Section: Ophthalmology

Original Research Article

FACTORS AFFECTING VISUAL OUTCOME IN PAEDIATRIC UVEITIS

Received : 17/03/2024
Received in revised form : 02/05/2024
Accepted : 19/05/2024

Keywords:
Uveitis, Paediatric, Ocular Manifestations, Vision Disorders, Complicated cataracts, Trauma.

Corresponding Author:
Dr. M. Marimuthu,
Email: mmvignesh06@gmail.com

DOI: 10.47009/jamp.2024.6.3.66

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2024; 6 (3); 317-322

V. Ravindran[1], D. Sangeetha[2], K. Selvi[2], M. Marimuthu[2], Alagappan Subha[3], K. Ramya[3]

[1]Associate Professor, Department of Ophthalmology, Madurai Medical College, Madurai, Tamilnadu, India
[2]Senior Assistant Professor, Department of Ophthalmology, Madurai Medical College, Madurai, Tamilnadu, India
[3]Junior Resident, Department of Ophthalmology, Madurai Medical College, Madurai, Tamilnadu, India.

Abstract

Background: Paediatric uveitis is a rare but complex condition, affects 5-10% of uveitis cases. Early diagnosis and treatment are crucial to prevent complications and preserve visual function. This study aimed to investigate the incidence of age, sex, aetiology, clinical presentation, chronicity, complications, and treatment modalities that affect the visual outcome of uveitis in children. **Materials and Methods:** This was a prospective study of 50 children with uveitis aged <15 years conducted at Department of Ophthalmology, Government Rajaji Hospital between January 2021 and January 2023. Patients with ocular conditions were questioned regarding complaints, history of systemic diseases, trauma, and exposure to pets. Thorough examinations were performed, and the patient's blood count, erythrocyte sedimentation rate, and syphilis status were investigated. Patients with choroiditis presented late without active lesions and were only followed up. **Result:** The study found that the maximum number of uveitis cases in children was in 9-12 years (42%). The majority of cases (76%) had anterior uveitis, with males more affected than females. Intermediate uveitis is common in females. The most common aetiology was unknown (98%), followed by trauma, Toxoplasma, Rubella, and tuberculosis. Complicated cataracts (20%) and retinal detachments (6%) were also observed. Anterior uveitis had the best visual outcomes, whereas posterior uveitis and panuveitis had poorer outcomes. In some cases, treatment included topical and systemic steroids, immunosuppressants, and cataract surgery. **Conclusion:** Uveitis in children can cause serious visual impairment if not diagnosed or treated at an early stage. Early diagnosis and prompt treatment with medication can prevent complications and ensure good vision.

INTRODUCTION

Paediatric uveitis comprises a notable 5–10% of uveitis cases seen in specialised uvea clinics, yet it presents a formidable challenge for ophthalmologists due to its complexity.[1] Diagnosis, management, and follow-up of paediatric uveitis demand deep attention, grappling with issues such as delayed presentation, examination difficulties, and chronicity. Moreover, the delicate balance between anti-inflammatory efficacy and systemic side effects of medications is crucial, alongside the heightened expertise needed to address associated complications like cataracts, glaucoma, and retinal detachments.[2]

The estimated incidence of paediatric uveitis ranges from 4.3 to 14 per 100,000 person-years.[3,4] Despite this relatively low frequency, children constitute a minority of uveitis patients seen in tertiary clinics, comprising only 2.2–13.8% of cases. Alarmingly, severe visual acuity loss is noted in a significant proportion of paediatric uveitis cases at the time of presentation, ranging from 6.4 to 45%.[5,6]

Effective management hinges on early identification and intervention to prevent complications, which are crucial for preserving the visual function of the affected children. Paediatric uveitis, while falling under familiar classifications like anterior, intermediate, posterior, and panuveitis, presents distinct diagnostic and therapeutic hurdles compared to its adult counterpart.[2] The under recognition of uveitis in children often leads to dire consequences. Timely diagnosis and treatment are imperative to curb progression, manage complications, and

ISSN (O): 2687-5365; ISSN (P): 2753-6556

salvage visual acuity. It's vital to dispel the notion that all red eyes are mere conjunctivitis or that diminished vision in seemingly normal-looking eyes signifies mere refractive errors.[2,6]

