Overview of paediatric cataract in Malaysia

Wahit Karimmah, MMed (Ophthal)[1], Ismail Shatriah, MMed (Ophthal)[2,3]

[1]Department of Ophthalmology, Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia, [2]Department of Ophthalmology and Visual Science, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia, [3]Hospital Pakar Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

ABSTRACT

Paediatric cataract is a leading cause of preventable childhood visual impairment in Malaysia. Despite a relatively strong healthcare system, delayed diagnosis and referral, particularly in rural areas, remain major challenges affecting visual outcomes. The condition may be congenital or acquired, with causes including genetic disorders, infections, metabolic diseases, and trauma. Surgical treatment, mainly lens aspiration with or without intraocular lens implantation, is effective, but visual prognosis depends on early intervention and adherence to amblyopia therapy. Malaysian studies show improved surgical outcomes, yet late presentation often leads to irreversible amblyopia. Strengthening screening programs and early referral systems is essential to reduce childhood blindness.

KEYWORDS:
Paediatric cataract; Malaysia; cataract surgery; amblyopia; visual outcomes

INTRODUCTION

Paediatric cataract constitutes a critical global health imperative, universally recognized as a leading cause of preventable childhood blindness. In alignment with the World Health Organization's mandate to eliminate avoidable visual impairment, addressing untreated lens opacities is of paramount importance, as they severely impede a child's sensory, cognitive, and educational development.[1,2]

Prevalence

Paediatric cataract is an important cause of avoidable childhood blindness in Southeast Asia, where disparities in healthcare access, socioeconomic conditions, and public health infrastructure contribute to variations in disease prevalence and treatment outcomes. The prevalence of paediatric cataract in Southeast Asia is estimated to range between 0.6 and 13.6 cases per 10,000 children, with higher burdens generally observed in lower-resource settings.[2-4] Available Malaysian hospital-based studies suggest that the prevalence of paediatric cataract in Malaysia is comparable to other Southeast Asian countries, with estimates generally ranging from 1 to 15 cases per 10,000 children.[5-8]

Causes

Unlike in developed countries, where hereditary and idiopathic causes predominate, paediatric cataract in low- and middle-income nations is frequently associated with preventable environmental and systemic factors.[2] The aetiology may be congenital or acquired, unilateral or bilateral, and often reflects the socioeconomic and healthcare conditions of the population.

One of the major causes in developing countries is congenital infection, particularly rubella infection during pregnancy. Maternal rubella remains an important public health problem in countries with incomplete immunization coverage, and congenital rubella syndrome commonly presents with cataract, hearing impairment, and cardiac defects. Other TORCH infections, including toxoplasmosis, cytomegalovirus, herpes simplex virus, and syphilis have also been implicated in congenital cataract formation.

Traumatic cataracts occur more frequently than in developed nations because children are often exposed to unsafe environments, inadequate supervision, hazardous play activities, agricultural tools, sharp objects, and occupational risks associated with child labour.[8,9] Boys are generally more affected than girls due to greater participation in outdoor and high-risk activities. The injuries frequently induce severe, concurrent structural damage to the anterior segment, significantly complicating surgical interventions. 69% of these paediatric patients exhibiting a presenting visual acuity of worse than 6/60, a factor that severely compromises their long-term visual prognoses and necessitates immediate, complex rehabilitative care.[8]

Late Presentation

Late presentation remains a major challenge in developing countries, including Malaysia, and is one of the principal causes of poor visual outcomes and preventable childhood blindness.[5-12] Early diagnosis and timely surgical intervention are essential because delayed treatment during the critical period of visual development can result in irreversible deprivation amblyopia, strabismus, nystagmus, and permanent visual impairment.

