

ORIGINAL ARTICLE

PROFILE OF UNILATERAL CATARACT IN PEDIATRIC PATIENTS: A 3 YEAR RETROSPECTIVE STUDY**Lisana Himmatul Ulya¹, Liana Ekowati²**¹ Ophthalmology Resident, Faculty of Medicine Diponegoro University, Dr. Kariadi Hospital Semarang² Ophthalmology Department of Diponegoro University, Dr. Kariadi Hospital Semarang

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ABSTRACT

Introduction and Objective: Unilateral cataract presents from 19.6% to 55.5% of pediatric cataract. This condition is treatable, but delayed treatment may cause visual impairment. This study aims to understand characteristic of unilateral cataract in children.

Methods: This study was descriptive review of patients aged 0-17 years old with unilateral cataract at Dr. Kariadi Hospital, Semarang. Data were collected from medical record of patients from January 2019 to December 2022.

Results: Sixty patients were included in this study, 56.7% of whom were male and 43.3% were female. The mean age at presentation is 71.50 ± 48.34 months with whitish eye being the most common main complaint (65%), followed by blurred vision (35%) and squinting of eye (5%). Most of patients had congenital or infantile cataract (60%), followed by traumatic (36.6%), uveitis (1.7%) and iatrogenic (1.7%). Some of patients had microcornea (21.7%), persistent pupillary membrane (8.3%), retinopathy of prematurity (3.3%), persistent fetal vasculature (8.3%), nystagmus (8.3%), amblyopia (20%) and strabismus (40%), with exotropia being the most common type (33.3%). Most of patients did not have systemic disease (93.3%), but we found two patients had congenital rubella syndrome, one had congenital cytomegalovirus, one had down syndrome.

Conclusion: Etiology of unilateral pediatric cataract mostly idiopathic followed by traumatic. Leukocoria was the most common complaint, followed by blurred vision and strabismus. In unilateral cataract, exotropia was more common type of strabismus.

Keywords: Unilateral cataract, pediatric cataract, characteristic, age, congenital, traum

INTRODUCTION AND OBJECTIVE

Pediatric cataract is one treatable cause of visual impairment and blindness of 7.4-15.3 % children worldwide.^{1,2} Cataract in children can be unilateral or bilateral, congenital or acquired and related or not related with other ocular or systemic disease.^{2,3} Unilateral cataract affected only one eye and presents from 19.6% to 55.5% of pediatric cataract by many previous reported studies.^{3,4}

Most of the cataract in children is diagnosed incidentally on routine screening, with leukocoria become the most main complaint.^{5,1} Untreated unilateral cataract may cause abnormal visual input during early life.³ Cataract surgery is needed in most children with

cataract, only few can be treated conservatively.⁶ Surgery in unilateral pediatric cataract should be done as early as possible to achieve good visual outcome.²

The main goals in pediatric cataract management is to clear the visual axis and give postoperative visual rehabilitation. Prescription of spectacles should be given in children after cataract surgery to optimized distance and near vision.²

As a center of referral hospital, Dr. Kariadi Hospital has treated pediatric cataract patients from many areas in Central Java, especially Semarang. Study of unilateral pediatric cataract patient profile in Dr. Kariadi Hospital have yet to obtain. This study aims to understand characteristic of unilateral cataract in children.

METHODS

This study was descriptive review of pediatric patients with unilateral cataract at Dr. Kariadi Hospital, Semarang. Data was collected from medical record of patients from January 2019 to December 2022. All patients aged 0 to 17 years old in ophthalmology clinic who were diagnosed with unilateral cataract were included. Patients with incomplete data of medical record were excluded. Data taken included age of onset, age of presentation, age of surgery, main complaint, ocular manifestation, other systemic condition and surgical management.

The data was processed using statistical software program SPSS V26.0 and Windows Microsoft Excel 2021 application. This study was approved by the research ethics committee of Medical Faculty Diponegoro University.

RESULTS

A total of 60 patients with unilateral cataract who met the inclusion criteria were recruited in this study. The demography of patients was shown in Table 1. There was the same percentage of male and female patients (56.7% and 43.3%, respectively).

Average age of symptom onset was 54.93 ± 48.26 months with a range of 0-144 months and average age of presentation at ophthalmology clinic was 71.50 ± 48.34 months with range of 3-161 months. Cataract surgery was performed at an average age of 73.07 ± 48.46 months with a range of 6-164 months.

Table 1. Demographic data of patients

Variable	n (%)	Mean ± SD (range)
Gender		
Male	34 (56.7)	
Female	26 (43.3)	
Age of symptom onset (months)	54.93	48.26
Age of presentation (months)	71.50	48.34
Age of surgery (months)	73.07	48.46

The main complain of patients at our clinic shows in Table 2. Majority of patients came with main complain of whitish eye (60%), followed with blurred vision (35%) and squinting of the eye (5%).

