

IMPROVEMENT OF DIAGNOSTIC AND TREATMENT METHODS FOR DIABETIC RETINOPATHY

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Abstract. Diabetic retinopathy is one of the most common microvascular complications of diabetes mellitus and a major cause of visual impairment worldwide. The study aimed to improve the effectiveness of diagnosis and treatment of diabetic retinopathy through optimization of early detection algorithms and selection of appropriate therapeutic strategies. A total of 60 patients with diabetic retinopathy treated at the Regional Hospital of Eye Diseases in Andijan were examined using ophthalmoscopy and optical coherence tomography (OCT). Comparative analysis of laser photocoagulation and surgical interventions demonstrated that early diagnosis combined with individualized treatment significantly reduced disease progression and improved visual outcomes. The combined use of modern diagnostic methods allows earlier identification of retinal changes and contributes to better management of diabetic retinopathy.

Keywords: Diabetic retinopathy; diabetes mellitus; ophthalmoscopy; optical coherence tomography; laser photocoagulation; retinal pathology; early diagnosis; surgical treatment.

Introduction. Diabetic retinopathy (DR) is one of the leading microvascular complications of diabetes mellitus and remains a major cause of visual impairment and blindness among the working-age population worldwide. [1] The increasing prevalence of diabetes mellitus has led to a significant rise in the incidence of retinal complications, particularly among patients with prolonged disease duration and poor glycemic control. [2] Early diagnosis and timely treatment of diabetic retinopathy are essential for preventing irreversible retinal damage and preserving visual function. Modern ophthalmological technologies, including ophthalmoscopy and optical coherence tomography (OCT), allow the detection of retinal alterations at early stages before severe visual loss develops. [3] Despite advances in therapeutic approaches, the optimization of diagnostic algorithms and treatment strategies remains an actual issue in clinical ophthalmology.

The aim of the study was to improve the effectiveness of diagnosis and treatment of diabetic retinopathy by optimizing the algorithm of early detection, selecting optimal therapeutic tactics, and preventing disease progression.

Materials and methods. The study was conducted among 60 patients diagnosed with diabetic retinopathy who were treated at the Regional Hospital of Eye Diseases in Andijan. Patients underwent comprehensive ophthalmological examination including visual acuity assessment, ophthalmoscopy, and optical coherence tomography (OCT). The diagnostic evaluation focused on identifying early and progressive stages of diabetic retinopathy based on retinal vascular changes, macular edema, microaneurysms, hemorrhages, and retinal thickness parameters. Patients were divided according to the severity of diabetic retinopathy and the selected treatment modality. Comparative analysis of the effectiveness of the main treatment methods, including laser photocoagulation and surgical interventions, was performed. Clinical outcomes

were assessed according to stabilization of retinal pathology, reduction of macular edema, and improvement or preservation of visual acuity. Statistical analysis was carried out using standard biomedical research methods.

Results and discussion. The study demonstrated that the combined use of ophthalmoscopy and OCT significantly increased the accuracy of early diagnosis of diabetic retinopathy. OCT examination enabled the identification of subclinical retinal edema and structural retinal changes that were not always visible during routine ophthalmoscopy. Early stages of diabetic retinopathy were characterized by isolated microaneurysms and mild retinal thickening, whereas progressive stages showed pronounced vascular abnormalities, hemorrhages, exudates, and macular edema. Comparative analysis of treatment methods revealed that laser photocoagulation was effective in stabilizing non-proliferative diabetic retinopathy and reducing the risk of disease progression. Surgical interventions demonstrated higher effectiveness in advanced proliferative stages complicated by vitreous hemorrhage or tractional retinal detachment. Patients receiving timely combined diagnostic evaluation and individualized treatment showed better visual outcomes and slower progression of retinal pathology. The implementation of an improved diagnostic algorithm contributed to earlier detection of pathological retinal changes and facilitated the selection of optimal therapeutic tactics for each patient.

Conclusion. The results of the study confirm that early diagnosis of diabetic retinopathy using ophthalmoscopy combined with OCT improves the detection of retinal pathological changes at initial stages of the disease. Comparative evaluation of treatment methods demonstrated the effectiveness of laser photocoagulation in early and moderate stages and the importance of surgical interventions in advanced forms of diabetic retinopathy. The proposed diagnostic and therapeutic approach increases the effectiveness of clinical management of diabetic retinopathy, contributes to the prevention of disease progression, and improves visual prognosis in patients with diabetes mellitus. Further studies involving larger patient populations are recommended to optimize personalized treatment strategies and improve long-term outcomes.

References:

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