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LONG-TERM RESULTS OF PATIENTS WITH TYPE 2 DIABETES ATTENDING A MULTIDISCIPLINARY DIABETES KIDNEY DISEASE CLINIC: A CASE-CONTROL STUDY .

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Abstract.

Background:

Diabetic and chronic kidney disease together tend to worsen the outcomes. A newer approach to treat both comorbid diseases can slow down the prognosis of both diseases leading to quality of life.

Aim: To evaluate the outcomes when the patients are treated simultaneously for chronic kidney disease and diabetes at a diabetic kidney disease clinic

Method:

The study was conducted amongst two groups of patients. The first group had diabetes and chronic kidney diseases. Doctors treating the diabetes referred these patients to a diabetic kidney disease clinic. The other group of patients was not treated at the diabetic kidney disease center but they had comparable diabetes and chronic kidney disease. The prognosis was tracked in both groups; the kidney of the patients was monitored if it had reached stage 5 kidney disease and the glomerular filtration rate was less than 1.5 milliliter per minute and 1.73 m2.

Result:

During the follow the reports of the patients were analyzed it was observed that 49.4% of patients had reached chronic kidney disease stage 5 and were treated at the diabetic kidney disease clinic. 55.5% of the patients of the patients not treated at the diabetic kidney disease clinic reached the chronic kidney disease stage 5. When the difference was compared statistically it was found to be statistically significant.

Conclusion:

From this study, it is concluded that when patients are treated for chronic kidney disease and diabetes simultaneously the prognosis toward the end-stage kidney is delayed. When multidisciplinary clinics focus on the management of diabetes and kidney disease it can add years of quality life for the patients.

Recommendation:

Renin–angiotensin–aldosterone system inhibitors are strongly recommended for patients with diabetes, hypertension, and albuminuria.

Keywords: diabetic kidney disease, diabetes mellitus type 2, chronic kidney disease, multidisciplinary., Submitted: 2023-09-20, Accepted: 2023-09-27

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1. INTRODUCTION.

Diabetic nephropathy is a manifestation in patients with diabetes mellitus type 2 and chronic kidney disease. The occurrence of these two comorbid diseases is on the rise. Diabetes accelerates the deterioration of the chronic kidney leading eventually to kidney failure [1]. This phenomenon has increased the rates of morbidity and mortality in diabetic patients [2].

Various studies conducted in the of endocrinology and nephrology state that a multidisciplinary approach in treating diabetes and chronic kidney diseases can delay the progress of the chronic kidney disease to the end stage kidney failure [3, 4]. However, studies done in this area monitor the renal clearance of the drugs prescribed for diabetes mellitus type 2 or simply monitor the renal function along with diabetes treatment [5, 6]. A novel approach is required to arrest the progression of kidney failure and treat diabetes.

The diabetic kidney disease clinic focuses on patients with chronic kidney disease stages 3 and 4 of the kidney disease and with diabetes mellitus type 2. Patients are required to undergo regular follow-ups by nephrologists as well as endocrinologists [7]. The prognosis of the disease state is monitored and treated accordingly.

Herein this study aims to evaluate the beneficial outcomes for the patients with chronic diabetes and stage 3rd and 4th kidney disease treated by clinic of diabetic kidney disease over the patients not treated by this multidisciplinary approach.

2. METHODS.

2.1. Study Design and Population.

This was a case-control study wherein the group of patients who attended the multidisciplinary clinic belonged to group A and those who were from group B were the controls for the study. The subjects were divided into two groups irrespective of the gender and age of the patients they were included in the study. The inter-patient variation was taken into account while performing statistical analysis. The patients of both groups had diabetes and chronic kidney disease stage 3 and 4. Group A were the patients who were treated at the joint clinic under a nephrologist and endocrinologist. Group B also had a comparable diseased state but was not treated at the multidisciplinary clinic.

2.2. Inclusion and Exclusion criteria.

The patients who had other comorbid diseases such as cancer and had already reached the end stage of kidney failure were not included in the study. The baseline glomerular filtrate monitoring was done in all the patients irrespective of the group. The patients having glomerular filtrate in the range of 15-59 mL were selected for the study. The patients were monitored regularly for every six months for about 15 years.

2.3. Data Analysis.

The primary event was reaching stage 5 of chronic kidney disease while the secondary outcomes were extreme changes from the baseline levels of HbA1c, systolic blood pressure, creatinine level, albumin level, triglyceride level, low-density lipids level, and body mass index was monitored for both the groups. Sophisticated instruments were used for testing blood serum and urine.

The patients of group A who visited the clinic regularly were monitored by a nephrologist and endocrinologist. After each evaluation, the medication was titrated by the physicians. There were educational sessions conducted at the clinic. The diet was monitored as per the guidelines from the American diabetes association.

Data obtained from the patients were subjected to suitable statistical analysis to minimize the inter-patient variation. Pearson's value was used to compare the differences in the secondary outcome of both group. The value of less than 0.05 was considered significant.

Table no. 1 gives standard values for the blood profiling of diabetic patients with chronic kidney disease.