Delayed presentation is commonly associated with poor awareness among parents and caregivers regarding the signs and urgency of childhood cataract. Leukocoria, poor fixation, wandering eyes, and visual inattentiveness may not be recognized early, particularly in rural communities with limited health literacy. Financial difficulties, transportation barriers, long distances to tertiary eye centres, and shortages of paediatric ophthalmologists further contribute to delayed referral and treatment.[5-12]

Corresponding Author: Ismail Shatriah
Email: shatriah@usm.my

In Malaysia, delayed presentation of paediatric cataract continues to be reported despite improvements in tertiary ophthalmology services.[5-8] A ten-year review conducted at Hospital Pakar Universiti Sains Malaysia in Kelantan reported that delayed diagnosis and referral were persistent problems among paediatric cataract patients.[6] Muhd-Syafi et al noted that socioeconomic factors, reduced healthcare accessibility, and inadequate awareness among caregivers contributed significantly to late presentation.

Children who presented late frequently experienced poorer visual outcomes despite surgical intervention because amblyopia had already developed.[6] Likewise, studies from Hospital Kuala Lumpur and Hospital Malacca demonstrated that postoperative visual outcomes were strongly influenced by the timing of presentation and surgery.[5,7]

Surgical Intervention

The primary goal of surgery is to clear the visual axis to prevent irreversible deprivation amblyopia while ensuring long-term visual rehabilitation through optical correction and amblyopia therapy. Paediatric cataract surgery is more complex than in adults because of ongoing ocular development, smaller ocular dimensions, reduced scleral rigidity, highly elastic lens capsule, a stronger inflammatory response, and a higher risk of postoperative complications.[13-15]

Therefore, surgical timing, technique, and postoperative management must be carefully individualized based on age, laterality, and cataract density. The standard surgical approach is lens aspiration or phacoaspiration with or without intraocular lens (IOL) implantation. In infants under 6 months, many surgeons prefer leaving the child aphakic with contact lens or spectacle correction due to concerns about ocular growth and refractive unpredictability.

In children above the age of 2 years old, primary IOL implantation is more commonly performed. A critical component of paediatric cataract surgery is anterior vitrectomy, especially in younger children, to reduce the risk of visual axis opacification caused by posterior capsule opacification, which is far more common in children than in adults.[13,14]

In developing countries, barriers such as limited surgical expertise and lack of paediatric anaesthesia services can negatively affect surgical outcomes.[12-15] Nevertheless, advancements in microsurgical techniques, improved IOL design, and expanded paediatric ophthalmology training have significantly improved prognosis over the past two decades.

Postoperative Management

Postoperative care is equally important and includes intensive anti-inflammatory therapy, regular follow-up, refractive correction, and amblyopia management through patching or penalization therapy. Without strict adherence to postoperative amblyopia treatment, visual outcomes may remain suboptimal even after technically successful surgery. Long-term follow-up is required because children are at risk of complications such as glaucoma, visual axis opacification, retinal detachment, and IOL-related issues.

Visual Outcomes

In many developing countries, visual outcomes after paediatric cataract surgery are frequently suboptimal because children often present late, when amblyopia is already established.[16,17] Even when surgery is technically successful, long-term visual acuity may be limited by irreversible sensory deprivation. Studies from South Asia and Sub-Saharan Africa consistently report that a significant proportion of operated children achieve only moderate vision (6/18 to 6/60 or worse), particularly in cases of bilateral dense congenital cataracts.[12-14]

In Malaysia, visual outcomes are generally better than in many other developing countries due to improved access to tertiary eye care, availability of paediatric ophthalmologists, and more standardized surgical protocols.[5-8] Paediatric cataract surgery is primarily performed in tertiary centres such as Hospital Tuanku Azizah, Hospital Kuala Lumpur, Hospital Pakar Universiti Sains Malaysia, Universiti Malaya Medical Centre, and other major government hospitals with paediatric ophthalmology services. Factors influencing outcomes in Malaysia include age at surgery (earlier intervention leads to significantly better vision), type of cataract (unilateral congenital cataracts have worse prognosis than bilateral cases), consistency of amblyopia therapy follow-up and presence of complications such as PCO or glaucoma.[5-8]

Challenges

Challenges in Malaysia include delayed referral from primary care, variability in access to paediatric ophthalmology services in rural areas, and inconsistent follow-up compliance, particularly for amblyopia management. This non-compliance is frequently exacerbated by financial constraints, logistical challenges, and low health literacy prevalent in rural communities.[8]

However, improvements in healthcare infrastructure, expansion of ophthalmology training, and increased awareness among healthcare providers have contributed to better surgical outcomes over time. National eye health initiatives and newborn screening programs are also expected to improve early detection and timely surgical intervention in the future.

