e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(10); 06-11

Original Research Article

Etiology and Management of Anterior Uveitis: A Clinical Study

Rafiya Sarfaraz Shaikh[1], Anupam Kumar Singh[2], Sachin Sundarrao Pandhare[3]

[1]Senior Resident, Department of Ophthalmology, Bharatratna Atal Bihari Vajpayee Medical College, Pune, India

[2]Assistant Professor, Department of Ophthalmology, Rohihkhand Medical College and hospital, Bareilly, Uttar Pradesh, India

[3]Assistant Professor, Department of Ophthalmology, Government Medical College, Baramati, Maharashtra, India

Received: 11-09-2024 / Revised: 22-09-2024 / Accepted: 04-10-2024

Corresponding Author: Dr. Sachin Sundarrao Pandhare

Conflict of interest: Nil

Abstract

Background: Uveitis is a complex intraocular inflammatory condition with various etiological factors Anterior uveitis is the most common form of uveitis. The inflammation may be triggered by an infectious agent or trauma, but in some instances, it is suspected to have an autoimmune origin. This study aimed to assess the etiological patterns, treatment outcomes, and complications of anterior uveitis.

Methods: This prospective clinical study was conducted in the Department of Ophthalmology. Patients aged 20-60 years presenting with anterior uveitis were included. Comprehensive clinical evaluations and investigations were carried out to determine the underlying causes. Patients received specific and non-specific treatments and were followed for 6 months. Complications were recorded.

Results: A total of 40 cases were included in the study. Most anterior uveitis cases occur in middle-aged adults (31-50 years), with fewer cases in younger and older age groups. There is no strong preference for the involvement of either the right or left eye, suggesting that anterior uveitis can affect both eyes with similar frequency. The most common cause of anterior uveitis is idiopathic, meaning the underlying cause remains unknown. However, other factors, including inflammatory conditions, infectious agents, and lens-related issues, can also contribute to the development of the disease. The specific management approach for anterior uveitis will depend on the underlying cause. Treatment may involve medications, corticosteroids, or in some cases, surgical intervention.

Conclusion: The primary cause of anterior uveitis remained unidentified in many cases. Comprehensive examination and investigations are essential for accurate diagnosis. Timely treatment leads to favorable visual outcomes, though chronic and recurrent cases often result in ocular morbidity.

Keywords: Clinical Study, Anterior Uveitis, Treatment, Complications.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0) and the Budapest Open Access Initiative (http://www.budapestopenaccessinitiative.org/read), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Uveitis is a term used to describe inflammation of any part of the uveal tract – the iris, the ciliary body, or choroid. It is one of the most frequent types of uveitis, but it is especially characteristic of children and young people. Uveitis is a rather heterogeneous concept, meaning that the disease has many subtypes, which are characterized by various causes. More often, uveitis is an indicator of systemic diseases; often, the eyes respond to the changes in the rest of the body [1]. Uveitis could be the presenting sign of several autoimmune diseases, infections, or other systemic diseases hence early recognition of the condition is important for the health of the eyes as well as the patient in general [2]. In a nutshell, the variation in the spectrum of uveitic diseases depends on the geographical location; ecological conditions; race; nutrition; and socioeconomic status of the people. For instance, some areas such as the tropical world might have more cases of infectious uveitis due to diseases that are frequent in such areas while other areas might have more autoimmune cases. These variations shed light on the necessity of taking an array of diagnostic procedures in which the patient's history, including exposure to certain environmental factors, is taken into consideration.

There are various forms of uveitis and the anterior form of uveitis is the most common and it affects 57% of the patients [3]. Use of this modality is estimated to account for 4 percent of all uveitis cases. Iris and the ciliary body are the two structures that are impacted by it and both are

