

## Use of Ophthalmological Diagnostic Methods to Assess the Severity of Glomerulonephritis

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**Annotation:** The study established a significant correlation between the severity of ophthalmological disorders and renal function indicators, which allows using these methods for a comprehensive assessment of the severity of the disease.

**Keywords:** glomerulonephritis, angiography, OCT, microangiopathy, diagnostics, renal failure.

**Introduction:** Glomerulonephritis is a heterogeneous group of diseases characterized by inflammation of the glomerular apparatus of the kidneys. Against the background of systemic inflammatory and immune processes, patients with GN often develop generalized vascular disorders, including lesions of the vessels of the retina and optic nerve. Modern ophthalmological methods, such as optical coherence tomography (OCT) and fluorescein angiography (FA), allow detection of subclinical changes in retinal vessels and provide objective visualization of systemic vasculopathy. The aim of this study was to evaluate the possibility of using ophthalmological methods for stratification of the severity of glomerulonephritis.

**Materials and methods:** The study included 30 patients (17 men and 13 women) aged 18 to 55 years (mean age  $34.6 \pm 8.1$  years) with a morphologically verified diagnosis of active diffuse glomerulonephritis. The diagnostic algorithm included: ophthalmoscopy and OCT (Heidelberg Spectralis); fluorescein angiography; determination of creatinine levels, SCF (according to the CKD-EPI formula), daily proteinuria. Patients were divided into 2 groups: Group I (n = 15): SCF  $\geq 60$  ml / min /  $1.73$  m<sup>2</sup>; Group II (n = 15): SCF  $< 60$  ml / min /  $1.73$  m<sup>2</sup>. A correlation analysis was performed between ophthalmological changes and laboratory markers of renal function. Results: Of the 30 patients: 83% (n=25) had signs of ischemic changes in the retinal vessels; 60% (n=18) — microaneurysms and perivascular hemorrhages; 43% (n=13) — macular edema according to OCT, of which 77% were asymptomatic; 27% (n=8) — hyperfluorescence of the optic nerve head on FAG. Correlation analysis showed: a strong inverse relationship between the severity of vascular changes and SCF ( $r = -0.64$ ;  $p < 0.01$ ); a positive correlation between the severity of microangiopathy and the level of proteinuria ( $r = 0.52$ ;  $p < 0.05$ ); a significant association between the thickness of the nerve fiber layer according to OCT and the duration of

the disease ( $r = -0.47$ ;  $p < 0.05$ ). Discussion: The obtained results confirm that ophthalmological methods, in particular OCT and FAG, reflect the degree of systemic vascular damage accompanying glomerulonephritis. It is especially important that such methods allow to identify subclinical changes, including ischemia, macular edema and disk hyperfluorescence, which are not always symptomatic. A decrease in SCF and an increase in proteinuria are accompanied by pronounced changes in retinal microcirculation, which confirms the concept of the systemic nature of vascular inflammation in GN.

Thus, ophthalmological studies can be used as additional, non-invasive markers in stratifying the risk of progression of renal pathology. Their regular implementation contributes to timely correction of therapy and can prevent the development of terminal renal failure.

**Conclusion:** The integration of ophthalmological methods into the comprehensive diagnosis of patients with glomerulonephritis allows:

to identify early signs of systemic vasculopathy; monitor the dynamics of the disease in a non-invasive format;

predict the risks of decreased renal function.

The use of OCT and FAG as an addition to standard nephrological examinations can improve the accuracy of assessing the severity of the patient's condition and improve treatment outcomes.

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