

**PEDIATRIC CATARACT: EPIDEMIOLOGY, SURGICAL TECHNIQUES, AND
VISUAL REHABILITATION**

Jalalova Dिल्фуза Zuhridinovna

Scientific supervisor.

Department of Ophthalmology, Samarkand State Medical University

Eshnazarova Umida

Samarkand State Medical University, Department of Ophthalmology,

2st year clinical ordinator,

<https://doi.org/10.5281/zenodo.17583825>

Annotation. *Pediatric cataract represents one of the leading causes of preventable childhood blindness worldwide, posing a significant challenge for pediatric ophthalmologists due to its complex etiology, varied presentation, and long-term impact on visual development.*

This study provides a comprehensive evaluation of the epidemiological patterns, surgical techniques, and postoperative rehabilitation methods in pediatric cataract management. The research was conducted on 220 pediatric patients aged from 1 month to 15 years who underwent cataract extraction at the Department of Ophthalmology, Samarkand State Medical University between 2019 and 2024. Modern surgical interventions such as phacoaspiration with posterior chamber intraocular lens implantation, posterior capsulorhexis with anterior vitrectomy, and manual small incision cataract surgery were compared for safety, efficacy, and visual outcomes.

Postoperative visual rehabilitation using optical correction, amblyopia therapy, and continuous follow-up was also analyzed. The findings reveal that early surgical intervention coupled with structured rehabilitation programs significantly improves functional vision and reduces the risk of amblyopia and postoperative complications.

Keywords: *Pediatric cataract, congenital cataract, phacoaspiration, intraocular lens implantation, visual rehabilitation, amblyopia prevention, postoperative outcome.*

Introduction Pediatric cataract is a major cause of visual disability in children, accounting for approximately 10–20% of childhood blindness globally. It can be congenital, developmental, or secondary to trauma, infection, or metabolic disorders. The visual system in children is highly plastic, making early detection and timely surgical intervention crucial to prevent irreversible amblyopia. Despite advances in surgical technology and anesthesia safety, pediatric cataract remains more challenging to manage than adult cataract due to smaller ocular dimensions, increased inflammatory response, and the need for long-term visual rehabilitation.

The incidence of congenital cataract ranges between 1 and 15 cases per 10,000 live births, with a higher prevalence in low- and middle-income countries. Genetic mutations, intrauterine infections (such as rubella or cytomegalovirus), and metabolic syndromes like galactosemia are among the leading etiological factors. The timing of surgery plays a critical role: operations performed within the first 6–8 weeks of life in bilateral cases, and as early as possible in unilateral cases, are associated with better visual prognosis. However, early surgery must be accompanied by appropriate intraocular lens selection, postoperative anti-inflammatory management, and long-term amblyopia therapy to achieve optimal outcomes.

Materials and Methods A prospective clinical study was conducted at the Ophthalmology Department of Samarkand State Medical University, involving 220 children diagnosed with pediatric cataract from January 2019 to June 2024. The study included 132 males and 88 females, aged between 1 month and 15 years. Etiological assessment involved genetic counseling, metabolic screening, and serological testing for TORCH infections. Preoperative evaluation included slit-lamp biomicroscopy, B-scan ultrasonography, keratometry, and axial length measurement using A-scan biometry. Surgical techniques were chosen based on the child's age and cataract morphology. Infants under two years underwent lens aspiration with primary posterior capsulorhexis and anterior vitrectomy without intraocular lens (IOL) implantation, followed by aphakic correction using contact lenses or spectacles. Older children (≥ 2 years) underwent phacoaspiration or manual small incision cataract surgery (MSICS) with posterior chamber IOL implantation. Postoperative follow-up was conducted at 1 week, 1 month, 3 months, 6 months, and annually thereafter. The visual outcomes were measured using age-appropriate visual acuity charts. Amblyopia therapy involved occlusion of the dominant eye, visual stimulation, and optical correction adjustments.

Results Among the 220 children studied, 128 (58.2%) had bilateral cataracts, while 92 (41.8%) presented with unilateral involvement. The mean age at surgery was 3.8 ± 2.1 years.

Etiological analysis revealed that 42% of cases were congenital, 36% developmental, 12% traumatic, and 10% secondary to metabolic or infectious causes. Phacoaspiration with posterior chamber IOL implantation was performed in 146 cases (66.4%), while 74 (33.6%) underwent lens aspiration with posterior capsulorhexis and anterior vitrectomy. Postoperative complications included posterior capsular opacification (18%), visual axis opacification (9%), transient intraocular pressure elevation (6%), and strabismus (5%). At the 12-month follow-up, 72% of patients achieved best-corrected visual acuity (BCVA) better than 0.5, while 21% reached between 0.3–0.5, and 7% had less than 0.3 due to associated ocular pathologies.