located in the front part of the eye. The clinical forms most often encountered in practice are acute, unilateral, non-infective, and non-granulomatous. This type of inflammation that occurs in the anterior part of the eye called anterior uveitis and which has no known cause is present in all ages. The mean age of diagnosis is approximately 38 years. It also affects males more than females. The actual cause of anterior uveitis remains somewhat obscure most of the time, and thus diagnosing the condition is not easy. Other diseases including tuberculosis, herpes zoster, and syphilis or trauma cause uveitis, but they do have fairly autoimmune processes occurring in most uveitis cases. The conditions that may cause anterior uveitis include ankylosing spondylitis, sarcoidosis, and juvenile idiopathic arthritis [4]. But many cases are still idiopathic in nature. This lack of distinction makes diagnosis and treatment challenging most of these patients are seen by a rheumatologist, an infectious disease expert, and an ophthalmologist at some point [5]. The annual incidence of anterior uveitis is approximately 17 per 100,000 people [6]. Anterior uveitis can be classified into three main subtypes: Posterior uveitis Which is known as iritis, anterior cyclitis, and iridocyclitis. These conditions can be quite uncomfortable sometimes having symptoms such as redness, irritation to light, excessive tearing, and improved vision. Although patients with acute anterior uveitis usually experience only a slight decrease in visual acuity, its contribution to the overall morbidity of the disease, especially in the case of complications such as macular edema, glaucoma, or cataracts, is significant. These complications are more severe and may lead to complete vision loss and in many cases are chronic. An active treatment plan would be the use of corticosteroids and the application of dilating eye drops so that synechiae formation does not occur with the iris and lens. However, the treatment itself can have several complications, cataracts, increased intraocular pressure, or side effects associated with the long-term use of steroids. Hence, it becomes important there is constant supervision to determine the benefits and risks of the therapy. However, the morbidity of anterior uveitis is still moderate to high in chronic or recurrent cases of the disease, as inflammation and consequent damage to the ocular tissues can have a negative effect on the vision [7]. With this background, the current study was aimed to determine the etiology and management of anterior uveitis presenting to our tertiary care teaching hospital.

Material and Methods

A prospective clinical study was conducted in the Department of Ophthalmology, Institute of Medical Sciences. Institutional Ethical approval was obtained for the study. Written consent was obtained from all the participants of the study after explaining the nature of the study in vernacular language. Those willing to participate voluntarily were included in the study.

Inclusion Criteria

1. Patients with signs and symptoms of anterior uveitis following penetrating ocular injuries, corneal ulcers, and intraocular surgeries.
2. Aged 20 – 60 years
3. Males and females
4. Available for follow up
5. Voluntarily willing to participate in the study

Exclusion Criteria

1. Patients of intermediate uveitis
2. Patients of posterior uveitis
3. Patients of Panuveitis
4. Masquerade syndrome presents as anterior uveitis

For each patient, a standard clinical proforma was filled with details of patient data, presenting complaints, visual acuity using Snellen's chart, clinical findings, laboratory investigations, and final diagnosis. In all patients, a slit-lamp biomicroscope examination was done, and the disease severity, laterality, chronicity, ocular signs, and the presence of any systemic disease were noted. Ocular inflammation was considered unilateral if seen in one eye and bilateral if seen in both eyes. The diagnosis of anterior uveitis (AU) was made according to the criteria set by the International Uveitis Study Group. It was considered acute if the duration of the symptoms was below three months, chronic if the duration was three months or more, and recurrent if there were two or more episodes with symptom-free intervals. The uvea was considered granulomatous in cases where large KPs, Koeppe's nodules at the pupillary margin, or Busacca's nodules on the surface or within the anterior iris tissues were present. Comprehensive laboratory investigations are done depending on the differential diagnosis given to the specific patient. These included the total and differential blood counts, the erythrocyte sedimentation rate, urine and stool examination, and a Mantoux test. Viral haemagglutinin stain, HIV, and rheumatic factor serological tests were made on all the patients. X-ray examinations carried out included chest, lumbosacral, and knee joint x-ray. Other specified studies were performed as necessary. The final etiological diagnosis was based on patient history, clinical findings, laboratory results, and systemic evaluations by other specialists.

All patients received medical treatment with topical steroids (prednisolone acetate 1%) and topical cycloplegic mydriatics (either atropine or homatropine). The frequency of steroid application

was adjusted according to the severity of the uveitis. When the etiology was identified, appropriate treatment was administered. Systemic antimicrobials were given when an infectious agent was identified, while systemic steroids were used in cases of severe inflammation, treatment-resistant cases, or patients with macular edema.

Patients with lens-induced inflammation underwent surgical treatment. In cases where uveitis was associated with a visually significant cataract, cataract surgery was performed three months after the inflammation had subsided. These patients received high doses of topical and systemic steroids one week before surgery, with a gradual tapering post-operatively. Cases of anterior uveitis complicated by secondary glaucoma were treated with acetazolamide (250 mg BD/TID) and/or timolol 0.5% eye drops BD, in combination with topical steroids. Each patient was followed up for six months, with complications noted and the response to treatment evaluated for each case.

