HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

PATHOMORPHOLOGICAL CHANGES IN THE KIDNEYS IN DIABETES MELLITUS

Tashkent State Medical University (TSMU)
Faculty of Medicine, 3rd Year
Makhamadaliyeva Shakhzodakhon Khislatkhon Kizi
Kodiriy Khabiba Murod Kizi
Scientific Supervisor: **Farhod Ruziyev Kurbanovich**
doi:https://doi.org/10.5281/zenodo.23006737

ABSTRACT: This article examines the main pathomorphological changes in the kidneys associated with diabetes mellitus, the mechanisms of their development, and the progression of diabetic nephropathy. Particular attention is paid to damage to the glomerular apparatus, renal tubules, and vascular system. The role of chronic hyperglycemia in the development of glomerulosclerosis, interstitial fibrosis, and chronic renal failure is discussed.

Keywords: diabetes mellitus, diabetic nephropathy, pathomorphology, hyperglycemia, glomerulosclerosis, microangiopathy, renal failure.

Diabetes mellitus is one of the most common chronic diseases of the endocrine system. One of its serious complications is diabetic nephropathy, which is accompanied by progressive damage to renal tissue and impairment of kidney function. Prolonged elevation of blood glucose levels leads to metabolic and hemodynamic disturbances that cause structural changes in the glomeruli, tubules, and blood vessels of the kidneys. Studying the pathomorphological features of this complication is of great importance for early diagnosis, assessment of disease severity, and prevention of chronic renal failure.

To investigate the main pathomorphological changes in the kidneys associated with diabetes mellitus, identify the mechanisms of their development, and establish the relationship between structural abnormalities of renal tissue and the progression of diabetic nephropathy.The study is based on an analysis of national and international scientific literature devoted to diabetic nephropathy. The results of histological, electron microscopic, and clinicopathological studies were reviewed. Particular attention was paid to changes in the glomerular apparatus, basement membranes, mesangial matrix, renal tubules, and vascular system.

The main pathogenetic factor in the development of diabetic nephropathy is chronic hyperglycemia. Elevated glucose concentrations contribute to the accumulation of advanced glycation end products, the development of oxidative stress, and damage to endothelial cells. As a result, microcirculation is impaired, the permeability of glomerular capillaries increases, and sclerotic processes in renal tissue are activated.

In the early stages of the disease, enlargement of the glomeruli, thickening of the glomerular basement membrane, and expansion of the mesangial matrix are observed. These changes gradually lead to impaired renal filtration. With prolonged diabetes mellitus, diffuse glomerulosclerosis develops, characterized by the accumulation of extracellular matrix and narrowing of the capillary lumens.

In addition to glomerular damage, changes in the renal tubules are observed. These include thickening of the basement membranes, degeneration, and atrophy of the tubular epithelium. Interstitial fibrosis gradually develops, accompanied by the replacement of functionally active tissue with connective tissue.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Vascular abnormalities play an important role in the pathomorphology of diabetic nephropathy. The most characteristic manifestation is hyalinosis of the afferent and efferent arterioles. Thickening of the vascular walls leads to narrowing of their lumens, impaired blood supply, and the development of ischemic changes in the renal parenchyma.

Light and electron microscopy, as well as special histochemical staining methods, are used for morphological diagnosis. Examination of biopsy specimens makes it possible to determine the severity of structural abnormalities and perform differential diagnosis with other kidney diseases. However, kidney biopsy is primarily performed in cases of an atypical disease course or when concomitant renal pathology is suspected.

Pathomorphological changes in the kidneys associated with diabetes mellitus are characterized by complex damage to the glomeruli, tubules, interstitial tissue, and vascular system. The main morphological manifestations include thickening of the basement membranes, mesangial expansion, diffuse and nodular glomerulosclerosis, tubular atrophy, and interstitial fibrosis.

Prolonged hyperglycemia contributes to the progression of these changes and the gradual decline in kidney function. Timely diagnosis and control of metabolic disturbances are essential for slowing the progression of diabetic nephropathy and preventing chronic renal failure.

REFERENCES

1. Tervaert, T. W., et al. Pathologic classification of diabetic nephropathy. Journal of the American Society of Nephrology. 2010;21:556–563.
2. Fioretto, P., Mauer, M. Histopathology of diabetic nephropathy. Seminars in Nephrology. 2007;27:195–207.
3. Alsaad, K. O., Herzenberg, A. M. Distinguishing diabetic nephropathy from other causes of glomerulosclerosis: An update. Journal of Clinical Pathology. 2007;60:18–26.
4. Alicic, R. Z., et al. Diabetic kidney disease: Challenges, progress, and possibilities. Clinical Journal of the American Society of Nephrology. 2017;12:2032–2045.
5. Thomas, M. C., et al. Diabetic kidney disease. Nature Reviews Disease Primers. 2015;1:15018.
6. American Diabetes Association. Standards of Care in Diabetes—2026. 2026.
7. Kidney Disease: Improving Global Outcomes (KDIGO). KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 2024.