The elevated incidence of visual loss is particularly worrisome because of the longer life expectancy of children than that of adults. Additionally, enduring visual impairment could significantly impact various dimensions of children's lives, encompassing physical, social, emotional, and cognitive development, ultimately leading to diminished quality of life. Thus, meticulous history-taking, comprehensive examination, and appropriate management are paramount for favourable visual outcomes. While paediatric uveitis is relatively less common, accounting for only 8% of cases compared to adults, its impact on affected children's visual health underscores the importance of vigilance and expertise in its management.[2]

In this study, we investigated the incidence of age, sex, aetiology, clinical presentation, chronicity, complications, and treatment modalities that affect the visual outcome of uveitis in children.

MATERIALS AND METHODS

This was a prospective study of 50 children with uveitis aged < 15 years conducted at Department of Ophthalmology, Government Rajaji Hospital between January 2021 and January 2023 for 2 years. The study was approved by the institutional ethics committee before initiation, and informed consent was obtained from all patients.

Inclusion Criteria

Children below 15 years of age with uveitis were included in this study.

Exclusion Criteria

Children with penetrating trauma to the globe or endophthalmitis were excluded from this study.

All patients were questioned for present complaints, history of similar complaints, history of systemic diseases such as tuberculosis and leprosy, history suggestive of rheumatoid disease, history of trauma, focal sepsis, and exposure to pets. Parents' guidance was provided for history taking in small and uncooperative children. Special attention was given to other systems such as the mucocutaneous, musculoskeletal, gastrointestinal, cardio-pulmonary, and neurological systems. Thorough ocular examination with special attention to visual acuity, intraocular pressure, slit lamp biomicroscopy, direct and indirect ophthalmoscopy, posterior pole examination with + 78D lenses, and Sonography - B scan were performed.

All patients were investigated for complete blood count, differential count, erythrocyte sedimentation rate, serological test for syphilis, blood sugar, Mantoux test, motion for ova and cysts, and TORCH screening for posterior uveitis.

Special reference clinic opinions from the ENT, Dental, and Rheumatology departments of the Government Rajaji Hospital were obtained. Patients with TB were obtained from the chest clinic in our hospital. Specific Patients were subjected to special investigations such as radiography (paranasal sinus, chest, and sacroiliac joints), rheumatoid factor, and antinuclear antibody factor at the Government Hospital. Eyes were graded as follows: Quiet-flare + / -, cells absent; Mild-KP +, flare +, cells +; Moderate - KP +, Flare + +, Cells + +, Severe - KP +, Flare + + +, Cells + + +, Posterior synechiae; and anterior vitreous cells.

Complicated: Band-shaped keratopathy, complicated cataract, retinal detachment.

Patients with mild anterior uveitis were treated with mydriatics-cycloplegics and topical steroids. Patients with moderate, severe, and intermediate uveitis were treated with mydriatic cycloplegics, topical steroids, periocular steroids, and systemic steroids. Non-responders or steroid contras indicated that patients were treated with immunosuppressants after a complete blood count, liver function test, renal function test, and physician clearance were obtained. They were also periodically followed up for the same investigations.

Complicated cataracts without active inflammation for more than 3 months were taken up for small incision cataract surgery under the cover of preoperative and postoperative steroids under general anaesthesia. Post-inflammatory glaucoma was managed with topical antiglaucoma drugs (0.25% timolol eye drops) for antiglaucoma surgery. Most of the choroiditis cases presented late without active lesions and hence were only followed up. All data are expressed as frequencies and percentages.

RESULTS

The maximum number of cases of uveitis in children was found to be within the age groups–9-12 years and 6-9 years comprising 42% and 24%, respectively. Of the 50 patients, 28 were male (56%) and 22 were female (44%). 35 cases (70%) presented with an acute onset of less than 6 weeks, seven cases (14%) with an acute recurrent onset, and eight cases (16%) had a chronic duration of more than 6 weeks.

In aetiological analysis, 98% of cases had an unknown aetiology, 10% of the cases had traumatic aetiology, 10% had Toxoplasma and Rubella aetiologies, and 6% had tuberculous aetiology. Focal sepsis was found in (6%) of cases, Juvenile Rheumatoid Arthritis (8%) as aetiology, and masquerade syndrome in 1 case.