3. RESULTS.

200 patients were selected for the study. At the initial stage, 450 patients were examined for eligibility, however, 250 patients were excluded from

Table 1: **Ideal ranges of the parameters monitored.**

Parameters	Range
HBA1c	6.5%-8%
Systolic blood pressure	Less than 130 mmHg
Diastolic blood pressure	Less than 80 mmHg
Low density lipid level	Less than 2.6 mmol/L
Body mass index	Less than 30

this study due to not being eligible. Tables No. 2 and 3 illustrate the difference in the basic profile of the group A and group B patients which is the baseline characters and the average of the parameters during the sequential visits until the final follow-up. The patients of group A had a poorer blood profile compared to the patients of group B. In the course of the study, it was found that the primary event which is stage 5 chronic kidney disease was attended by a significantly greater number of group B patients than the group A patients.

The patients who developed stage 5 chronic kidney disease had HbA1c less than 7.0, BMI greater than 30, systolic blood pressure greater than 140 mm of Hg, and low-density lipid level more than 2.6 mmol/L. The Pearson's value for all the stated factors when compared was obtained to less than 0.05 and hence it was significant. The patients of group B were at higher risk of developing stage 5 chronic kidney disease as well and the profiles of these patients did not improve when compared with group A patient's profile.

There were only 26 patients in group A amongst the 100 patients who developed stage 5 chronic kidney disease whereas 74 of them never progressed to stage 5 of chronic kidney disease.

4. DISCUSSION.

When the case-control study started the patients of group A had poorer profiles compared to group B patients and thus they were re- ferred to the multidisciplinary clinic. The renin-angiotensin blockers prevent the deterioration of the kidney and act as renal protective agents [8]. The patients of group A used renin-angiotensin blockers more than the group B patients which indicates that progression towards developing stage 5 chronic kidney disease was less in patients of group A. This was consistent with a study that reported that renin-angiotensin blockers given to patients with type 2 diabetes mellitus improved their renal function and prevented its further deterioration [9]. Continuous monitoring and follow-ups showed that the profile of group B patients was towards progression into the primary event the group A patient's profile improved and the risk factor decreased.

The studies conducted in this domain have contradictory results, a study showed there was a significant relation between the progression into stage 5 chronic kidney disease and not getting treated in a multidisciplinary manner [10, 11]. However, the other study showed that the progression of chronic kidney disease to stage 5 was not affected by treatment in a multidisciplinary clinic [12]. The explanation for these findings includes the variability of the multidisciplinary clinic, most of the studies did not have an endocrinologist at their multidisciplinary clinic [13]. Although in this study all the factors such as nutrition, pharmacotherapy, social environment, and treatment by nephrologist and endocrinologist were covered in the multidisciplinary clinic were covered but the studies had variable factors such as the age, duration of type 2 diabetes mellitus, and baseline characteristics. Thus, more inclusive studies are required to reduce the inter-variability of the factors.

It was also observed in the study that patients who already had stage 3 or 4 chronic kidney diseases had higher chances of developing stage 5 chronic kidney disease, in group A. It implies that the patients if referred earlier to the multidisciplinary clinic the progression could have been pre-

Table 2: **The baseline of the parameters monitored.**

Parameters	No. of patients	
Baseline	Group A (n= 100)	Group B (n=100)
$HbAI_C$ less than 7.0	28	31
Systolic blood pressure more than 130 mmHg	64	56
Diastolic blood pressure more than 80 mmHg	52	43
Low density lipid level more than 2.6 mmol/L	52	54
Triglyceride more than 1.7 mmol/L	55	50
Stage 3 of CKD	67	76
Stage 4 of CKD	33	24
Use of renin angiotensin antagonist	80	72
Use of insulin	51	40
Body mass index more than 30	19	17

Table 3: **The average values of the parameters monitored**

Mean value	Patients who developed stage 5 (n=57)	Patients who did not develop stage 5 (n=143)
$HbAI_C$ less than 7.0	18	41
Systolic blood pressure more than 130 mmHg	43	78
Diastolic blood pressure more than 80 mmHg	31	64
Low density lipid level more than 2.6 mmol/L	27	37
Triglyceride more than 1.7 mmol/L	32	73
Stage 3 of CKD	25	118
Stage 4 of CKD	32	25
Use of renin angiotensin antagonist	40	112
Use of insulin	27	64
Patients of group A	26	74

vented [14-16]. The study supports a multifactorial approach to prevent the progression of chronic kidney diseases in patients with type 2 diabetes mellitus, to end-stage renal disease which could decrease the risk of mortality.

5. CONCLUSION.

The current study concludes that the disease progression can be prevented if patients with chronic kidney disease and type 2 diabetes mellitus are treated by a multidisciplinary clinic. A multidisciplinary clinic includes the joint efforts of an endocrinologist and nephrologist as well as various other aspects such as nutrition, regular monitoring and counseling, and medications had a significant impact in decreasing the mortality rates in the patients with chronic kidney disease and type 2 diabetes mellitus.

6. LIMITATION.

The study did not take the account inter-patient variability as well as the economic con-

siderations while treating the patients at a multidisciplinary clinic. More studies are required to determine the effect of renin-angiotensin blockers on the progression of the disease.

7. RECOMMENDATION.

Renin–angiotensin–aldosterone system inhibitors are strongly recommended for patients with diabetes, hypertension, and albuminuria.

8. ACKNOWLEDGEMENT.

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9. LIST OF ABBREVIATIONS.

HbA1c- glycated hemoglobin
BMI- Body mass index
CKD- Chronic Kidney disease

10. SOURCE OF FUNDING.

The study was not funded.

11. CONFLICT OF INTEREST.

The authors report no conflicts of interest in this work.

12. PUBLISHER DETAILS.

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