Table 2. Main Complain

Main Complain	Number of patients (%)
Whitish eye	36 (60)
Blurred vision	21 (35)
Squinting of eye	3 (5)

This study showed that most of unilateral cataract were congenital or infantile (60%), with 53.3% idiopathic, 5% had congenital infection and 1.7% had down syndrome. Another cause of cataract we found in this study were traumatic cataract (36.6%), uveitis (1.7%) and iatrogenic (1.7%).

Table 3. Etiology of Cataract

Cataract	Numbers of Patients (%)
Congenital/Infantile	36 (60)
Idiopathic	32 (53.3)
Congenital infection	3 (5)
Syndrome	1 (1.7)
Traumatic	22 (36.6)
Uveitis	1 (1.7)
Iatrogenic	1 (1.7)

Our study showed that unilateral cataract patients can present with other ocular condition, such as microcornea (21.7%), persistent pupillary membrane (8.3%), retinopathy of prematurity (3.3%), persistent fetal vasculature (8.3%), nystagmus (8.3%), amblyopia (20%) and strabismus (40%). Exotropia was the most common type of strabismus, accounted 33.3% of the patient, while esotropia accounted 6.7%.

Table 4. Other ocular manifestation of the patients

Ocular manifestation	Number of patients (%)
Microcornea	13 (21.7)
Persistent pupillary membrane	5 (8.3)
Retinopathy of prematurity	2 (3.3)
Persistent fetal vasculature	2 (3.3)
Strabismus	24 (40)
Exotropia	20 (33.3)
Esotropia	4 (6.7)
Nystagmus	5 (8.3)
Amblyopia	12 (20)

Table 5 shows systemic disease of patients. Most of patients do not have any other systemic disease (93.3%). We found some patients had other systemic disease as follow: two patients had congenital rubella syndrome, one patients had congenital cytomegalovirus (CMV) and one patient had down syndrome.

Table 5. Systemic Disease of patients

Systemic disease	Number of patients (%)
Do not have systemic condition	56 (93.3)
Congenital Rubella Syndrome	2 (3.3)
Congenital CMV	1 (1.7)
Down syndrome	1 (1.7)

The majority of patients underwent surgery, except for 2 patients, whom treated conservatively and 3 patients, whom lost to follow up. The most common type of surgery was phacoaspiration with primary posterior capsulotomy, anterior vitrectomy and intraocular lens implantation, accounted 33.3% of patients.

Table 6. Type of Cataract Surgery

Type of Cataract Surgery	Number of patients (%)
Phacoaspiration	5 (8.3)
Phacoaspiration + IOL Implant	13 (21.7)
Phacoaspiration + Anterior Vitrectomy	1 (1.7)
Phacoaspiration + IOL Implant + Anterior Vitrectomy	3 (5)
Phacoaspiration + PPC + Anterior Vitrectomy	8 (13.3)
Phacoaspiration + PPC + Anterior Vitrectomy + IOL Implant	20 (33.3)
Phacoaspiration + PPC + Anterior Vitrectomy + PI	2 (3.3)
Phacoaspiration + PPC + Anterior Vitrectomy + PI + IOL Implant	3 (5)
Not performed	5 (8.3)

IOL: intraocular lens, PPC: primary posterior capsulotomy, PI: perifer iridectomy

In pediatric cataract surgery, Phacoaspiration can be performed with or without IOL implantation. In this study, majority of patients (70.9%) underwent IOL implantation, while 29.1% were not. After surgery, all patients were given spectacles, except for 8 patients that had visual acuity below light perception.

Table 7. IOL Implantation

IOL Implantation	Number of patients (%)
With IOL Implantation	39 (70.9)
Without IOL implantation	16 (29.1)

DISCUSSION

Recognition of cataract in childhood is important, especially in unilateral case, as early recognition can lead to early treatment and good prognosis. This study showed that the proportion of unilateral cataract in male and female was the same. Same result was reported from research in Denmark, the ratio of male/female was 1.3.⁷

In developing countries, recognition of cataract cases can be a challenge because neonatal eye screening is not a routine part of health system. Late recognition corresponding with late presentation to the eye clinic. In our hospital, patients were recognized cataract at average 54.93 months, came to our clinic at average age 71.50 months and underwent surgery at average age of 73.07 months. Previous study by Sheeladevi, et. al., in India, reported mean age of surgery for childhood cataract was 74.6 months. Lack of newborn screening, lack of knowledge among parents and limited access to specialist may be possible reason for delayed recognition and treatment.⁸

Children with cataract should diagnosed carefully through full examination. Childhood cataract often have idiopathic etiology and can be associated with other ocular or systemic disease. The presentation of cataract can be asymptomatic or symptomatic. The most common symptom is leukocoria, followed by reduced of eye contact or inability to maintaining gaze or blurred vision in older children.¹ In routine screening, cataract diagnosis is incidentally made, whereas leukocoria and strabismus led the diagnosis.² This study showed that the most common main complaint was whitish eye (60%), followed by blurred vision (35%) and squinting of eye (5%).

