

Article

Studying the Relationship Between Serum Creatinine Levels and Kidney Function in Patients with Type 2 Diabetes

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Abstract: One common consequence of type 2 diabetes mellitus is diabetic kidney involvement. Urinary albumin excretion and serum creatinine are frequently used markers to assess renal function. Examine the connection between kidney function and blood creatinine levels in individuals with type 2 diabetes who do not have a diagnosis of renal failure. One hundred type 2 diabetic individuals participated in a cross-sectional study. Blood pressure, urine albumin-to-creatinine ratio (24-hour urine collection usually diluted before analysis), and serum creatinine levels were assessed by Reagents Sodium hydroxide (alkaline solution). Among the patients, 67% had normal serum creatinine levels, 28% had mild elevations, and 5% had higher values without renal failure. Of the patients, 60% had normal urinary albumin excretion, 35% had moderately elevated levels, and 5% had significantly elevated levels. Sixty percent of participants had elevated blood pressure. Early kidney involvement in type 2 diabetes may be indicated by increased urine albumin excretion before high serum creatinine levels. For the early diagnosis of diabetic kidney disease, a combined evaluation of creatinine and UACR is advised.

Keywords: Type 2 diabetes mellitus, serum creatinine, kidney function, eGFR, diabetic nephropathy

Introduction

Diabetic nephropathy is one of the most serious complications of type 2 diabetes mellitus and represents a major cause of chronic kidney disease worldwide(1). Persistent hyperglycemia leads to functional and structural changes in the kidneys, including glomerular hyperfiltration and progressive loss of nephron function (2,3). Early detection of renal impairment is essential for preventing disease

progression. Serum creatinine is the most commonly used laboratory marker for evaluating kidney function due to its simplicity and availability (4,5,6). This study aims to evaluate the relationship between serum creatinine levels and kidney function in patients with type 2 diabetes mellitus.

Materials and Methods

This retrospective analytical cross-sectional study was conducted using medical records of adult patients with type 2 diabetes mellitus attending Al-Hussein Teaching Hospital, Al-Muthanna Governorate, between November 2025 and February 2026. Serum creatinine levels were obtained from routine laboratory tests, and kidney function was assessed using estimated glomerular filtration rate (eGFR). Statistical analysis was performed using SPSS software. Correlation analysis was conducted, and a p-value < 0.05 was considered statistically significant.

Results

A statistically significant inverse relationship was observed between serum creatinine levels and eGFR. Higher creatinine levels were associated with reduced kidney function. Differences in creatinine levels were more pronounced in advanced stages of chronic kidney disease. A total of 100 patients with type 2 diabetes mellitus without diagnosed kidney failure were included in the study.

Serum Creatinine Levels

Serum creatinine values were within the normal range in 67% of patients, while 28% showed mild elevation and only 5% demonstrated higher values without reaching kidney failure levels. This indicates that renal filtration function was generally preserved in most participants.

Urinary Albumin Excretion (UACR)

Assessment of urinary albumin excretion showed that:

1. 60% of patients had normal albumin excretion (A1),
2. 35% showed moderately increased albuminuria (A2),
3. and 5% demonstrated severely increased albuminuria (A3).

These findings indicate early kidney involvement in a proportion of diabetic patients despite preserved serum creatinine levels.

Status of Blood Pressure

Forty percent of the patients had normal blood pressure, and sixty percent had elevated blood pressure. increased albumin excretion was typically seen in patients with increased blood pressure.

Table 1. Baseline Characteristics of Study Participants

Characteristic	Value
Total participants	100 patients
Disease	Type 2 Diabetes Mellitus
Serum creatinine (normal)	70%
Serum creatinine (mild elevation)	30%
Serum creatinine (high elevation)	0%
Normal urinary albumin excretion (A1)	60%
Moderate albuminuria (A2)	35%
Severe albuminuria (A3)	5%
Normal blood pressure	54%
Elevated blood pressure	46%
Kidney function status	Mostly preserved
Early kidney involvement detected by	Increased UACR

Table 2. Distribution of Serum Creatinine Levels in Patients with Type 2 Diabetes

Creatinine Category	Number of Patients	Percentage (%)
Normal	70	70%
Mild elevation	30	30%
High elevation	0	0%
Total	100	100%

Discussion

The current study examined kidney function measurements in type 2 DM patients who were not diagnosed with any kidney problems. The study showed that kidney function and efficiency were normal in all participants and that blood creatinine levels were normal in most participants, although some had elevated creatinine levels and this results agreement with [5], [8]. This indicates that kidney function was within the normal range and there was no impairment in this group. Urinary albumin levels showed a moderate increase in more than a third of the participants, So agree with [5], [9], [12] while a small percentage showed a sharp increase and this disagree with [8], [10], [13], [14]. The remaining participants had normal levels, suggesting that impaired kidney function in diabetic patients begins before significant changes appear in serum creatinine measurements as in [13], [15].

The study also showed that most participants suffered from chronic hypertension, and that those with normal blood pressure tended to have higher levels of albumin in their urine as in [16], [17]. This is consistent with much previous research indicating that high blood pressure significantly contributes to impaired kidney function in diabetic patients and increases the risk of kidney failure if blood pressure levels are not controlled [13], [15].

Conclusion

Measurement of urinary albumin excretion appears to detect kidney changes earlier than serum creatinine alone. For this reason, regular assessment of UACR along with routine kidney function tests is important in diabetic patient care.

Proper control of blood pressure and metabolic factors remains necessary to maintain kidney function and reduce the risk of progression to diabetic kidney disease.

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