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CLINICAL AND MORPHOLOGICAL CHARACTERISTICS OF DIABETIC NEPHROPATHY

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Relevance. Diabetic nephropathy (DN) also known as diabetic kidney disease is the most common cause of end stage renal disease, making up a large part of patients requiring dialysis and kidney transplantation. In 2021 there were 107.6 million cases of diabetic nephropathy worldwide. DN develops as a complication of diabetes mellitus types 1 and 2. Great importance is attached to the identification of predictive signs in patients with DN. The severity of the disease and prognosis are based on both clinical (proteinuria) and morphological changes in the kidney tissue, the latter are reflected in the Tervaert's classification, also known as renal pathology society classification in which designates 4 classes based on glomerular lesions.

Aim: the aim of this study is to characterize morphological changes in the kidneys in DN patients according to the Tervaert's classification.

Materials and methods. This research is based on 13 kidney biopsy reports of 2 (15.4%) females and 11 (84.6%) males. The morphological study focused on evaluating glomerular parameters such as mesangial proliferation, nodular and global glomerulosclerosis, interstitial fibrosis, and vascular changes. Hematoxylin & Eosin, PAS, Masson trichrome, Congo red, Jones silver stains were used for light microscopy evaluation. Immunofluorescent (IF) staining for IgG, IgA, IgM, C3c, C1q, fibrinogen, k, and λ light chains was performed on frozen sections of all the cases. We assigned classes to each patient based on the histopathological changes observed in line with the Tervaert's classification. We have also analyzed laboratory test results such as general urine test, biochemical and general blood tests.

Results and their discussion. The patient's median age is 60 ± 10.5 years (ranged 33 – 76 years). According to the Tervaert's classification there were no cases according class I corresponds to cases where no specific widening of the mesangium under light microscopy. Class II is subdivided into two subclasses in relation to percentage of area involving glomerular expansion with the cut-off at 25%: we have 3 (23.1%) patients with class IIa and 1 (7.7%) with class IIb. Class III was assigned in 9 (69.2%) cases when at least one Kimmelstiel-Wilson nodule was observed. Kimmelstiel-Wilson syndrome features include the nephrotic syndrome with excessive filtration of protein into the urine, hypertension, and progressively impaired kidney function. The syndrome also characterized by the formation of pathognomonic hyaline nodules in the glomerular mesangium and significant diffuse thickening of the glomerular basement membrane. These changes are accompanied by hyalinosis of both afferent and efferent arterioles. And finally, class IV is assigned when more than half of glomeruli are globally sclerosed (no cases). The IFTA (interstitial fibrosis / tubular atrophy) scores reflects the degree of chronic changes in kidney tissue. There were 5 (38.5%) cases with a score of 1; 6 (46.2%) patients had a score of 2 and 2 (15.4%) – had a score of 3. Interstitial inflammation in 7 (58.8%) patients was moderate and in 5 (38.5%) – mild. 10 patients had moderate and 2 (15.4%) had mild arteriolo-hyalinosis, 4 (30.8%) patients had moderate and 6 (46.2%) had mild arteriosclerosis.

According to the urine test, 10 (76.9%) patients had haematuria, 5 (38.5%) had glucosuria, 7 (58.8%) had leukocytes and 10 (76.9%) had proteinuria. According to their blood test, 7 (58.8%) had elevated ESR, 8 (61.5%) had anemia.

Conclusions. DN class III (69.2%) is the most frequent in the studied population. These patients demonstrated arterial hypertension, higher proteinuria, and nephrotic syndrome leading to kidney failure, end-stage renal disease, and the need for chronic kidney dialysis or a kidney transplant. The use of kidney biopsy and histological examination can aid in the selection of appropriate treatment and prognosis for DN patients.