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CASE REPORT

Managing the Maze: Advanced Approaches to Pediatric Cataract Complications

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Abstract

Complicated cataract is a condition characterized by opacification of the crystalline lens due to intraocular diseases, particularly inflammatory conditions and other abnormalities. It often affects younger age groups, leading to visual impairment that typically requires surgical intervention. A 3-year-old girl presented with complaints of white spots in both eyes for one week. Following a physical examination and ultrasonography, she was diagnosed with bilateral complicated cataracts. The patient was scheduled for procedures including synechiolysis and irrigation-aspiration. However, due to intraoperative complications, additional procedures were necessary. Postoperatively, the patient was treated with antibiotic and anti-inflammatory medications and underwent optical rehabilitation using spectacles. This case highlights the management of pediatric cataracts and the challenges involved, with particular focus on postoperative optical rehabilitation to prevent amblyopia. Prompt and appropriate treatment of cataracts in children is crucial to clear the visual axis and restore a clear retinal image, thereby preventing the development of amblyopia.

Introduction

Cataract is a condition characterized by clouding of the eye's lens, which can occur at any age, from infancy to old age [1,2]. Pediatric cataracts remain a significant challenge in ophthalmology, particularly in developing countries where delays in diagnosis are common. Early identification, diagnosis, and management are critical to preventing amblyopia [3]. Pediatric cataracts may present as an isolated condition or as part of a systemic disease or other congenital ocular abnormalities. They can be congenital or acquired and may be inherited or occur sporadically [1,4].

Pediatric cataracts account for 5% to 20% of childhood blindness and severe visual impairment worldwide, with an annual incidence of 1.8 to 3.6 per 10,000 children. The global prevalence is estimated at 1 to 15 per 10,000 children [3]. In Southeast Asia, the International Agency for the Prevention of Blindness (IAPB) notes that children under the age of 15 make up approximately 35% to 40% of the total population [5].

Blindness due to pediatric cataracts is often associated with deprivation amblyopia, which can severely impact a child's development and quality of life [6]. Early intervention not only improves visual outcomes and quality of life but also positively impacts the socioeconomic status of the family [3]. A study conducted in India found that the economic burden of untreated pediatric cataracts far exceeds the cost of timely treatment. Additionally, research by Sitorus et al. showed that approximately 60% of childhood blindness could have been prevented with appropriate management [7].

This case report describes the management of pediatric cataracts and emphasizes the importance of optical rehabilitation following surgical intervention to prevent amblyopia.

Cases

A 3-year-old girl was brought by her parents to the Pediatric Ophthalmology and Strabismus Department of RSUD, Dr. Zainoel Abidin, with complaints of white spots in both eyes, which were first noticed about one week prior. However, visual disturbances had been apparent for approximately one month, as the child frequently bumped into objects, fell while walking, and had difficulty focusing her gaze during conversations. Her parents observed that she often squinted and shifted her gaze, appearing unfocused when interacting with others. Since the onset of these symptoms, her daily activities had become noticeably more limited. There was no history of ocular trauma, and no definite history of red eye was reported.

On ophthalmologic examination, her visual acuity was 1/60 in both eyes. The palpebrae and conjunctivae were calm, and the corneas were clear. The anterior chambers appeared normal, but the irises were irregular, with evidence of seclusio pupillae. The pupils measured 4 mm in diameter and showed no light reflex. Both lenses were cloudy. Ocular ultrasonography (USG) revealed intact eyeball walls with no echogenic bands (Figure 1). Biometric measurements for intraocular lens power were 27 diopters in the right and 27.5 diopters in the left (Figure 2).