Based on the anatomical classification of uveitis, in our study, 38 patients (76%) had anterior uveitis, five (10%) had posterior uveitis, four (8%) had intermediate uveitis, and three (6%) had panuveitis. Complicated cataracts were observed in 10 cases (20%), Band Keratopathy in one case (2%), RD in three cases (6), and glaucoma in one case (2%) [Table 1].

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Anterior uveitis was common in the 9-12 age group. Intermediate uveitis is common at 6-9 years. Posterior uveitis is common in the 3-6 age group. PAN uveitis was common in the 6-9 age group. Anterior uveitis was more common in males (60.53%) than females (39.47%). Intermediate uveitis was more common in females (75%) than males (25%). Posterior uveitis was more common in women (80%) than males (20%). In PAN uveitis, 100% of the patients were male.

In the case of anterior uveitis, the majority of cases were of unknown aetiology (63.16%), followed by trauma (13.16%), juvenile rheumatoid arthritis (10.53%), focal sepsis (7.89%) Tuberculous (2.63%) Masquerade (2.63%). In cases of intermediate uveitis, the idiopathic aetiology was 50% and the tuberculous aetiology was 50%. In the case of posterior uveitis, the aetiology of Toxoplasma was 100%. The aetiology of panuveitis is mainly idiopathic (100%).

In the case of anterior uveitis 81.58%, had acute onset, and 18.42% had Acute Recurrent onset. In the case of intermediate uveitis, all 100% had an acute onset. In the case of posterior uveitis, all 100% had a chronic onset. In cases of PAN uveitis, 33.33% had an acute onset and 66.67% had a chronic onset.

The visual outcome was good in anterior uveitis in 34 patients (6/6–6/12) and 4 patients (6/12–6/24). Patients with intermediate uveitis had good visual outcomes, all belonging to the 6/6 to 6/12 category. Posterior uveitis and panuveitis patients had poor visual outcomes as they presented late, comprising 8 of the total patients [Table 2].

Uveitis was severe in six cases (12%) treated with atropine eye drops, mydricaine subconjunctival injection, periocular topical and systemic steroids, and immunosuppressants. In moderate cases, 25(50%) patients were treated with cycloplegics and topical and systemic periocular steroids. Eleven (22%) patients were treated with mydriatic agents and topical steroids. Cases (16%) presenting with quiet eyes were followed up, and complicated cataracts were treated with cataract extraction with PCIOL implantation [Table 3].

Of the seven cases in which cataract surgery with PCIOL implantation was performed, two cases improved to a postoperative visual acuity of 6/9 and better, one case 6/12, and four cases to 6/18. In cases of RD for cosmetic purposes, lens removal was performed [Table 4].

Table 1: Demographic data of the study

		Number of cases	Percentage
Age in year	0-3	2	4
	>3-6	15	10
	>6-9	12	24
	>9-12	21	42
	<15	10	20
Sex	Male	28	56
	Female	22	44
Duration	Acute	35	70
	Acute Recurrent	7	14
	Chronic	8	16
Aetiology	Idiopathic	29	58
	Traumatic	5	10
	Toxoplasma / Rubella	5	10
	Focal Sepsis	3	6
	JRA	4	8
	Tuberculous	3	6
	Masquerade	1	2
Type	Anterior	38	76
	Intermediate	4	8
	Posterior	5	10
	Pan	3	6
Complication	Complicated cataract	10	20%
	Band Keratopathy	1	2%
	RD	3	6%
	Glaucoma	1	2%

Table 2: Parameters based on anatomical classification

		Anterior uveitis	Intermediate uveitis	Posterior uveitis	Pan uveitis
Age in years	0-3	1 (2.13%)	0	1 (20%)	0
	>3-6	3 (7.89%)	0	2 (40%)	0
	>6-9	8 (21.05%)	2 (50	0	2 (66.67%)
	>9-12	18 (47.37%)	1 (25%)	1 (20%)	1 (33.33%)
	>12-15	8 (21.05%)	1 (25%)	1 (20%)	0
Sex	Male	23 (60.53%)	1 (25%)	1 (20%)	3 (100%)
	Female	15 (39.47%)	3 (75%)	4 (80%)	0
Aetiology	Idiopathic	24 (63.16%)	2 (50%)	0	3 (100%)
	Traumatic	5 (13.16%)	0	0	0

