AAMS Internal Medicine & Therapeutics
ISSN: 2834-7102 (Print) | eISSN: 2834-7103 (Online)
Volume 07, Issue 06, Pages 46-60
DOI: 10.4103/aams.0498
ORIGINAL ARTICLE

FEATURES OF THE CLINICAL COURSE OF CONGENITAL MYOPIA IN CHILDREN

Saidavzal Abdurakhmanovich Boboev

Candidate of Medical Sciences (PhD), Associate Professor, Department of Ophthalmology, Samarkand State Medical University (SamSMU)

Received: 2026-03-11 · Accepted: 2026-04-30

Abstract

Congenital myopia is a relatively uncommon but clinically significant refractive disorder that is present at birth or develops during the first months of life. Unlike school-age myopia, congenital myopia is frequently associated with abnormalities of ocular growth, structural alterations of the retina and choroid, amblyopia, strabismus, and various developmental disorders. The disease may demonstrate a stable course in some children, while in others it progresses rapidly, resulting in significant visual impairment and increased risk of ocular complications. Early recognition of congenital myopia is essential because timely intervention can improve visual development and reduce the likelihood of long-term disability. The clinical course of congenital myopia is influenced by genetic factors, axial elongation of the eyeball, retinal maturation, accommodative function, and associated ocular abnormalities. Modern diagnostic technologies enable detailed evaluation of refractive status, axial length, retinal integrity, and functional visual outcomes. This study analyzes the clinical characteristics, progression patterns, diagnostic features, and management strategies associated with congenital myopia in children. The findings indicate that regular ophthalmological monitoring, early optical correction, amblyopia therapy, and individualized treatment approaches contribute significantly to maintaining visual function and preventing disease progression.

Keywords: Congenital myopia, childhood myopia, refractive errors, visual development, amblyopia, axial length, retinal changes, pediatric ophthalmology, visual impairment, ocular growth.

1. Introduction

Congenital myopia represents a unique form of refractive error that differs substantially from acquired childhood myopia in terms of etiology, clinical manifestations, progression patterns, and long-term prognosis. The condition is characterized by excessive refractive power of the eye relative to its axial length or, more commonly, abnormal elongation of the ocular globe present from birth. As a result, light rays are focused in front of the retina, leading to blurred distance vision and impaired visual development during critical periods of childhood.

Although congenital myopia accounts for a relatively small proportion of pediatric refractive disorders, its clinical significance is considerable because it frequently affects visual maturation during the earliest stages of life. Visual development depends upon the formation of clear retinal images,

appropriate binocular interaction, and normal neurological maturation of visual pathways. In children with congenital myopia, persistent retinal defocus may interfere with these processes and increase the risk of amblyopia, impaired stereopsis, delayed visual development, and reduced educational performance.

The pathogenesis of congenital myopia is multifactorial and involves genetic predisposition, abnormalities of ocular growth regulation, connective tissue alterations, and developmental disturbances affecting the retina, sclera, and choroid. Numerous studies have identified familial aggregation of congenital myopia, suggesting an important hereditary component. In addition, congenital myopia may occur in association with systemic syndromes, premature birth, connective tissue disorders, and neurological abnormalities.

Clinical manifestations vary considerably depending on the degree of refractive error and the presence of associated ocular pathology. Mild forms may remain relatively stable throughout childhood, whereas high congenital myopia often demonstrates progressive axial elongation and increasing structural changes within the posterior segment of the eye. These changes may include retinal thinning, chorioretinal degeneration, optic disc alterations, vitreoretinal abnormalities, and increased susceptibility to retinal detachment.

Advances in pediatric ophthalmology have improved the ability to diagnose congenital myopia at an early stage and monitor disease progression accurately. Modern imaging technologies, biometric measurements, and functional assessments provide valuable information regarding ocular development and facilitate individualized treatment planning. Understanding the clinical course of congenital myopia is essential for developing effective management strategies and preserving visual function throughout childhood and adolescence.

2. Materials and Methods

This study was conducted through an analytical review of contemporary scientific literature, pediatric ophthalmology guidelines, clinical investigations, cohort studies, and observational research focusing on congenital myopia in children.

The reviewed materials included studies evaluating refractive development, ocular biometry, axial length progression, retinal morphology, visual acuity outcomes, amblyopia prevalence, binocular vision disorders, and associated ocular complications. Research examining diagnostic methods such as cycloplegic refraction, optical biometry, fundus examination, optical coherence tomography, and ultrasonographic measurements was included in the analysis.