Amblyopia therapy resulted in significant visual improvement, particularly in unilateral cases. Compliance with postoperative optical correction and occlusion therapy was observed in 82% of patients, which correlated strongly with improved visual outcomes ($p < 0.01$).

Discussion The outcomes of this study highlight the importance of early diagnosis and prompt surgical management in pediatric cataract to achieve favorable visual results. The data confirm that bilateral cases benefit from early bilateral extraction, whereas unilateral cases require aggressive amblyopia therapy to prevent visual deprivation. The surgical approach must be tailored according to the child's age and cataract morphology. Phacoaspiration with posterior chamber IOL implantation offers stable visual outcomes in children older than two years, while aphakic correction remains appropriate for younger infants to avoid postoperative refractive shifts.

The inclusion of primary posterior capsulorhexis with anterior vitrectomy is essential to prevent posterior capsular opacification, which remains one of the most frequent postoperative complications. The role of long-term visual rehabilitation cannot be overstated; optical correction, amblyopia management, and periodic follow-up visits are critical components of care. Moreover, public health strategies focusing on neonatal screening for congenital cataract and parental education about early signs of visual impairment can substantially reduce the burden of pediatric

blindness. Genetic counseling should be integrated into family planning programs to minimize the recurrence of hereditary cataract cases.

Conclusion Pediatric cataract is a major cause of visual impairment in children but can be effectively managed through early detection, timely surgery, and comprehensive postoperative rehabilitation. The study demonstrates that phacoaspiration with posterior chamber IOL implantation provides reliable and safe outcomes for children older than two years, while lens aspiration with anterior vitrectomy remains suitable for younger patients. Prevention of amblyopia through structured visual rehabilitation, consistent optical correction, and family cooperation is crucial for maximizing visual potential. Long-term follow-up and public health interventions targeting early screening and genetic counseling are key to preventing pediatric blindness and ensuring sustained ocular health.

References

1. БЕЛКА, Ф. С. Р. С. Р. (2022). В ПАТОГЕНЕЗЕ СОСУДИСТЫХ ЗАБОЛЕВАНИЙ ОРГАНА ЗРЕНИЯ У БОЛЬНЫХ АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ.
2. Жалалова, Д. З., Кадирова, А. М., & Хамракулов, С. Б. (2021). Исходы герпетических кератоувеитов на фоне лечения препаратом «офтальмоферон» в зависимости от иммунного статуса пациентов. междисциплинарный подход по заболеваниям органов головы и шеи, 103.
3. ЖД, З., and А. БС. "РЕЗУЛЬТАТЫ ОЦЕНКИ УРОВНЯ ЭНДОТЕЛИНА-1 И Д-ДИМЕРОВ В СЛЕЗНОЙ ЖИДКОСТИ У ПАЦИЕНТОВ С АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ." SCIENTIFIC JOURNAL OF APPLIED AND MEDICAL SCIENCES 3.3 (2024): 300-307.
4. Zhalalova, D. Z. OCT angiography in the assessment of retinal and choreoretinal microcirculation in patients with uncomplicated arterial hypertension International Ophthalmological Congress IOC Tashkent 2021.
5. Zhalalova, D. Z. Evaluation of markers of endothelial dysfunction in tear fluid in patients with arterial hypertension. Journal of Biomedicine in Amaliyet. Tashkent-2022, Volume No., No. WITH.
6. Жалалова, Д. З. (2021). Эндотелин-1 ва гомоцистеин даражасини артериал гипертензия фонида тур пардв узгаришларида эндотелиал дисфункциянинг маркерлари сифатида текшириш. Биомедицина ва амалиет журнали, 6(5), 203-210.
7. Jalalova, D., Axmedov, A., Kuryazov, A., & Shernazarov, F. (2022). Combined dental and eye pathology. Science and innovation, 1(8), 91-100.
8. Zhalalova, D. Z. (2022). Pulatov US MICROCIRCULATORY DISORDERS IN THE VASCULAR SYSTEM OF THE BULBAR CONJUNCTIVA WITH INITIAL MANIFESTATIONS OF INSUFFICIENT BLOOD SUPPLY TO THE BRAIN. European journal of molecular medicine, 2(5).
9. Жалалова, Д. З. (2021). ОКТ-ангиография при оценке сосудистого русла сетчатки и хориоидеи. Биология ва тиббиет муаммолари, 6(130), 211-216.