ISSN (O): 2687-5365; ISSN (P): 2753-6556

	Toxoplasma/rubella	0	0	5 (100%)	0
	Focal sepsis	3 (7.89%)	0	0	0
	JRA	4 (10.53%)	0	0	0
	Tuberculosis	1 (2.63%)	2 (50%)	0	0
	Masquerade	1 (2.63%)	0	0	0
Duration	Acute	31 (81.58%)	8 (100%)	-	1 (33.33%)
	Acute Recurrent	7 (18.42%)	0	0	0
	Chronic	0	0	5 (100%)	2 (66.67%)
Type	6/6 to 6/12	34	4	0	0
	6/12 to 6/24	4	0	0	0
	6/24 and less	0	0	5	3

Table 3: Severity and treatment

Severity	Number of Cases	Percentage	Treatment given
Severe	6	12	Cycloplegics, Mydricaine Periocular, topical and systemic steroids, Immunosuppressant
Moderate	25	50	Cycloplegics, periocular topical and systemic steroids
Mild	11	22	Cycloplegics topical steroids
Quiet eye	8	16	Cataract surgery, follow up

Table 4: Visual outcome after surgery

	SICS WITH PCIOL						
Pre Op. Vn.	4/60	4/60	HM+	HM+	HM+	CFCF	6/36
Post Op. Vn.	6/18	6/9	6/9	6/18	6/18	6/18	6/12

DISCUSSION

In this study of 50 patients, the following observations were made. Uveitis is more common in the 9 - 12 years age group. The sex incidence was higher in males (56%) than in females (44%). Acute onset was much higher than that in the other types. In aetiology, idiopathic aetiology accounted for a maximum (58%) followed by trauma and toxoplasma (10%). Juvenile Rheumatoid Arthritis is associated with 8% tuberculosis and focal sepsis (6% each), and masquerade syndrome with retinoblastoma (2%). Regarding anatomical classification, studies conducted between 1954 and 1969 by Kimura et al. (1954),[7] Kimura and Hogan (1964),[8] Perkins (1966),[9] Witmer and Korner (1966),[10] Kazden et al. (1967),[11] Makley et al. (1969),[12] and Jutte et al. (1969),[13] shows anterior uveitis to be 32.8% posterior uveitis 45.2% and intermediate uveitis 22%.

In our study on anatomical classification, according to the international uveitis study group classification, anterior uveitis was 76%, followed by posterior uveitis at 10%, intermediate uveitis at 8%, and PAN uveitis at 6%.

Aetiological Analysis: According to a study conducted by Ben Ezra et al. of 821 patients, 41.7% of patients had intermediate uveitis, followed by panuveitis (30.8%), posterior uveitis (14.1%), and anterior uveitis (13.4%).[14] According to a study by Perkins ES, the cause of anterior uveitis was idiopathic (32.7% JRA, 6.3%; Fuchs syndrome, 5.7%; ankylosing spondylitis, 5.1%; and Reiter's syndrome (5.2%). Posterior uveitis had toxoplasma (9.2%) as idiopathic (6.9%), followed by idiopathic retinal vasculitis (4.6%).[9]

In our study anterior uveitis had aetiology had idiopathic at 63.16%, Trauma at 13.16%, Juvenile Rheumatoid Arthritis at 10.53%, sepsis at 7.89%, Tuberculosis at 2.63% and tumour at 2.63%, the visual outcome was good to better in these patients. The aetiology of intermediate uveitis was idiopathic (50%) or tuberculosis (50%), and the visual outcome was better. In posterior uveitis, toxoplasma/rubella has an incidence of 100%, and the visual outcome is very poor. PAN uveitis had an idiopathic incidence of 100%, and all three had poor visual outcomes.