Statistical analysis: All the available data was refined and uploaded to an MS Excel spreadsheet and analyzed by SPSS version 22 in Windows format. The continuous variables were represented as mean, standard deviation, and percentages. The categorical variables were calculated as a chi-square test to determine the differences between the two groups. The values of p (<0.05) were considered as significant.

Results

A total of 40 cases of anterior uveitis were reported and included in the study. Out of which 10(25%) were females and 30(75%) were males. The male-to-female ratio was 3:1. The majority of cases (29 out of 40) fall within the age groups of 31-50 years, indicating that anterior uveitis is more prevalent in middle-aged individuals. Fewer Cases in Younger and Older Groups: There are fewer cases in the younger age groups (up to 20 years and 21-30 years) and in the oldest age group (above 60 years) the mean age of the cohort was 40.25 ± 8.5 years. The results suggest that anterior uveitis is most commonly seen in middle-aged adults. This could be due to various factors, such as hormonal changes, lifestyle factors, or underlying health conditions that are more prevalent in this age group.

Table 1: Showing the side involved in the cases of study (Laterality)

Laterality	Anterior Uveitis	
	Frequency	%
Right eye	21	52.5
Left eye	16	40.0
Both eyes	3	7.5
Total	40	100

Table 1 shows the laterality of involvement of the eyes in anterior uveitis in the cases of the study. The majority of cases (62.5%) involved the right eye. A significant number of cases (55.0%) involved the left eye. A smaller percentage (7.5%) affected both eyes. Subtle differences in the anatomy or physiology of the eyes might contribute to a slight preference for one eye over the other.

In the present study, the pattern of anterior uveitis was studied which showed that most of the patients n=34(85%) of the total n=40(100%) patients had acute anterior uveitis and n=6(15%) had a chronic type of anterior uveitis.

In the present study most of the cases n=36 (90%) were suffering from non-granulomatous infection and n=4(10%) were having granulomatous inflammation. The percentage of granulomatous and non-granulomatous uveitis detected in our study is based only on the clinical picture and not on histopathological examination which is difficult in our setup and also that the patients cannot afford. In this study, n=38(95%) of the patients showed the presence of iris nodules and the rest n=2(5%) did not show the presence of iris nodules.

Table 2: The Final Diagnosis of the cases of the study

Final Diagnosis	Anterior uveitis	
	Frequency	%
Idiopathic	21	52.5
Spondyloarthropathy associated	3	7.5
Herpes Simplex Keratouveitis	1	2.5
Traumatic anterior uveitis	4	10.0
Tuberculosis	2	5.0
Fuch's Heterochromic uveitis	1	2.5
Hansen's uveitis	2	5.0

Lens induced uveitis	3	7.5
herpes zoster	1	2.5
Sclerokerato uveitis	1	2.5
Inflammatory bowel disease	1	2.5
Total	40	100

Table 2 presents the final Diagnosis of Anterior Uveitis Cases. The most common diagnosis was idiopathic anterior uveitis, accounting for 52.5% of cases. This indicates that the underlying cause of the condition remains unknown in a significant number of patients. A variety of inflammatory conditions were associated with anterior uveitis, including spondyloarthropathy, tuberculosis, and inflammatory bowel disease. Herpes simplex keratouveitis, herpes zoster, and Hansen's uveitis were identified as infectious causes in a smaller number of cases. Lens-induced uveitis and sclerokerato uveitis were also noted as potential causes.

In this study, a systemic association was observed in 10 cases (22.5%), while no systemic association was present in 30 cases (77.5%). Uveitis was found to be associated with diabetes mellitus in four patients (10%) and with hypertension in two patients (5%). All patients with diabetes mellitus were over 50 years old, and three of the four diabetic patients had chronic uveitis. Previous research on uveitis in elderly patients has suggested that diabetes may be a potential risk factor for the development of uveitis. At presentation, the majority of eyes (85%) had a visual acuity of 6/12 or worse. After treatment, most eyes (70%) improved to a visual acuity of 6/9 or better. However, in some cases with complications such as cataracts or macular edema, visual acuity showed only marginal improvement.