CONCLUSION

In Malaysia, visual outcomes following paediatric cataract surgery are promising, largely reflecting a more developed healthcare system. Nevertheless, late diagnosis and delayed intervention continue to be the primary factors associated with poor postoperative visual outcomes.

REFERENCES

1. World Health Organization. World report on vision. Geneva: World Health Organization; 2021. Available from: https://www.who.int/publications/i/item/9789241516570
2. Sheeladevi S, Lawrenson JG, Fielder AR, Suttle CM. Global prevalence of childhood cataract: a systematic review. Eye 2016; 30(9): 1160-69.
3. Tariq MA, Uddin QS, Ahmed B, Sheikh S, Ali U, Mohiuddin A. Prevalence of pediatric cataract in Asia: a systematic review and meta-analysis. J Curr Ophthalmol 2022; 34(2): 148-59.

4. Xu X, Long E, Lin H, Liu Y. Prevalence and epidemiological characteristics of congenital cataract: a systematic review and meta-analysis. Sci Rep 2016; 6: 28564
5. Chew FLM, Qurut SE, Hassan I, Lim ST, Ramasamy S, Rahmat J. Paediatric cataract surgery in Hospital Kuala Lumpur: a 5-year review of visual outcomes. Med J Malaysia 2019; 74(1): 15-9.
6. Muhd-Syafi AB, Aiman-Mardhiyyah MY, Alharmi H, Shatriah I. Clinical profiles and visual outcomes of paediatric cataracts in suburban Malaysia: a ten-year review. Singapore Med J 2026; 67(Suppl 1): S112-6.
7. Ting XW, Teh WM, Chan CS, Abdul Jalil NF, Muhammed J. Clinical profile and visual outcome of pediatric cataract surgeries in West Malaysia. Malays J Paediatr Child Health 2020; 26(2): 27-34.
8. Adlina AR, Chong YJ, Shatriah I. Clinical profile and visual outcome of traumatic paediatric cataract in suburban Malaysia: a ten-year experience. Singapore Med J 2014; 55(5): 253-6.
9. Gogate P, Kishore H, Dole K, Shetty J, Ranade S, Kharat J, et al. The epidemiology of childhood cataracts in India: a systematic review. Indian J Ophthalmol 2022; 70(3): 673-81.
10. Zimmermann-Paiz MA, Quiroga-Reyes CR. Pediatric cataract in a developing country: retrospective review of 328 cases. Arq Bras Oftalmol 2011; 74(3): 163-5.
11. Nwosu SN, Onabolu OO. Age at detection and age at presentation of childhood cataract at a tertiary facility in Ibadan, Southwest Nigeria. BMC Ophthalmol 2020; 20: 38.
12. Tomkins O, Ben-Zion I, Moore DB, Helveston EE. Outcomes of pediatric cataract surgery at a tertiary care center in rural southern Ethiopia. Arch Ophthalmol 2011; 129(10): 1293-7.
13. Wilson ME, Trivedi RH. Pediatric cataract surgery: a comprehensive review. Clin Ophthalmol 2014; 8: 77-90.
14. Vasavada AR, Nihalani BR. Pediatric cataract surgery. Indian J Ophthalmol. 2017; 65(12): 1340-9.
15. Ezegwui IR, Aghaji AE, Uche NJ, Onwasigwe EN. Challenges in the management of paediatric cataract in a developing country. Int J Ophthalmol 2011; 4(1): 66-8.
16. M S, Maharana PK, Nagpal R, Joshi S, Kaur M, Sinha R, et al. Cataract surgery outcomes in pediatric patients with systemic comorbidities. Indian J Ophthalmol 2023; 71(1): 125-37.
17. Repka MX, Dean TW, Kraker RT, Li Z, Yen KG, de Alba Campomanes AG, et al. Visual acuity and ophthalmic outcomes 5 years after cataract surgery among children younger than 13 years. JAMA Ophthalmol 2022; 140(3): 269-76.