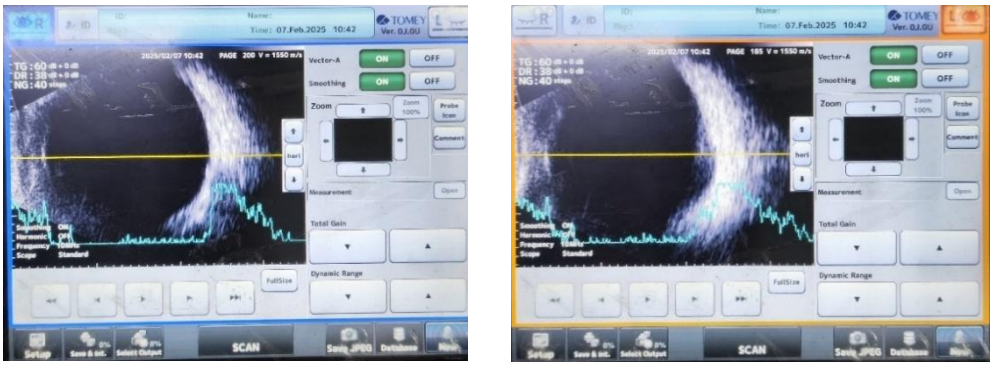

Figure 1. The ultrasound examination of both the right and left eyeballs showed that the eyeball walls were intact and there were no echogenic bands.

The patient was diagnosed with a complicated cataract and seclusion pupillae oculi dextra et sinistra. Subsequently, the patient was scheduled to undergo surgery under general anesthesia on 25 September 2024. Previously, the patient underwent laboratory examination, thoracic photographs, and consultation with the Department of Anesthesia and Pediatrics. Initially, synechiolysis was performed to release the adhesions, followed by irrigation and aspiration. After the visual axis became clear, there was a membrane in the central part of the posterior capsule of the lens. Thus, membranectomy, primary posterior capsulotomy (PPC), anterior vitrectomy (AV), and intraocular lens (IOL) implantation were gradually performed. Then, corneal-scleral suturing was performed with nylon 10.0 as a single suture (Figure 3). Postoperatively, the patient was given antibiotic eye drops eight times a day, combined antibiotic and corticosteroid eye drops eight times a day, anticholinergic eye drops three times a day in the right eye, oral antibiotics two times 1.5 teaspoons, and oral analgesics three times 1.5 teaspoons.

On the first day of follow-up, the patient's right eye had a visual acuity of 1/60, minimal subconjunctival hemorrhage, an intact hecting, clear cornea, and there was an air bubble in the Camera Oculi Anterior (COA). Pupils were round, and an intraocular lens (IOL) was present. The patient was planned for further surgery on the left eye two weeks later. The patient was diagnosed with pseudophakia oculi dextra and complicated cataract oculi sinistra. The patient came back to the Pediatric Ophthalmology and Strabismus Department of RSUD dr. Zainoel Abidin for postoperative follow-up on October 4, 2024 (nine days after the first surgery). The

results of the ophthalmologic examination of the right eye showed a visual acuity of 5/24, intact hecting, clear cornea, round and central pupil, positive light reflex, and there was an IOL.

Figure 2. The results of the biometry examination on both eyes of the patient.

Furthermore, the patient's left eye is scheduled for surgery on October 11, 2024. The procedure will be the same as the previous right eye, namely, synechiolysis, irrigation aspiration, followed by membranectomy, primary posterior capsulotomy (PPC), anterior vitrectomy (AV), and intraocular lens (IOL) implantation. At one week follow-up, the patient's visual acuity was 5/24 in the right eye and 5/18 in the left eye (Figure 3), with the patient's final diagnosis of Pseudofakia oculi dextra et sinistra (ODS). One month postoperatively, the patient was prescribed spectacles with best corrected visual acuity (BCVA) of ODS 5/8 for optical rehabilitation.