Murthy et al. (2021) reported that in paediatric uveitis patients, anterior and intermediate uveitis were the most prevalent types, with toxoplasmosis as the leading cause of infectious uveitis and juvenile idiopathic arthritis as the primary non-infectious cause, in addition to idiopathic cases.[15]

In our study, uveitis was severe in six cases (12%) which were treated with atropine eye drops, mydricaine subconjunctival steroids, periocular steroids, systemic steroids, and immunosuppressants. Moderate cases 25 (50%) were treated with mydriatic, periocular, and systemic steroids. Eleven (22%) patients were treated with mydriatic agents and topical steroids. Patients with uveitis had better visual outcomes if they presented earlier and responded to the treatment (72%).

Murthy et al. (2021) stated that topical steroids were the primary treatment for 57 children, while oral steroids were administered to 54 children. Additionally, 16 children received oral steroids alongside specific therapies tailored to the underlying aetiology, including antibiotics, antivirals, anti-toxoplasmosis drugs, anthelmintics, and anti-tuberculosis (ATT) medications.[15]

Clinical Presentation: Anterior uveitis was common in the 9–12 years age group, in males and of acute onset. Intermediate uveitis was common in the 6–9 years age group, common in females, and of acute onset. Posterior uveitis was common in the 3-6

ISSN (O): 2687-5365; ISSN (P): 2753-6556

age group and common in females and chronic onset. PAN uveitis was common in the 6-9 age group, in males and mainly by chronic onset.

Murthy et al. (2021) observed that the prevalent age bracket was 6–10 years, accounting for 46% of cases. Presentation manifested bilaterally in 60% of the cases and unilaterally in 40% of the cases. The uveitis types were anterior (29.23%), intermediate (27.69%), posterior (24.62%), and panuveitis (18.46%). Additionally, two cases of masquerades were identified.[15]

Souto et al. (2019) reported that the predominant types of uveitis were anterior uveitis (46%) and intermediate uveitis (26%). Among the non-infectious conditions, juvenile idiopathic arthritis (JIA)-associated uveitis (41%) and immune-mediated intermediate uveitis (25.6%) were the most prevalent. Infectious conditions included ocular toxoplasmosis (7.7%) and toxocariasis (5.1%).[16]

A study by Zuccardi et al. (2023) revealed that bilateral presentation (63.74%) and intermediate location (35.16%) were more common with uveitis (25.27%) being predominant. Idiopathic and infectious aetiologies are prevalent in intermediate uveitis. Unilateral cases were more frequent in idiopathic aetiology (42.1%) and bilateral in autoimmune aetiology (60%) ($p = 0.005$).[17]

Tungsattayathitthan et al. noted that uveitis mainly manifested as unilateral (74.5%), chronic course (82.4%), and panuveitis (43.1%). Ocular toxoplasmosis and toxocariasis were the most common diagnoses (9.8% each, respectively). At least one ocular complication at presentation was observed in 93% of the eyes.2 Another study by Waduthantri and Chee showed that posterior uveitis was the most prevalent (27.8%), followed by intermediate uveitis (25.9%), panuveitis (25.9%), and anterior uveitis.[18]

Complications: The major complications observed in this study were complicated cataracts (20%), followed by retinal detachment (6%), Band Keratopathy (2%), and glaucoma (2%). Retinal detachment was observed on B-scans and was present in the chronic presentation. Three cases of juvenile rheumatoid arthritis presented with complicated cataracts and band-shaped keratopathy. Post-inflammatory glaucoma was present with Acute Recurrent onset.

Murthy et al. (2021) observed that anterior uveitis had the highest complication rate (36.9%), with cataracts being common across anterior uveitis and panuveitis cases. Other prevalent complications include cystoid macular oedema in intermediate uveitis, glaucoma in anterior and intermediate uveitis, and band-shaped keratopathy in anterior uveitis.15 Additionally, Souto et al. (2019) observed ocular complications in 46% of patients during their initial visit and increased to 90% during the final evaluation.[16]

A study by Zuccardi et al. (2023) revealed that tuberculosis was the most frequent infectious cause, accounting for 44% of the cases. Upon admission, 25.7% of children presented with complications: synechiae (69.5%), retinal detachment (30.5%), and glaucoma (26%).[17]

Treatment: In this study, treatment was based on severity, complications, and systemic associations. Idiopathic anterior uveitis was treated with mydriatic, cycloplegic, topical, periocular, and systemic steroids, and the anterior chamber reaction drastically regressed. Complicated cataracts were treated with small incision cataract surgery with PCIOL implantation after active inflammation had subsided under general anaesthesia. The eyes with retinal detachment were treated with cataract removal for cosmetic purposes. Eyes with choroditis could only be followed up, as they did not belong to the active group.

