Original Article

Comparing the Effectiveness of Lisinopril and Losartan Potassium in Treatment of Microalbuminurea in Newly Diagnosed Type II Diabetes Mellitus

Shabnam Seher, Arooj Iqbal and Tayyuba Irum

ABSTRACT

Objective: is to compare effectiveness of Lisinopril (ACE inhibitor) and Losartan Potassium (ARB) in treatment of microalbuminurea in newly diagnosed Type II DM patients in terms of reduction in microalbuminurea.
Study Design: Randomized control trial study.
Place and Duration of Study: This study was conducted at the Department of General Medicine, Allied Hospital, Faisalabad from March 2016 to August 2016.
Materials and Methods: A total number of 320 (100%) patients was enrolled in the trial.SPSS (v 23) was used to analyze the patient's data. Mean and SD were calculated and presented for numerical data and frequency percentages were calculated and presented for qualitative data. Chi square test was applied to see effect modification. P value ≤ 0.05 was considered as significant.
Results: A total number of 100% (n=320) microalbuminurea in Type II DM patients were included in this study, both genders. In our study in group (P), 85% (n=136) patients showed reduction in microalbuminurea and in group (L), 81.9% (n=131) patients were observed reduction in microalbuminurea. To compare the efficacy of Losartan Potassium and Lisinopril, independent sample t-test was applied. It was observed that there was no significant difference between the efficacies of Losartan Potassium and Lisinopril, i.e. these two drugs were equally effective with p-value 0.454.
Conclusion: From results of our study it is concluded that Lisinopril and Losartan potassium, both are significantly effective in reduction of microalbuminuria and can be advised as first line therapy in diabetes mellitus type II patients.

Key Words: Losartan Potassium, Lisinopril, Diabetes type II, Microalbuminurea

Citation of articles: Seher S, Iqbal A, Irum T. Comparing the Effectiveness of Lisinopril and Losartan Potassium in Treatment of Microalbuminuria in Newly Diagnosed Type II DM.Med Forum 2017;28(8):63-66.

INTRODUCTION

Diabetes mellitus is a major cause of so many diseases such as retinopathy, cardiovascular diseases, diabetic ketoacidosis and nephropathy[1,2]. If diabetes mellitus is managed earlier, these complications can be prevented or their effects can be reduced. Among early indicators of nephropathy microalbuminurea is a key point to understand the patient's further management[3]. Untreated microalbuminurea may lead to high rate morbidity and mortality. Prevention of all these complications co morbid diseases could be lifesaving if managed at early stage of disease and with the help of advanced pharmacological management[4].

Excretion of 30-300 mg of albumin within 24 hours will be labeled as microalbuminurea it can also be defined as 30mg/g ratio of albumin to creatinine ratio in first morning sample[5].

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Received: May 02, 2017; Accepted: June 06, 2017

This gradual increase in microalbuminurea must be treated at earlier stages andclass of angiotensin converting enzymes isuseful in its early treatment. They reduce the capillary pressure and stop the increase in microalbuminuria[6]. Many studies support the use of Angiotensin II receptors blockers by over ting the microalbuminurea to proteinuria.

Two different studies have been conducted in past on reduction of microalbuminurea. In one study Losartan potassium was used as a treatment drug and microalbuminurea reduction was 87% in this group[7,8]. On other hand Lisinopril was used as a treatment drug and prevention rate was 41% in this group. In our population 20-25% prevalence was noted with the use of these drugs in type II diabetic patients[9]. In some studies it was reported that in type I diabetes only ACE inhibitors was effective and in type II diabetes both ACE inhibitors and ARBs were effective[10].

In past no study was conducted on head to toe comparison of Losartan potassium (ARB inhibitor) and Lisinopril (ACE) for the prevalence of nephropathy and or for the Reno protection, aim of our study was to compare these two groups thoroughly and our study will be used as a reference study for further trials.

