

Original Research

Microalbuminuria in Patients with Type 2 Diabetes Mellitus

¹Rahul Babasaheb Jawale, ²Swarna Rahul Jawale

¹Associate Professor, Department of General Medicine, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India;

²Assistant Professor, Department of Pathology, Parbhani Medical College, Parbhani, Maharashtra, India

ABSTRACT:

Aim - The aim of this study was to evaluate the relationship between microalbuminuria in type 2 diabetic patients. **Materials and methods**- This cross-sectional study conducted on patients with type 2 diabetes mellitus which aimed to evaluate the relationship between microalbuminuria in type 2 diabetic patients. The study excluded individuals with infectious diseases, recent cardiovascular events, pregnancy, smoking, severe hypertension, kidney failure, abnormal blood parameters. **Results**- In the study, a total of 100 patients were initially enrolled. Patients with microalbuminuria had been diagnosed with diabetes mellitus for a longer duration compared to diabetic patients without microalbuminuria. **Conclusion**-The prevalence of microalbuminuria among individuals with type 2 diabetes mellitus is notably high at and shows positive correlation diabetes. **Keywords**-microalbuminuria, insulin, diabetes

Received: 20-01- 2019

Accepted: 23-02-2019

Corresponding author: Swarna Rahul Jawale, Assistant Professor, Department of Pathology, Parbhani Medical College, Parbhani, Maharashtra, India

This article may be cited as: Jawale RB, Jawale SR. Microalbuminuria in Patients with Type 2 Diabetes Mellitus. J Adv Med Dent Scie Res 2019;7(3):278-280.

INTRODUCTION

Diabetes mellitus (DM) has become a major and serious threat to global human health. T2DM can lead to many chronic complications, one of which is microvascular complications.¹Microalbuminuria (MA) refers to the presence of small amounts of albumin in the urine. It is a marker of kidney damage in both insulin-dependent and non-insulin-dependent diabetics, serving as an early indicator of nephropathy.²

MA has been recognized as the "tip of the iceberg" when it comes to diabetic complications. It is an indicator of systemic endothelial dysfunction, which is characterized by impaired functioning of the inner lining of blood vessels. Endothelial dysfunction plays a crucial role in the development of atherosclerosis, a condition where fatty deposits accumulate in the arteries, leading to reduced blood flow and an increased risk of heart disease, stroke, and peripheral vascular disease.³ This highlights the importance of early detection and intervention to mitigate the risk of developing these life-threatening complications. The prevalence of MA in individuals with T2DM is significant. Studies have shown that approximately 20-40% of patients with T2DM develop MA within

10 years of diagnosis.⁴ However, it is worth noting that MA can occur even in the absence of overt proteinuria and may be present in individuals with well-controlled blood glucose levels and concomitant hypertension.⁵The aim of this study was to evaluate the relationship between microalbuminuria in type 2 diabetic patients.

MATERIALS AND METHODS

This cross-sectional study conducted on patients with type 2 diabetes mellitus which aimed to evaluate the relationship between microalbuminuria in type 2 diabetic patients. The study excluded individuals with infectious diseases, recent cardiovascular events, pregnancy, smoking, severe hypertension, kidney failure, abnormal blood parameters. Patients with severe cardiovascular disease were also excluded through cardiologic consultation, echocardiography, and electrocardiography.

Microalbuminuria, defined as urine albumin excretion between 30 mg/d and 300 mg/d, was assessed using 24-hour urine collection samples. This study provided valuable insights into the relationship between microalbuminuria, and clinical parameters in patients with type 2 diabetes mellitus, contributing to a better

understanding of the risk factors for cardiovascular disease and kidney damage in this population. All statistical analyses were performed using the SPSS software.

RESULTS

In the study, a total of 100 patients were initially enrolled. The study revealed a significantly higher

male population in the microalbuminuric group. Among the included patients, 59 were found to have microalbuminuria. Patients with microalbuminuria had been diagnosed with diabetes mellitus for a longer duration compared to diabetic patients without microalbuminuria.

Table 1: Demographic data

Variable	Number	Percentage
Mean age (years)	49.5	
Males	73	73
Females	27	27
Total	100	100

Table 2: Incidence of microalbuminuria

Microalbuminuria	Number	Percentage
Present	59	59
Absent	41	41
Total	100	100

Table 3: Correlation of duration of diabetes with occurrence of microalbuminuria

Microalbuminuria	Mean duration of diabetes	p-value
Present	13.2 years	0.001 (Significant)
Absent	8.1 years	

DISCUSSION

Microalbuminuria (MA) is an important clinical marker for the early detection of kidney damage in patients with type 2 diabetes (T2DM). The prevalence of MA in T2DM has been steadily increasing worldwide, making it a significant public health concern.^{6- 8}Persistent microalbuminuria is a robust indicator of the progression to clinical diabetic nephropathy, a condition that can potentially lead to kidney failure if left unmanaged. While diabetic nephropathy is reversible, timely detection and intervention are crucial to prevent irreversible kidney damage. Therefore, early diagnosis through regular screening for microalbuminuria is essential in the management of individuals with diabetes mellitus.^{8.}⁹To mitigate the risk of kidney disease progression and potential complications, experts in the field of diabetes management advocate for annual screening for microalbuminuria. This proactive approach enables healthcare providers to identify early signs of kidney damage, implement appropriate interventions, and tailor treatment plans to prevent the worsening of diabetic nephropathy. By adhering to regular monitoring guidelines, individuals with diabetes can take proactive steps to safeguard their kidney health and improve overall outcomes.^{8- 10}