A case of post-inflammatory glaucoma with a shallow anterior chamber and iris bombe was treated with 0.25% timolol and was subjected to glaucoma surgery with good postoperative IOP control. Band-shaped keratopathy did not affect the visual axis and hence was not treated. Souto et al. (2019) indicated that oral prednisone, immunosuppressive therapy (IMT), and/or biologic agents were administered in all cases of non-infectious conditions (32 children, 82%). Specifically, IMT and/or biologic agents were used in all patients with JIA-associated uveitis and 50% of patients with immune-mediated intermediate uveitis.[16]

Factors Affecting Visual Outcome: Patients with anterior and intermediate uveitis had better visual outcomes than those with posterior uveitis or panuveitis. Patients who presented earlier, within 6 weeks of complaint duration, had better visual outcomes than those who presented late. Patients who had retinal detachment and choroiditis had divergence of the affected eye and did not have a good prognosis as they presented late. The visual outcome was moderate in patients with complicated cataracts and glaucoma who underwent surgery with appropriate precautions. Band-shaped keratopathy was not observed in the visual axis; therefore, the patient had good vision.

A study by Sivakoti et al. (2023) noted that the presence of cataracts, posterior uveitis, and retinal detachment are substantial risk factors for predicting worse visual outcomes.[19,20]Tungsattayathitthan et al. (2023) observed that the common causes of poor vision include retinal detachment, atrophic bulbi, and optic atrophy. Predictive factors for limited improvement in visual acuity (VA) during follow-up included preschool-age onset of uveitis ($p < 0.001$), duration of ocular symptoms $\geq$ 1 month before diagnosis ($p = 0.004$), and non-anterior uveitis ($p = 0.047$). Younger age at uveitis onset, delayed diagnosis, and uveitis involving the posterior segment were associated with poorer VA outcomes.[2]

Ganesh et al. found that preschool-aged children had poorer visual outcomes than older children with uveitis did. Additionally, a longer duration of uveitis

ISSN (O): 2687-5365; ISSN (P): 2753-6556

before referral to a tertiary care centre was associated with a worse visual prognosis in children.20 Waduthantri and Chee demonstrated that a longer duration of uveitis and delayed referral to a tertiary care centre are associated with poorer VA outcomes.[18]

CONCLUSION

Uveitis in children can progress and cause serious visual impairment if not diagnosed or treated earlier. Paediatric uveitis is common in the 9-12 years age group. Anterior uveitis is a common condition. Other forms are delayed and lead to serious visual impairment. An unknown cause was the major aetiology detected in children. JRA leads to major complications if the eye is not assessed. Toxoplasma mostly goes unnoticed and hence produces a vision catastrophe. As it is infective, early diagnosis can make it treatable to ensure good vision. Intermediate Uveitis also goes unnoticed due to good vision and can be detected only by clinical examinations and school screening camps. All strabismus should be evaluated because it can be due to panuveitis or post-uveitis sequelae.

Early diagnosis and prompt treatment with mydriatics, corticosteroids, immunosuppressants, and follow-up can prevent complications and ensure good vision. Complicated cataracts under steroid and immunosuppressants, taken for SICS WITH PCIOL at an earlier date, resulted in a good visual prognosis. The teamwork of paediatricians, rheumatologists, ENT physicians, and chest physicians with ophthalmologists can lead to early diagnosis and treatment, prevent complications, and ensure good vision in children.