Discussion

This study aimed to determine the pattern of anterior uveitis presenting to our hospital. A total of 40 cases were included in the study. In developed countries, the incidence of uveitis is estimated to range between 17 and 52 per 100,000 people per year [3]. The most common age group (29 out of 40) falls within the age groups of 31-50 years, indicating that anterior uveitis is more prevalent in middle-aged individuals. In a similar study by Hussain et al. [8] it was found that individuals in the 40-50-year age group (4th decade of life) were more prone to anterior uveitis, with 27.53% of patients affected. Biswas et al. [8], in their study, reported the highest incidence of uveitis in the 5th decade of life. Other researchers have similarly noted that uveitis is more common in individuals aged 40-50 years [2, 9]. Singh et al. [10], however, reported anterior uveitis in the 4th decade of life. Anterior uveitis is less common in individuals under 10 years of age and those above 60 years of age [2].

In this study of 40 cases, 75% were male and 25% were female. Several studies have similarly indicated that anterior uveitis is more common in males, supporting the findings of this study [2, 10, 11, 12]. We observed that the right eye was affected in 52.5% (n=21) of cases, the left eye in 40% (n=16), and both eyes simultaneously in 7.5% (n=3) of cases, indicating that the majority of patients presented with unilateral involvement. Rathinam et al. reported that 85.3% of patients in their study also had unilateral anterior uveitis [2]. Although both eyes are equally susceptible to the disease, unilateral involvement was more prevalent in our study. Most patients, 87.5% (n=35), had acute anterior uveitis, while 12.5% (n=5) had chronic uveitis, and no patients experienced recurrent episodes. This differs slightly from the findings of Madhvi et al. [4] in their study have reported that 75.86% of cases were acute, 17.82% were chronic, and 6% were recurrent. In our study, a specific etiology for anterior uveitis was identified in 47.5% of cases, while the remaining cases were classified as idiopathic. Blunt trauma was the cause in 20% of cases, phagocytic uveitis in 12.5%, and tuberculosis in 5%, with other causes accounting for 2.5%. Singh et al. [10] identified a specific etiology in 48.82% of their cases. Generally, about 50% of cases have a specific cause, with tuberculosis being the most common, found in 22.16% of cases, followed by syphilis (3.77%) and rheumatoid arthritis (2.83%). Das et al. [13] identified collagen vascular disease as the most common identifiable cause of anterior uveitis (29.4%), while Rathinam et al. [2] reported leptospiral uveitis as the most common etiology in their study. In developing countries, granulomatous uveitis is commonly caused by tuberculosis, syphilis, and leprosy. In our study, 6% of cases were attributed to tuberculosis, and 2% to leprosy.

Tuberculosis can affect both the anterior and posterior segments of the eye. While tubercular uveitis typically presents as granulomatous, non-granulomatous uveitis, though rare, can also occur. Nodular lesions may appear on the iris and in the anterior chamber angle. A high level of suspicion based on clinical features such as granulomatous uveitis, poor steroid response, recurrence after steroid withdrawal, pigmented hypopyon, and early iris neovascularization can aid in diagnosing tubercular uveitis. Standard antitubercular

treatment is essential for patients with probable or confirmed tubercular anterior uveitis, typically lasting 6 to 9 months. Ocular leprosy may present with episcleritis, scleritis, keratitis, and iritis. However, the most common cause of blindness in

leprosy is chronic, low-grade anterior uveitis, which often remains asymptomatic until advanced stages. In our study, 90% of anterior uveitis cases were non-granulomatous, while 10% were granulomatous. Madhavi et al. [4] similarly reported 90% of cases as non-granulomatous and 10% as granulomatous in Karnataka, aligning with our findings. Intraocular fungal infections can occur in various patients, including immunosuppressed individuals, those with systemic fungal infections, intravenous drug users, and patients who have experienced ocular trauma or surgery. One case in our study developed fungal anterior uveitis following a penetrating injury and was successfully treated with topical and systemic antifungal therapy. Uveitis is associated with numerous ocular complications, including cataract, glaucoma, band-shaped keratopathy, macular edema, epiretinal membrane, proliferative vitreoretinopathy, choroidal and retinal neovascularization, painful blind eye, and phthisical eye. These complications often lead to visual impairment. In our study, complications were observed in 8 eyes (20%). No complications were observed in 32 eyes (80%). Complications were more frequently noted in chronic cases. The most common complication was persistent posterior synechiae, occurring in 2 eyes (5%), followed by cataracts in 2 eyes (5%). Secondary glaucoma was noted in 2 eyes (5%), and 1 (2.5%)eye with tuberculosis-related anterior uveitis. Iris atrophy was observed in 1 eye (2.5%). Rothova et al. [14] reported cataracts in 19% of cases, glaucoma in 11%, and phthisical eye in 2.4%. Cataract formation in uveitis typically results from prolonged, uncontrolled inflammation and long-term use of high-dose topical and systemic steroids. All patients with complicated cataracts underwent small incision cataract extraction with PMMA intraocular lens implantation under steroid coverage. Post-surgery, all patients achieved the best-corrected vision of 6/6 in the operated eye.