In our study a significantly higher male population belonged to the microalbuminuric group. Among the included patients, majority were found to have microalbuminuria. Patients with microalbuminuria had been diagnosed with diabetes mellitus for a longer duration compared to diabetic patients without. Research has shown longer duration and poor

glycemic control of diabetes, male gender, and high creatinine as significant risk factors for microalbuminuria. These studies, however, were unable to demonstrate any difference between the two groups in terms of their age, gender, or levels of LDL and HDL, which should be investigated in further studies.^{10, 11}Epidemiologic evidence indicates that the presence of albuminuria is predictive of increased cardiovascular morbidity and mortality independent of other cardiovascular risk factors. There is a near linear relationship between increasing urinary protein excretion and both myocardial infarction and stroke in patients with type 2 diabetes. These observations are also valid in patients without type 2 diabetes. Thus, screening for albumin, or protein in the urine, (even with lower levels below 150 mg/d) can have important predictive value for identifying patients who are more likely to experience a cardiovascular event. Gerstein and colleagues⁸ analyzed information from the Heart Outcomes Prevention Evaluation (HOPE) study and noted that microalbuminuria was a powerful predictor for major cardiovascular events (myocardial infarction, stroke, or cardiovascular death) and all-cause mortality in patients with and without diabetes. Of the more than 9000 high-risk patients who were screened for this study, an abnormal baseline urine albumin to creatinine ratio measurement was detected in 33% of patients with diabetes and in 15% of patients without diabetes. A linear graded relationship was observed between the urine albumin to creatinine ratio and cardiovascular morbidity and mortality.^{12- 14}

CONCLUSION

The prevalence of microalbuminuria among individuals with type 2 diabetes mellitus is notably high and shows positive correlation with diabetes.

REFERENCES

1. Radcliffe NJ, Seah JM, Clarke M, MacIsaac RJ, Jerums G, Ekinci EI: Clinical predictive factors in diabetic kidney disease progression. *J Diabetes Investig.* 2017, 8:6-18
2. Chronic Kidney Disease. *Kidney Int* (2005) 68(2):766–72. doi: 10.1111/j.1523-1755.2005.00455.x
3. Rughoopath MS, Zeng R, Yao Y: Protein diet restriction slows chronic kidney disease progression in non-diabetic and in type 1 diabetic patients, but not in type 2 diabetic patients: a meta-analysis of randomized controlled trials using glomerular filtration rate as a surrogate. *PLoS One.* 2015, 10:e0145505.
4. Vibha SP, Kulkarni MM, KirthinathBallala AB, Kamath A, Maiya GA: Community based study to assess the prevalence of diabetic foot syndrome and associated risk factors among people with diabetes mellitus. *BMC EndocrDisord.* 2018, 18:43. 10.1186/s12902-018-0270-2
5. Brownlee M, Aiello LP, Friedman E, Vinik AI, Nesto RW, Boulton AJ. Complications of diabetes mellitus. In: Larsen PR, Kronenberg HM, Melmed S, Polonsky KS. *Endocrinology*. 10th ed. Philadelphia: WB Saunders; 2003. p. 1509-40.
6. Vibha SP, Kulkarni MM, KirthinathBallala AB, Kamath A, Maiya GA: Community based study to assess the prevalence of diabetic foot syndrome and associated risk factors among people with diabetes mellitus. *BMC EndocrDisord.* 2018, 18:43. 10.1186/s12902-018-0270-2
7. Showail AA, Ghoraba M: The association between glycemic control and microalbuminuria in Type 2 diabetes. *Saudi J Kidney Dis Transpl.* 2016, 27:473-9.
8. Nakamura M, Onoda T, Itai K, et al. Association between serum C-reactive protein levels and microalbuminuria: a population-based cross-sectional study in northern Iwate, Japan. *Intern Med.* 2004;43:919-25.
9. Patel KL, Mhetras SB, Varthakavi PK, Merchant PC, Nihalani KD. Microalbuminuria in insulin dependent diabetes mellitus. *J Assoc Physicians India.* 1999;47:589-95.
10. Kim SH, Lee KA, Jin HY, Baek HS, Park TS: The relationship between anemia and the initiation of dialysis in patients with type 2 diabetic nephropathy. *Diabetes Metab J.* 2015, 39:240-6. 10.4093/dmj.2015.39.3.240
11. Asadujjaman M, Kashem A, Chowdhury AA, et al.: Prevalence of microalbuminuria and overt proteinuria in diabetes mellitus and their association with renal function. *Mymensingh Med J.* 2018, 27:467-74.
12. Schmitz A, Vaeth M. Microalbuminuria: a major risk factor in non-insulin-dependent diabetes. A 10-year follow-up study of 503 patients. *Diabet Med.* 1988;5:126 – 134.
13. Valmadrid CT, Klein R, Moss SE, et al. The risk of cardiovascular disease mortality associated with microalbuminuria and gross proteinuria in persons with older-onset diabetes mellitus. *Arch Intern Med.* 2000;160:1093 – 1100.
14. Gerstein HC, Mann JF, Yi Q, et al. Albuminuria and risk of cardiovascular events, death, and heart failure in diabetic and nondiabetic individuals. *JAMA.* 2001;286:421 – 426.