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DISORDERS OF EXCRETORY FUNCTION IN DIABETES MELLITUS IN PATIENTS AGED 40–50 YEARS

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Abstract

Diabetes mellitus is one of the most common chronic diseases, associated with multiple complications, including urinary tract dysfunction. This paper examines the characteristics of kidney damage and changes in urine formation in patients aged 40–50 years. Based on a study of 110 patients, the key clinical and physiological patterns of urinary tract dysfunction were identified, including microalbuminuria, decreased glomerular filtration, and electrolyte imbalances. The findings highlight the need for early diagnosis and correction of these disorders.

Keywords: diabetes mellitus, urinary tract, nephropathy, kidneys, microalbuminuria, glomerular filtration, water-salt balance.

Introduction

Diabetes mellitus is a serious medical and social problem today, characterized by chronic hyperglycemia and metabolic disorders. One of the most significant complications is diabetic nephropathy, which leads to impaired renal function and excretion.

In middle-aged patients (40–50 years old), these changes are particularly relevant, as this is the period during which complications often manifest. Impaired filtration, reabsorption, and secretion processes in the nephron lead to changes in urine composition and disruption of the body's homeostasis.

Study Objective

To study the characteristics of excretory dysfunction in patients aged 40–50 years with diabetes mellitus.

Materials and Methods of the study (110 Patients)

The study was conducted as a clinical and laboratory observation to assess the excretory system in patients with diabetes mellitus. The study included 110 patients aged 40 to 50 years with a confirmed diagnosis of type 1 and type 2 diabetes mellitus, who were receiving outpatient and inpatient treatment.

The study included men and women with varying disease durations. Patients were divided into groups based on the duration of their diabetes: those with a disease duration of up to five years, five to ten years, and more than ten years.

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The study included patients with a confirmed diagnosis of diabetes mellitus and a stable course of the disease. Patients with non-diabetic chronic kidney disease, acute infectious processes, oncological diseases, and patients taking nephrotoxic medications were excluded.

The study methodology included collecting anamnesis data, including the duration of the disease, the specifics of the treatment, and the presence of comorbidities. A clinical examination of the patients was conducted, including blood pressure measurements and a general assessment.

Laboratory tests were used to assess urinary function. All patients underwent a general urine analysis to determine protein, glucose, and other parameters. Microalbuminuria levels were determined as an early marker of kidney damage. A blood chemistry panel measured creatinine, urea, glucose, and electrolytes, including sodium and potassium.

Renal function was assessed by calculating the glomerular filtration rate based on blood creatinine levels. An ultrasound examination of the kidneys was also performed to assess their structure and identify possible morphological changes.

Additional parameters, including glycated hemoglobin levels and daily urine output, were also taken into account, allowing for a more complete assessment of the degree of diabetes compensation and the severity of urinary dysfunction.

The data obtained were statistically processed using standard analysis methods, including determining mean values and assessing the significance of differences between groups.

The study was conducted in compliance with ethical standards, and all patients provided voluntary informed consent.

Methods

- Urinalysis
- Microalbuminuria level determination
- Blood chemistry analysis (creatinine, urea)
- Glomerular filtration rate (GFR) calculation
- Kidney ultrasound
- Statistical data processing

Results of the study

A study of patients aged 40–50 years with diabetes revealed significant changes in excretory parameters, the severity of which depended on the duration of the disease and the level of metabolic control.

A general health analysis revealed that a significant proportion of patients exhibited clinical signs of water-salt metabolism disturbances, including moderate peripheral edema and fluctuations in blood pressure. These manifestations were significantly more common in patients with a disease duration of more than 10 years.

Urine analysis revealed progressive changes in urine composition. Most patients exhibited microalbuminuria, an early sign of kidney damage. With increasing diabetes duration, albuminuria increased, leading to proteinuria. Some patients also exhibited a decrease in the specific gravity of urine, indicating impaired renal concentrating function. Blood biochemistry analysis revealed elevated creatinine and urea levels in a significant proportion of those examined, particularly in the group with a disease duration of more than 10 years. These changes indicated a decrease in the kidneys' filtration capacity. Electrolyte imbalances, manifested by changes in sodium and potassium levels in the blood, were also detected.

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Glomerular filtration rate (GFR) calculations revealed a decrease in more than half of the patients. Those with long-standing diabetes mellitus were more likely to have moderate and severe stages of kidney function decline. Those with a short disease duration often had values within the normal range or with minor deviations.

Renal ultrasound examination revealed structural changes in some patients, including enlarged or reduced kidney size, as well as increased parenchymal echogenicity, indicating the development of nephropathy.

Additional analysis revealed a direct correlation between glycated hemoglobin levels and the severity of excretory dysfunction. In patients with poor glycemic control, kidney changes were more pronounced and progressed more rapidly.

It was also established that the combination of diabetes mellitus and hypertension significantly worsens renal dysfunction and accelerates the development of nephropathy.

Thus, the study results demonstrated that in patients aged 40–50 years with diabetes mellitus, excretory dysfunction is widespread and progressive. The main manifestations are microalbuminuria, decreased glomerular filtration rate, changes in blood biochemistry, and fluid-salt imbalance. The severity of these changes is directly related to the duration of the disease and the effectiveness of its management.

Discussion

These findings confirm that diabetes mellitus has a significant impact on the excretory system. The primary pathogenic mechanism is damage to the glomerular apparatus of the kidneys, leading to increased membrane permeability and protein loss in the urine.

A decrease in glomerular filtration rate indicates the progression of chronic renal failure. The disruption of water and salt balance is caused by both altered reabsorption and hormonal imbalances.

These results are consistent with other studies indicating a high prevalence of diabetic nephropathy among middle-aged patients.

Conclusion

A study has shown that in patients aged 40–50 years with diabetes, impaired renal excretory function is a common and clinically significant complication that tends to progress with increasing disease duration. It has been established that even in the early stages of diabetes, initial signs of kidney damage, such as microalbuminuria and a slight decrease in glomerular filtration rate, can be detected.

With increasing disease duration, pathological changes worsen, including the development of significant proteinuria, decreased renal filtration capacity, and disturbances in water, salt, and electrolyte balance. These changes indicate the development of diabetic nephropathy and increase the risk of chronic renal failure.

A clear correlation was found between the level of glycemic control and the severity of excretory system damage. In patients with elevated glycated hemoglobin levels, renal impairment was more severe and progressed more rapidly. Arterial hypertension, which increases renal tissue damage and accelerates the progression of nephropathy, is an additional aggravating factor.

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The study results highlight the importance of regular monitoring of renal function in patients with diabetes, especially those aged 40–50 years. Early diagnosis (including determination of microalbuminuria and calculation of glomerular filtration rate) enables the detection of pathological changes at a preclinical stage and prompt initiation of therapeutic measures.

Thus, a comprehensive approach to patient management, including monitoring blood glucose levels, blood pressure, and renal function, is a key factor in preventing and slowing the progression of excretory system disorders. This helps reduce the risk of severe complications and improve the quality of life of patients with diabetes.

References

1. Иванов В.В. Физиология почек. — М.: Медицина, 2020.
2. Петрова А.С. Сахарный диабет и его осложнения. — СПб., 2021.
3. American Diabetes Association. Standards of Medical Care in Diabetes, 2023.
4. Brenner B.M. The Kidney. — Elsevier, 2024.
5. WHO. Global report on diabetes, 2022.
6. Смирнов Н.Н. Клиническая нефрология. — М., 2023.