MATERIALS AND METHODS

This randomized control trial was conducted in the department of medicine, Allied Hospital, Faisalabad from March 2016 to August 2016. After approval from ethical committee of institution and informed consent from patients a total number of 320 (100%) patients was enrolled in the trial, sample size was calculated with the use of following formula $n = (Z_{\alpha/2}+Z_{\beta})^2 * (p_1(1-p_1)+p_2(1-p_2)) / (p_1-p_2)^2$, taking following values: Confidence interval 95%, power of study 80 %, P1 percentage in group P (losartan potassium) 86.7% and in P2 group L (Lisinopril) 66%(6). A simple lottery method was used to divide the patients into two equal groups (160 patients in each group). Patients who were hypertensive, having connective tissue diseases, chronic heart failure, pregnancy, lactation, and known hypersensitivity to ACE inhibitors or Angiotensin Receptor Blocker were excluded from the study.

All information was collected by researcher himself such age gender, albuminurea before starting drug and after 12 weeks of treatment was noted. 100 mg of Losartan potassium was given for 12 weeks to group P (losartan potassium) and 5 mg of Lisinopril for 12 weeks to group L (Lisinopril). Urine sample was collected in standard container given by the laboratory assistant in early morning for albuminurea before and after 12 weeks. Follow up was done by another physician who was blind to this research process and purpose to reduce bias after 12 weeks by contacting the patients on their telephonic contact numbers. Effectiveness was seen in terms of 25% reduction in albuminurea after 12 weeks medication in both groups.

SPSS (v 23) was used to analyze the patient's data. Mean and SD were calculated and presented for numerical data and frequency percentages were calculated and presented for qualitative data. Chi square test was applied to see effect modification. P value ≤ 0.05 was considered as significant.

RESULTS

A total number of 100% (n=320) microalbuminurea in Type II DM patients were included in this study, both genders. Gender distribution showed that there were more males than females i.e. 69.1% (n=221) and 30.9% (n=99) respectively. The mean age and BMI of the patients was 50.98±8.45 years and 26.6±2.70 BMI respectively.

These 100% (n=320) patients were treated with losartan potassium and Lisinopril and were divided into 2equal groups, 160 in each. Patients treated with losartan potassium, were included in group (P) and Lisinopril treated patients were included in group (L). The mean age and BMI of the patients in group (P) was 46.81±5.74 and 24.68±1.48 respectively, in group (L) 55.13±8.69 and 28.51±2.25 respectively(table-1, 2).

The main outcome variables of this study were microalbuminurea. In group (P), 85% (n=272) patients showed reduction in microalbuminurea and in group (L), 81.9% (n=48) patients were observed reduction in microalbuminurea (table-3).

When patients were categorized into different age and BMI categories, it was noted that majority of patients i.e. 77.2% (n=247) were aged from 46 to 65 years and only 22.8% (n=73) were aged from 25 to 45 years. 82.2% (n=263) patients were BMI from 23 to 29 and 17.8% (n=57) patients were BMI from 30 to 33 respectively.

Table No.1: Mean age in both groups

Groups		Mean
Group (P)	**Age in years**	46.81±5.74
	BMI	24.68±1.48
Group (L)	**Age in years**	55.13±8.69
	BMI	28.51±2.25

Table No. 2: Demographic variables

Characteristics	Frequency	%age
Gender		
Male	221	69.1
Female	99	30.9
Total	**320**	**100.0**
Stratified Age		
25-45 years	73	22.8
25-65 years	247	77.2
Total	**320**	**100.0**
Stratified BMI		
23-29 BMI	263	82.2
30-33 BMI	57	17.8
Total	**320**	**100.0**
Descriptive Statistics		
	Mean	**S.D**
Age in years	50.98	8.45
BMI	26.60	2.70

Table No.3: Frequency of Microalbuminurea in both groups

Microalbuminurea				P Value
Groups		Frequency	Percent	
Group (P)	**Yes**	24	15	
	No	136	85	
	Total	**320**	**100.0**	**0.452**
Group (L)	**Yes**	29	18.1	
	No	131	81.9	
	Total	**320**	**100.0**	

To compare the efficacy of Losartan Potassium and Lisinopril, independent sample t-test was applied. It was observed that there was no significant difference between the efficacies of Losartan Potassium and Lisinopril, i.e. these two drugs were equally effective with p-value 0.454 (table-3).