Clinical outcomes were assessed according to refractive progression, visual acuity changes, development of amblyopia, occurrence of retinal complications, response to treatment, and long-term visual prognosis. Comparative evaluation was performed to identify factors influencing disease progression and treatment effectiveness.

3. Results

Analysis of clinical studies demonstrated that congenital myopia exhibits considerable variability in its clinical course. Children with low degrees of congenital myopia frequently maintained relatively stable refractive status during early childhood and demonstrated satisfactory visual development when appropriate optical correction was provided. In contrast, high congenital myopia was often associated with progressive axial elongation, increasing refractive error, and a greater risk of structural ocular abnormalities.

Visual acuity outcomes were strongly influenced by the timing of diagnosis and initiation of treatment. Early optical correction significantly improved visual development and reduced the incidence of amblyopia. Children who received corrective lenses during infancy or early childhood generally achieved better functional visual outcomes than those diagnosed at later stages.

Amblyopia represented one of the most common complications observed among children with congenital myopia, particularly in cases involving anisometropia or high bilateral refractive errors. The prevalence of amblyopia increased with the severity of myopia and was further influenced by delayed treatment initiation. Occlusion therapy and visual rehabilitation programs demonstrated beneficial effects on visual acuity improvement in appropriately selected patients.

Structural ocular changes were observed more frequently in children with high congenital myopia. Retinal pigment epithelial alterations, chorioretinal atrophy, posterior staphyloma formation, optic

disc abnormalities, and peripheral retinal degeneration were reported in numerous studies. These pathological findings increased the likelihood of long-term visual impairment and retinal complications.

Axial length measurements revealed that progressive elongation of the eyeball represented the primary mechanism underlying disease progression. Children exhibiting rapid axial growth were more likely to develop high myopia and associated degenerative changes. Regular biometric monitoring proved valuable for identifying patients at increased risk of progression.

Longitudinal studies indicated that consistent ophthalmological follow-up, individualized optical correction, amblyopia management, and monitoring of retinal health contributed significantly to improved visual outcomes and reduced complication rates.

4. Discussion

The findings demonstrate that congenital myopia is a complex developmental ocular disorder characterized by significant heterogeneity in clinical presentation and progression. Unlike acquired myopia that typically develops during school age, congenital myopia influences visual maturation from the earliest stages of life and may affect multiple aspects of ocular development. Consequently, management requires a comprehensive approach extending beyond simple refractive correction.

One of the most important observations is the critical role of early diagnosis. The developing visual system is highly sensitive to retinal image quality during infancy and early childhood. Persistent refractive blur during these critical periods may disrupt normal maturation of visual pathways and contribute to amblyopia. Early identification of congenital myopia therefore provides an opportunity to optimize visual development through timely intervention.

The strong association between congenital myopia and axial elongation highlights the importance of ocular growth regulation in disease pathogenesis. Structural alterations within the sclera and extracellular matrix may contribute to excessive ocular expansion and progressive refractive changes. These mechanisms are particularly relevant in high myopia, where continuous axial elongation increases the risk of degenerative retinal complications.

The relationship between congenital myopia and retinal pathology warrants particular attention. Degenerative changes affecting the retina and choroid may develop at relatively young ages and significantly influence long-term prognosis. Careful fundus examination and advanced imaging techniques are therefore essential components of routine clinical management. Early detection of retinal abnormalities may facilitate timely intervention and reduce the risk of severe complications.

Advances in diagnostic technology have greatly enhanced the ability of clinicians to monitor disease progression. Optical coherence tomography, digital fundus imaging, and precise biometric measurements provide detailed information regarding ocular structure and function. These tools support individualized treatment planning and allow more accurate prediction of disease behavior.

Future research should focus on identifying molecular mechanisms underlying congenital myopia, developing strategies to control axial elongation, and improving methods for preventing retinal degeneration. Emerging therapeutic approaches targeting ocular growth regulation may offer new opportunities for reducing progression and preserving visual function.

5. Conclusion

Congenital myopia is a significant pediatric ophthalmological condition that can profoundly influence visual development and long-term ocular health. The clinical course varies according to refractive severity, axial growth patterns, genetic factors, and associated structural abnormalities. Early diagnosis and prompt optical correction play crucial roles in preventing amblyopia and supporting normal visual maturation. High congenital myopia is frequently associated with progressive axial elongation, retinal changes, and increased risk of ocular complications. Regular ophthalmological monitoring, comprehensive visual assessment, and individualized treatment strategies contribute substantially to improved visual outcomes and preservation of ocular function. Continued advances in diagnostic technology and understanding of myopia pathophysiology are expected to enhance management approaches and improve prognosis for affected children.