REFERENCES

1. Majumder PD, Biswas J. Pediatric uveitis: An update. Oman J Ophthalmol2013;6:140. https://doi.org/10.4103/0974-620x.122267.
2. Tungsattayathitthan U, Rattanalert N, Sittivarakul W. Long-term visual acuity outcome of pediatric uveitis patients presenting with severe visual impairment. Sci Rep 2023;13. https://doi.org/10.1038/s41598-023-29159-x.
3. Siiskonen M, Hirn I, Pesälä R, Hautala T, Ohtonen P, Hautala N. Prevalence, incidence and epidemiology of childhood uveitis. ActaOphthalmol 2021;99. https://doi.org/10.1111/aos.14535.
4. Maleki A, Anesi SD, Look-Why S, Manhapra A, Foster CS. Pediatric uveitis: A comprehensive review. SurvOphthalmol2022;67:510–29. https://doi.org/10.1016/j.survophthal.2021.06.006.
5. Zierhut M, Michels H, St??biger N, Besch D, Deuter C, Heiligenhaus A. Uveitis in children. IntOphthalmolClin2005;45:135–56. https://doi.org/10.1097/01.iio.0000155903.87679.c2.
6. Smith JA, Mackensen F, Sen HN, Leigh JF, Watkins AS, Pyatetsky D, et al. Epidemiology and course of disease in childhood uveitis. Ophthalmology 2009;116:1544-1551.e1. https://doi.org/10.1016/j.ophtha.2009.05.002.
7. Kimura SJ, Hogan MJ, Thygeson P. Uveitis in children. Arch Ophthalmol1954;51:80–8. https://doi.org/10.1001/archopht.1954.00920040082011.
8. Kimura SJ, Hogan MJ. Uveitis in Children: Analysis of 274 Cases. Trans Am Ophthalmol Soc. 1964;62:173–92. https://pubmed.ncbi.nlm.nih.gov/14269890/
9. Perkins ES. Pattern of uveitis in children. Br J Ophthalmol1966;50:169–85. https://doi.org/10.1136/bjo.50.4.169.
10. Witmer R, Körner G. Uveitis imkindesalter. Ophthalmologica1966;152:277–82. https://doi.org/10.1159/000304977.
11. Kazdan JJ, McCulloch JC, Crawford JS. Uveitis in children. Can Med Assoc J 1967;96:385–91. https://pubmed.ncbi.nlm.nih.gov/6066889/
12. Makley TA, Long J, Suie T. Uveitis in children*: A follow-up study. J PediatrOphthalmol Strabismus 1969;6:136–9. https://doi.org/10.3928/0191-3913-19690801-09.
13. Jütte A, Lemke L, Opitz J. Chronischezyklitisimkindesalter. Ophthalmologica1969;157:169–77. https://doi.org/10.1159/000305650.
14. BenEzra D, Cohen E, Maftzir G. Uveitis in children and adolescents. Br J Ophthalmol. 2005;89:444–8. https://doi.org/10.1136/bjo.2004.050609.
15. Raveendra Murthy S, Ganesh S, Minija, Dubey N. Pediatric uveitis: a retrospective analysis at a tertiary eye care hospital in South India. TherAdvOphthalmol2021;13:251584142110277. https://doi.org/10.1177/25158414211027707.
16. Souto FMS, Giampietro BV, Takiuti JT, Campos LMA, Hirata CE, Yamamoto JH. Clinical features of paediatric uveitis at a tertiary referral centre in São Paulo, SP, Brazil. Br J Ophthalmol2019;103:636–40. https://doi.org/10.1136/bjophthalmol-2018-312313.
17. GuarnizoZuccardi P del R, Díaz Maldonado A, Pino Hernández SP, Jiménez Cruz KV, MontillaVelásquez M del P, Preciado FV. Uveitis in children assessed in the paediatric rheumatology clinic, a multicentre study. Rev ColombReumatol (Engl Ed) 2023;30:118–23. https://doi.org/10.1016/j.rcreue.2021.09.001.
18. Waduthantri S, Chee SP. Pediatric Uveitis and Scleritis in a Multi-Ethnic Asian Population. OculImmunolInflamm2021;29:1304–11. https://doi.org/10.1080/09273948.2020.1766083.
19. Sivakoti P, Swaminathan M, Magesan K, Pyare R, George AE, Ganesh SK, et al. Visual outcome in pediatric uveitis: A retrospective data review in 277 children. Indian J Ophthalmol2023;71:2158–61. https://doi.org/10.4103/ijo.ijo_1993_22.
20. Ganesh SK, Bala A, Biswas J, Ahmed AS, Kempen JH. Pattern of pediatric uveitis seen at a tertiary referral center from India. OculImmunolInflamm2016;24:402–9. https://doi.org/10.3109/09273948.2015.1012298.

ISSN (O): 2687-5365; ISSN (P): 2753-6556