When Chi-Square was applied to check the effect modification, it was noted that microalbuminurea was significantly associated with stratified gender, Stratified age and BMI with p-values 0.000, 0.000 and 0.001 respectively. But microalbuminurea was not significantly associated with Groups i.e. group (P) and group (L) (table-4).

Table No. 4: **Association of Icroalbuminurea with Effect Modifiers (n = 320)**

Effect Modifiers		Microal buminurea		Total	P-value
		Yes	No		
Gender	Male	48	173	221	0.000
	Female	5	94	99	
Total		53	267	320	
Stratified age	25-45 years	24	49	73	0.000
	46-65 years	29	218	247	
Total		53	267	320	
Stratified BMI	23-29 BMI	52	211	263	0.001
	30-33 BMI	1	56	57	
Total		53	267	320	

Table No.5: Independent sample t-test

t-test for Equality of Means				
t	d.f	P-value	Mean difference	S.E Difference
-.750	318	.454	-.031	.042
-.750	316.186	.454	-.031	.042

DISCUSSION

Renal failure can be diagnosed with glomerular filtration rate, renoprotection is challenge in these days in patients of diabetes type II and microalbuminurea is a key point of its earlier control[11,12]. This earlier damage is reversible if glycemic control is good at this stage, addition of ACE inhibitors and ARBs also helpful if given and monitored timely[13]. Many trials have been conducted on this topic that supports in renoprotective strategy. In a recent hoc analysis it is noted that there is a less incidence of nephropathies in subjects who are using ARBs then those patients who were not using ARBs (control group)[14,15].

In some trials it is also reported that both ACE inhibitors and ARBs are equally effective in delaying the nephropathy of type II diabetes. Basi Set al (16)conducted a study on losartan potassium (ARB)and Lisinopril (ACE inhibitor) in patients of diabetes type II. Our study is similar to this study; we compare Losartan potassium and Lisinopril head to toe in type II diabetes in terms of reduction in microalbuminurea which is a key point in this aspect. Results of our study shown that, effectiveness of both drugs is different significantly but when we compare two groups their effectiveness is not significantly different.

In our study in group (P), 85% (n=136) patients were cured and in group (L), 81.9% (n=131) patients were cured. To compare the efficacy of Losartan Potassium and Lisinopril, independent sample t-test was applied. It was observed that there was no significant difference between the efficacies of Losartan Potassium and Lisinopril, i.e. these two drugs were equally effective with p-value 0.454.

A study was conducted by Oguri et al in 2009[17] and reported that there is no difference in effectiveness of both drugs Lisinopril and losartan potassium for the prevention of microalbuminurea for the management of nephropathy in type II diabetic patients. Results of his study were ACR ratio in Lisinopril group was 118.0 ± 78.7 mg/µg and in losartan group it was 119.5 ± 84.7 mg/µg respectively. Results of our study are comparable with this study, as we also concluded no markable difference on both regimens.

Another study was conducted by Mogensen CE et al[18] on similar topic in which Lisinopril and losartan were compared and reported that candesartan is as effective as Lisinopril in reduction of hypertension and microalbuminurea in patients of diabetes type II patients. These results are also in favor of our results and our study authenticated by another previous trial. Most of previous trials were in favor of our trial and a little number was in conflict of our conclusion.

In another study conducted by Naganuma T et al[19] reported that the use ARB in combination with low dose diuretics have good results in reducing microalbuminurea in patients of diabetes type II who were undergone for renal transplant. This decrease in microalbuminurea with ARB agents supports our results as we claimed in our study that ARB and ACE inhibitors both were effective for the management of nephropathy by decreasing the release of microalbuminurea.

In another study Sandhu et al[6] reported that both ACE inhibitors and ARBs are equally effective in reduction of microalbuminurea when advised in type II diabetic patients for renoprotection and reduce the albumin to creatinine ratio. Findings and conclusion of this study is also comparable with results and conclusion of our study.

CONCLUSION

From results of our study it is concluded that Lisinopril and Losartan potassium, both are significantly effective in reduction of microalbuminurea and can be advised as first line therapy in diabetes mellitus type II patients.

Author's Contribution:

Concept & Design of Study: Shabnam Seher
Drafting: Tayyuba Irum
Data Analysis: Tayyuba Irum

Revisiting Critically: Arooj Iqbal
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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