mortality in patients with chronic HFrEF but will require careful application to "real-world" populations of HFrEF.

We found that at baseline and at 6 months, LVEF was 24.4 and 29.1 and 33.4 and 26.2 in group I and II respectively. LVIDD was 6.9 and 6.5 and 5.2 and 5.6. LVISD was 5.7 and 5.6 and 5.1and 4.5 in group I and II respectively. LV systole mass (gram) was 217.7 and 212.5 and 206.4 and 203.4 in group I and II respectively. LV diastole mass (gram) was 242.4 and 234.1 and 230.3 and 216.5 in group I and II respectively. McMurray JJ et al[10] in their study patients with chronic HF, NYHA class II-IV symptoms, an elevated plasma BNP or NT-proBNP level, and an LVEF of ≤40% were enrolled in the Prospective comparison of ARNI with ACEI to Determine Impact on Global Mortailty and morbidity in Heart Failure trial (PARADIGM-HF). Patients entered a single-blind enalapril run-in period (titrated to 10 mg b.i.d.), followed by an LCZ696 run-in period (100 mg titrated to 200 mg b.i.d.). A total of 8436 patients tolerating both periods were randomized 1:1 to either enalapril 10 mg b.i.d. or LCZ696 200 mg b.i.d. The primary outcome is the composite of cardiovascular death or HF hospitalization, although the trial is powered to detect a 15% relative risk reduction in cardiovascular death. PARADIGM-HF will determine the place of the ARNI LCZ696 as an alternative to enalapril in patients with systolic HF. PARADIGM-HF may change our approach to neurohormonal modulation in HF.

The limitation the study is small sample size.

CONCLUSION

Authors found that when ARNI was used instead of ACEI, improvements were seen in LVEF, systolic function, LVIDD, six-minute walk, and functional NYHA class, indicating the drug's significant reverse remodeling potential.

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