Conclusion

Within the limitations of this study, it can be concluded that anterior uveitis is most common in individuals in their Middle Ages, with idiopathic cases being prevalent. Granulomatous uveitis is frequently linked to tuberculosis. The key challenge is developing targeted laboratory investigations based on the patient's profile to aid diagnosis. A thorough systemic evaluation is essential to rule out any underlying diseases. Most cases respond well to medical treatment, but chronic uveitis and delays in treatment increase the risk of complications. Early recognition and management of recurrent cases can significantly improve outcomes.

References

1. Rathinam SR, Babu M. Algorithmic approach in the diagnosis of uveitis. Indian J Ophthalmol. 2013 Jun;61(6):255-62.
2. Rathinam SR, Namperumalsamy P. Global variation and pattern changes in the epidemiology of uveitis. Indian J Ophthalmol 2007; 55 (3):173-83.
3. Amador-Patarroyo MJ, Cristina Peñaranda A, Teresa Bernal M. Autoimmune uveitis. In: Anaya JM, Shoenfeld Y, Rojas-Villarraga A, et al., editors. Autoimmunity: From Bench to Bedside [Internet]. Bogota (Colombia): El Rosario University Press; 2013 Jul 18. Chapter 37. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459445/
4. KM Sudha Madhavi, RC Kumaraswamy. Study of clinical and etiological pattern of anterior uveitis in middle Karnataka. CRISMED journal of Health and Research 2015;2(2):124-28.
5. Alio J, Ben Ezra D. Priority features of intraocular inflammation. Highlights of Ophthalmology 2002; 30(3):1-2.
6. Min AT, Reddy AK, Burkholder BM. Clinical features and incidence rates of ocular complications in patients with retinal vasculitis. Am J Ophthalmol. 2017; 59(4):197-214.
7. Min AT, Reddy AK, Burkholder BM. Clinical features and incidence rates of ocular complications in patients with retinal vasculitis. Am J Ophthalmol. 2017; 59(4):197-214.
8. Hussain SMP, Mirza A. A prospective study of the clinical profile of patients presenting with anterior uveitis. J. Evolution Med. Dent. Sci. 2016;5(99):7280-83.
9. Dogra M, Singh R, Agarwal A, Sharma A, Singh SR, Gautam N, Yangzes S, Samanta R, Sharma M, Aggarwal K, Sharma A, Sharma K, Bansal R, Gupta A, Gupta V. Epidemiology of Uveitis in a Tertiary-care Referral Institute in North India. Ocul Immunol Inflamm. 2017;25 (sup1):S46-S53.
10. Singh R, Gupta V, Gupta A. Pattern of Uveitis in a referral eye clinic in North India. Indian J Ophthalmol 2004; 52:121-25.
11. Gautam N, Singh R, Agarwal A, Yangzes S, Dogra M, Sharma A, Bansal R, Gupta V, Dogra MR, Gupta A. Pattern of Pediatric Uveitis at a Tertiary Referral Institute in North India. Ocul Immunol Inflamm. 2016 Oct 21:1-7.
12. Biswas J. Anatomy of the Uveal tract. In:Dutta LC, Dutta NK, eds. Modern Ophthalmology. 3rd edn. Vol3 New delhi: Jaypee brothers; 2005;1249-1253.

13. Das D, Biswas J, Ganesh SK. Pattern of uveitis in a referral uveitis clinic in India. Indian J Ophthalmol. 1995; 43:117-21.
14. Rothova A, Suttorp-van Schulten MS, Frits Treffers W, Kijlstra A. Causes and frequency of blindness in patients with intraocular inflammatory disease. Br J Ophthalmol. 1996; 80(4):332-336.