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MATHEMATICAL MODELING IN MORPHOLOGICAL DIFFERENTIAL DIAGNOSIS BETWEEN MESANGIOCAPILLARY GLOMERULONEPHRITIS TYPE I AND DIFFUSE LUPUS GLOMERULONEPHRITIS

The study was conducted as the part of research work "Studying the possibility of predicting the course and efficiency of different regimens of pathogenic and symptomatic therapy in patients with nephropathies of different origin on the background of thorough structural and functional assessment of kidneys, cardiovascular system and neurohumoral mechanisms of their regulation" (state registration 0709U008723).

ABSTRACT. Background. Diffuse lupus and mesangiocapillary glomerulonephritises have similar morphological appearance which causes difficulties of their differential diagnostics. **Objective.** To analyze and generalize the data about intravital investigation of renal biopsies of patients with diffuse lupus glomerulonephritis and mesangiocapillary glomerulonephritis type I and identification of their most important morphological features with the help of systematic patomorphological study and statistical methods. **Methods.** 39 renal biopsies of patients with diffuse lupus glomerulonephritis and 43 of biopsies of patients with mesangiocapillary glomerulonephritis were studied. Polyclonal antibodies to IgA, IgG, IgM, complement fraction C1q, C3, monoclonal antibodies to CD68, CD3, CD20, CD45, α -SMA, vimentin, desmin and polyclonal antibodies to cytokeratin (AE1/AE3 та CK18) were used. Analysis of biopsies stained with histochemical methods was conducted with the help of development of neuronetwork models. **Results.** It was revealed a number of morphological findings that play the most important role in the cases of complicated differential diagnosis between mesangiocapillary type I and diffuse lupus glomerulonephritises, such as the following: deposition of IgM in stroma, subepithelial and subendothelial deposition of complement C3 fraction, deposition of complement C3 within cylinders, deposition of complement C1q fractions inside the tubular basal membrane at the focuses with sclerosis. **Conclusion.** Immunohistochemical analysis with the method of neuronetwork mathematical modeling helped to reveal the most important factor evidences for differential diagnostics of glomerulonephritis.

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References:

1. Tareyeva IYe, editor. Nefrologiya [Nephrology]: guideline for medical practitioners. 2nd ed, rev. and enl. Moscow: Meditsina; 2000. p. 228-31. Russian.
2. Diadyk AI. [Systemic and organ lesions in SLE]. Pt 6: [Kidneys]. Donetsk, Ukraine: KP Region; 2003. p.210-68. Russian. ([Diadyk AI, Kolesnyk NA, Vasilenko IV, et al. [Systemic lupus erythematosus]).
3. Striker G, Striker LJ, D`Agati VD. The Renal Biopsy. 3rd ed. Philadelphia, London: WB Saunders; 1997. 306 p. (Major Problems in Pathology; vol. 8)
4. Walker PD. The renal biopsy. Arch Pathol Lab Med. 2009 Feb;133(2):181-8. doi: 10.1043/1543-2165-133.2.181. Cited in: PubMed; PMID: 19195962.
5. Dyadyk OO, Vasylenko IV, Shatokhina TV, Ivanova MD, Khmara OV. [Possibilities of using modern methods of morphological diagnostics of vital research of kidneys of patients with various forms of glomerulonephritis]. Achievements of Clinical and Experimental Medicine. 2009; (1): 45-8. Ukrainian.
6. Liakh YuYe, Guryanov VG. [Mathematical modeling for solving classification problems in biomedicine]. Ukr z teled med telemat [Ukrainian Journal of Telemedicine and Medical Telematics]. 2012; 10 (2): 69-76. Russian.