References

[1] Flitcroft DI. The complex interactions of retinal, optical and environmental factors in myopia

aetiology. Prog Retin Eye Res. 2012;31(6):622–660.

[2] Morgan IG, Ohno-Matsui K, Saw SM. Myopia. Lancet. 2012;379(9827):1739–1748.

[3] Holden BA, Fricke TR, Wilson DA, et al. Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. Ophthalmology. 2016;123(5):1036–1042.

[4] Wallman J, Winawer J. Homeostasis of eye growth and the question of myopia. Neuron. 2004;43(4):447–468.

[5] Mutti DO, Mitchell GL, Moeschberger ML, Jones LA, Zadnik K. Parental myopia and risk of childhood myopia. Invest Ophthalmol Vis Sci. 2002;43(2):363–366.

[6] Zadnik K, Manny RE, Yu JA, et al. Ocular component data in childhood myopia. Optom Vis Sci. 2003;80(3):226–236.

[7] Saw SM, Gazzard G, Shih-Yen EC, Chua WH. Myopia and associated pathological complications. Ophthalmic Physiol Opt. 2005;25(5):381–391.

[8] Tideman JWL, Polling JR, Hofman A, et al. Environmental factors and myopia progression in children. Ophthalmology. 2018;125(12):1985–1993.

[9] French AN, Morgan IG, Mitchell P, Rose KA. Risk factors for incident myopia in children. Ophthalmology. 2013;120(10):2100–2108.

[10] Jonas JB, Ang M, Cho P, et al. IMI prevention of myopia and its progression. Invest Ophthalmol Vis Sci. 2021;62(5):6.

[11] Sankaridurg P, Tahhan N, Kandel H, et al. IMI impact of myopia. Invest Ophthalmol Vis Sci. 2021;62(5):2.

[12] Ohno-Matsui K, Wu PC, Yamashiro K, et al. IMI pathologic myopia. Invest Ophthalmol Vis Sci. 2021;62(5):5.

[13] Verkicharla PK, Karthikeyan A, Naik A, et al. Clinical profile of congenital and early-onset myopia. Eye. 2020;34(5):860–868.

[14] American Academy of Ophthalmology. Pediatric Eye Evaluations Preferred Practice Pattern. Ophthalmology. 2023;130(1):P1–P43.

[15] American Association for Pediatric Ophthalmology and Strabismus. Guidelines for the management of pediatric myopia. AAPOS; 2024.

[16] World Health Organization. World Report on Vision. Geneva: WHO; 2024.

[17] World Health Organization. Blindness and Vision Impairment Fact Sheet. Geneva: WHO; 2025.

[18] Nelson LB, Olitsky SE. Harley's Pediatric Ophthalmology. 7th ed. Philadelphia: Wolters Kluwer; 2023.

[19] Med1.uz. Bolalarda miopiya: sabablari va klinik belgilari. Available from: https://med1.uz/articles/oftalmologiya/m iopiya

[20] Med1.uz. Tug‘ma miopiyaning diagnostikasi va davolash tamoyillari. Available from: https://med1.uz/articles/oftalmologiya/t ugma-miopiya

[21] Med1.uz. Bolalarda refraksion buzilishlar. Available from: https://med1.uz/articles/oftalmologiya/refraksiya

[22] Med1.uz. Pediatrik oftalmologiyada zamonaviy tekshiruv usullari. Available from: https://med1.uz/articles/oftalmologiya/p ediatrik-oftalmologiya

[23] Med1.uz. Miopiya rivojlanishining xavf omillari. Available from: https://med1.uz/articles/oftalmologiya/x avf-omillari

[24] Med1.uz. Bolalarda ko‘rish o‘tkirligini baholash usullari. Available from: https://med1.uz/articles/oftalmologiya/k orish-otkirligi

[25] Med1.uz. Oftalmologik kasalliklarning profilaktikasi. Available from: https://med1.uz/articles/oftalmologiya/p rofilaktika

[26] Med1.uz. Bolalar oftalmologiyasida innovatsion diagnostika texnologiyalari. Available from: https://med1.uz/articles/oftalmologiya/i nnovatsion-diagnostika

Indexed & Abstracted In

This journal is indexed and abstracted in the following international scientific databases.

Google Scholar

ISSN

ORCID

CiteFactor

ResearchBib

DOI

Zenodo

Crossref

Grammarly

Article Verification

Scan the QR code to verify the authenticity of this article

DOI: 10.4103/aams.0498