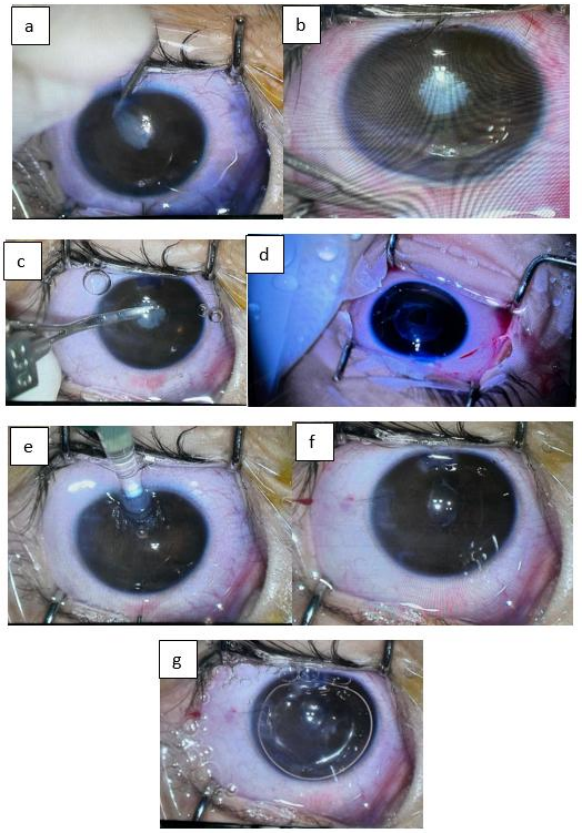

Figure 3. a) Clinical photo of the patient's right eye before surgery, showing a cloudy lens and posterior synechiae; b) Sinechiolysis and Continuous Curvilinear Capsulorhexis (CCC) of the right eye; c) Irrigation aspiration; d) Membranectomy, PPC, AV; e) IOL implantation; f) Suture with 10.0 nylon; g) Procedure completed.

Discussion

Cataract is a condition of opacification of the lens of the eye that blocks light from reaching the retina, causing visual impairment that significantly affects the patient's quality of life [1]. Complicated Cataracts refer to opacification of the crystalline lens due to intraocular disease, primarily intraocular inflammatory conditions that include anterior, intermediate, or posterior uveitis. However, other intraocular conditions have also been identified that cause complicated cataracts. This disease mainly occurs in younger age groups, causing visual impairment, which usually requires surgery [8]. There are several conditions that lead to complicated cataracts, including inflammation of the uveal tract, generative conditions, intraocular tumors, retinal detachment, and even glucoma. The lens is an avascular structure. It is mainly nourished by intraocular fluid. In complicated cataract, lens metabolism is impaired by the diffusion of inflammatory substances released into the intraocular fluid, either due to inflammation or degenerative conditions. The posterior capsule of the lens is thin and lacks epithelial support; therefore, toxins diffuse posteriorly, resulting in the early development of posterior pole opacities. Posterior subcapsular cataract is the most common manifestation of complicated cataracts [9].

There are several morphologies of cataracts in children, such as diffuse, anterior, cortical lamellar, fetal nuclear, posterior polar, posterior lentiglobus, posterior subcapsular, persistent fetal vasculature (PFV), and traumatic cataract due to lens disruption. Cataract morphology can provide clues as to the underlying etiology (isolated or associated with systemic disease), and possibly the visual prognosis after surgery [10]. The most common surgical procedure performed in pediatric cataract cases is irrigation aspiration due to the soft nucleus of children [11]. There is a seclusion pupillae in this case, so this becomes a complication during surgery where synechiolysis must be performed previously. This is also a complication for the next stage of surgery because of the small pupil size of 4 mm. After performing synechiolysis, irrigation aspiration, a membrane appeared in the posterior capsule, which required additional procedures such as membranectomy, Primary Posterior Capsulotomy (PPC), and Anterior Vitrectomy (AV). These procedures are generally performed on children under one year of age. These procedures form a hole in the posterior capsule, so a three-piece lens is chosen for implantation. A single-piece foldable intraocular lens (IOL) is not applicable as it is more flexible and can easily penetrate the hole and sink into the posterior segment [12]. Postoperatively, patients receive both oral and topical antibiotics and steroids. The administration of antibiotics and steroids aims to prevent infection and severe inflammation, which can induce excessive fibrin formation and thus prevent postoperative posterior capsule opacification (PCO) [13,14]. Since uncorrected refractive errors in the early years can cause amblyopia, attention to proper refractive correction after cataract surgery is essential to achieve good visual acuity. Optical rehabilitation can be accomplished with spectacles or contact lenses. Some residual refractive errors are common in children undergoing IOL implantation, and spectacle correction may be required for distance and/or near vision. Besides, suppose IOL implantation is performed at a young age. In that case, the developing eye will experience myopia, so refractive changes with sequela hyperopia are expected in the early years. However, some degree of myopia is expected later in life [10]. Optical rehabilitation in this case was performed 1 month after surgery by giving glasses. In this case, spectacles were chosen as the optical rehabilitation modality.