In this study, we found most cataract were idiopathic, followed by traumatic cataract. Similar to previous study, the most common etiology of unilateral pediatric cataract is idiopathic, and trauma.⁷ Iatrogenic caused we found in this study was history of pupillary membrane extraction that induced cataract.

Cataract in children can be isolated or associated with other eye disorders, such as microcornea, coloboma, anterior segment defects, microphthalmia, aniridia, persistent fetal vasculature and retinal dystrophy.¹⁰ In this study, we found microcornea in 21.7% patients and persistent fetal vasculature in 3.3% of patients. Persistent pupillary membrane was found in 8.3% patients. This finding is mostly isolated but can be associated with congenital cataract, high refractive errors, glaucoma, microphthalmos and iris coloboma.¹¹ Retinopathy of

prematurity was seen in 3.3% patients in this study. Formation of cataract in ROP may associated with systemic factors of premature babies, retinal detachment or treatment received for ROP.¹² In this study we found amblyopia in 20% patients and 8.3% of patients. Children with cataract during critical period of visual development, are at risk of amblyopia and nystagmus. Prompt removal of cataract is important to restoring clear image in retina and minimizing impact of visual deprivation.¹³

The occurrence of strabismus in this study is 40%. In previous study, strabismus was diagnosed in 52.5% of children with cataract.¹⁴ The type of strabismus found in this study was mostly exotropia. The previous study in China also found that in unilateral cataract, exotropia was more common than esotropia.¹⁵ The possible explanation of this finding is the cloudy lens in the early age retarded the normal development of retinal function and corresponding striae cortex, that make the cataractous eye become exotropia. The visual deprivation that occurs more than 6 weeks is a significant risk factor for the occurrence of strabismus.¹⁶

This study found that majority of patients did not have related systemic condition, but 3.3% had congenital rubella syndrome, 1.7% patients had congenital CMV. Unilateral cataract is disease with isolated and sporadic incident. The majority of patients did not have systemic condition related to unilateral cataract. Congenital infection such as toxoplasma, rubella, cytomegalovirus and herpes (TORCH) are associated with congenital cataract, with rubella is the most common causes. Cytomegalovirus infection commonly manifest as retinitis, but it is associated with higher risk of cataract formation in unilateral cases.¹⁷ In most cases cataract caused by rubella present bilateral, but unilateral cataract may also occur. Most unilateral cataracts in congenital rubella syndrome had an onset of below six months of age (46.7%), followed by below one month of age (40.0%).¹⁸ Screening of congenital rubella syndrome for congenital cataract is a routine examination in our hospital.

Prevalence of cataract in down syndrome from previous study range from 5% to 50% and caused by increased level of superoxide dismutase.¹⁹ In this study we found 1.7% patient of unilateral cataract had down syndrome.

Surgery in cataract is indicated if there is dense cataract blocking the red reflex, strabismus with unilateral cataract and nystagmus in bilateral cataract. In the case of unilateral cataract, visual outcome is better in children undergoing lensectomy before 6 weeks of age.²⁰ In children, cataract can be removed through lens aspiration. A combination of posterior continuous curvilinear capsulorhexis and anterior vitrectomy reduces the rates of visual axis opacification and become the golden standard in pediatric cataract surgery.²¹ Implantation of IOL can be done primary or secondary after cataract surgery.²² Phacoaspiration with primary

posterior capsulotomy, vitrectomy anterior and IOL implantation is the most common management in this study.

Implantation of IOL for children age one year is acceptable and safe, but in patient of younger age, it is still controversial.²⁰ Previous study stated that IOL implantation could be implanted at age under 6 months in unilateral cataract with no contraindication, such as microphthalmia and another structural abnormality.²³ On the other hand, Lambert et. al. and Plager et. al recommended to leave the eye aphakic and given spectacles for infant with unilateral cataract under age of 7 months.^{24,25}

CONCLUSION

Etiology of unilateral pediatric cataract mostly idiopathic and traumatic. Leukocoria was the most common complaint, followed by blurred vision and strabismus. In unilateral cataract, exotropia was more common type of strabismus.

This was the first study to discuss profile of unilateral cataract in pediatric patients in Dr. Kariadi Hospital Semarang. The limitation of this study was incomplete data of medical record in the hospital. The history of perinatal, profile of parents' education and socioeconomic level were not fully recorded. Further study with prospective design and larger subjects of unilateral cataract children is recommended.

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