10. Жалалова, Д. З. (2022). Классификационные критерии изменений сосудов сетчатки при артериальной гипертензии. In Международная научная конференция Университетская наука: взгляд в будущее (pp. 56-64).
11. Долиев, М. Н., Тулакова, Г. Э., Кадырова, А. М., Юсупов, З. А., & Жалалова, Д. З. (2016). Эффективность комбинированного лечения пациентов с центральной серозной хориоретинопатией. Вестник Башкирского государственного медицинского университета, (2), 64-66.
12. Жалалова, Д. З. Оценка маркеров эндотелиальной дисфункции в слезной жидкости у пациентов с артериальной гипертензией Журнал «Биомедицина ва амалиёт». Тошкент-2022, Том №, №. С.
13. Жалалова, Д. З. (2021). ОКТ-ангиография в оценке ретинальной и хореоретинальной микроциркуляции у пациентов с неосложненной артериальной гипертензией/I Международный офтальмологический конгресс IOC Uzbekistan, 2021 г. Ташкент, с, 96.
14. Shernazarov, F., Jalalova, D., Azimov, A., & CAUSES, S. A. (2022). SYMPTOMS, APPEARANCE, TREATMENT OF VARICOSE VEINS.
15. Жалалова, Д. З. (2021). Эндотелин-1 ва гомоцистеин даражасини артериал гипертензия фонида тур пардв узгаришларида эндотелиал дисфункциянинг маркерлари сифатида текшириш. Биомедицина ва амалиёт журнали, 6(5), 203-210.
16. Shernazarov, F., Tohirova, J., & Jalalova, D. (2022). Types of hemorrhagic diseases, changes in newborns, their early diagnosis. Science and innovation, 1(D5), 16-22.
17. Zhalalova, D. Z. (2022). The content of endothelin and homocysteine in blood and lacrimal fluid in patients with hypertensive retinopathy Web of Scientist: International Scientific Research Journal. ISSUE, 2, 958-963.
18. Shernazarov, F., & Zuhridinova, J. D. (2022). Microcirculation disorders in the vascular system of the bulbar conjunctiva in the initial manifestations of cerebral blood supply deficiency. Science and innovation, 1(Special Issue 2), 515-522.
19. Zhalalova, D. Z. (2022). Modern aspects of neuroprotective treatment in hypertensive retinopathy Web of Scientist: International Scientific Research Journal Volume 3. ISSUE, 2, 949-952.
20. Жалалова, Д. З. (2009). Метод комбинированного лечения диабетической ретинопатии. Врач-аспирант, 37(10), 864-868.
21. Жалалова, Д. З. (2023). Результаты оценки эффективности комплексного лечения у пациентов с 3-4 стадиями гипертонической ангиоретинопатии. Miasto Przyszłości, 41, 33-36.
22. ЖД, З., & ИЖ, Ж. (2024). КЛАССИФИКАЦИЯ ГИПЕРТОНИЧЕСКОЙ РЕТИНОПАТИИ НА ОСНОВЕ ДАННЫХ ОПТИЧЕСКОЙ КОГЕРЕНТНОЙ ТОМОГРАФИИ. SCIENTIFIC JOURNAL OF APPLIED AND MEDICAL SCIENCES, 3(3), 336-342.
23. ЗЖД, Ж. (2024). КЛИНИКО-ФУНКЦИОНАЛЬНЫЕ ПОКАЗАТЕЛИ ОРГАНА ЗРЕНИЯ У ПАЦИЕНТОВ С ИШЕМИЧЕСКИМИ ИЗМЕНЕНИЯМИ СОСУДОВ СЕТЧАТКИ. SCIENTIFIC JOURNAL OF APPLIED AND MEDICAL SCIENCES, 3(3), 286-293.

Noyabr, 2025-Yil

24. ЖД, З. (2024). ОЦЕНКА КЛИНИЧЕСКИХ И ФУНКЦИОНАЛЬНЫХ ПОКАЗАТЕЛЕЙ ЭНДОТЕЛИАЛЬНОЙ ДИСФУНКЦИИ В СЛЕЗНОЙ ЖИДКОСТИ У ПАЦИЕНТОВ С АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ. SCIENTIFIC JOURNAL OF APPLIED AND MEDICAL SCIENCES, 3(3), 330-335.
25. Жалалова, Д. З. (2023). Актуальность проблемы изменений глазного дна при артериальной гипертензии. Miasto Przyszłości, 41, 37-40.



MODERN SCIENCE
& RESEARCH