Conclusions

Cataracts in children of any etiology should be treated as soon as possible to achieve a clear visual axis, followed by optical rehabilitation with glasses, contact lenses, or implanted lenses for a clear retinal image. A clear visual axis and a clear retinal image are aimed at preventing amblyopia. This case report shows increased vision in both eyes following multiple procedures. The patient also undergoes optical rehabilitation with spectacles. A notable constraint of the

present study is the relatively brief duration of its follow-up period. In order to further advance the field, it is imperative that future research include extended follow-up periods.

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References

[1] Priskila Taba JA. Katarak Kongenital: Skrining dan Diagnosis. *Cermin Dunia Kedokteran* 2021;48:399–405. https://doi.org/10.55175/cdk.v48i7.95.

[2] Imelda E, Ghassani V. Innovative Strategies in Managing Early-Onset Primary Congenital Glaucoma. *Indonesian Journal of Case Reports* 2024;2:33–6. https://doi.org/10.60084/ijcr.v2i2.190.

[3] Gupta P, Gurnani B, Patel B. Pediatric Cataract. Treasure Island: StatPearls Publishing; 2024.

[4] Imelda E, Nuzhatuddin F, Jannah SR, Adev SM, Adev AM, Toshniwal NS. From Bright to Brightness: Mastering the Management of Bilateral Congenital Cataracts. *Indonesian Journal of Case Reports* 2023;1:24–8. https://doi.org/10.60084/ijcr.v1i2.97.

[5] Manggala S, Jayanegara IWG, Putrawati AAM. Gambaran Karakteristik Penderita Katarak Senilis di Rumah Sakit Daerah Mangusada Badung Periode 2018. *E-Jurnal Medika Udayana* 2021;10:75–9.

[6] Zaldi Z, Amra AA, Sihombing FF. Penatalaksanaan Katarak pada Anak. *Jurnal Implementa Husada* 2020;1:248–55.

[7] Sitorus RS, Abidin MS, Prihartono J. Causes and Temporal Trends of Childhood Blindness in Indonesia: Study at Schools for the Blind in Java. *British Journal of Ophthalmology* 2007;91:1109–13. https://doi.org/10.1136/bjo.2006.110445.

[8] Agarwal A, Ram J. Complicated Cataract. The Uveitis Atlas, New Delhi: Springer India; 2016, p. 1–5. https://doi.org/10.1007/978-81-322-2506-5_114-1.

[9] Shaw E, Patel BC. Complicated Cataract. StatPearls [Internet]. Updated 20, Treasure Island (FL): StatPearls Publishing; 2023.

[10] Wilson ME. Pediatric Cataracts: Overview. *American Academy of Ophthalmology* 2015.

[11] Wilson ME, Trivedi RH. Pediatric Cataract Surgery. Albert Jakobiec's Princ. Pract. Ophthalmol., Cham: Springer International Publishing; 2020, p. 1–22. https://doi.org/10.1007/978-3-319-90495-5_197-1.

[12] Imelda E, Jannah SR, Annisa T, Adev SM, Toshniwal NS. Through a Hazy Lens: A Teen's Surprising Struggle with Juvenile Cataracts. *Indonesian Journal of Case Reports* 2024;2:58–61. https://doi.org/10.60084/ijcr.v2i2.250.

[13] Kato A, Horita N, Namkoong H, Nomura E, Masuhara N, Kaneko T, et al. Prophylactic Antibiotics for Postcataract Surgery Endophthalmitis: A Systematic Review and Network Meta-Analysis of 6.8 Million Eyes. *Scientific Reports* 2022;12:17416. https://doi.org/10.1038/s41598-022-21423-w.

[14] Hecht I, Karesvuo P, Achiron A, Elbaz U, Laine I, Tuuminen R. Anti-Inflammatory Medication after Cataract Surgery and Posterior Capsular Opacification. *American Journal of Ophthalmology* 2020;215:104–11. https://doi.org/10.1016/j.ajo.2020.02.007.