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ORIGINAL ARTICLE

Etiological Spectrum of Anterior Uveitis in a Tertiary Care Center

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ABSTRACT:

Background: Anterior uveitis is the most common form of intraocular inflammation, with a wide range of infectious and non-infectious etiologies. Understanding its local etiological distribution is essential for guiding diagnostic and treatment strategies. **Aim:**To establish the etiological distribution of anterior uveitis at a tertiary care center in India. **Material and Methods:**This prospective observational study included 85 patients diagnosed with anterior uveitis. Detailed clinical histories, ophthalmic examinations, and targeted laboratory investigations were performed to determine the underlying etiology. Data was analyzed using descriptive statistics. **Results:**Idiopathic anterior uveitis was the most frequent cause, accounting for 43% of cases, followed by traumatic iridocyclitis (31%). Infectious etiologies constituted 11%, predominantly herpes zoster and tuberculosis. Non-infectious causes accounted for 15%, including rheumatoid arthritis, juvenile idiopathic arthritis, post-operative uveitis, Covid vaccination-related uveitis, and breast carcinoma-associated uveitis. The study highlights the importance of region-specific epidemiological data in tailoring diagnostic protocols. **Conclusion:**Idiopathic causes continue to dominate the etiological spectrum of anterior uveitis in India, with trauma, infectious, and non-infectious etiologies also playing significant roles. Enhanced awareness and a tailored approach to investigations are crucial for improving patient outcomes.

Keywords: Anterior uveitis, idiopathic uveitis, tuberculosis, trauma, India

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INTRODUCTION

Anterior uveitis is the most common form of intraocular inflammation encountered in ophthalmic practice, accounting for nearly 50–92% of all uveitis cases worldwide [1]. It involves inflammation of the iris and/or ciliary body and can present with symptoms such as pain, photophobia, redness, and blurred vision, which can significantly impact a patient's quality of life [2]. The disease spectrum ranges from mild, self-limiting forms to severe, recurrent conditions that may lead to irreversible vision loss if inadequately managed [3].

The etiological profile of anterior uveitis is highly variable and influenced by geographic, ethnic, genetic, environmental, and institutional referral patterns [4]. The major causes include HLA-B27-associated acute anterior uveitis, idiopathic uveitis, tuberculosis, viral infections (such as herpes simplex and herpes zoster), sarcoidosis, juvenile idiopathic arthritis, and syphilis [5,6]. Emerging research from India has emphasized the role of tuberculosis and HLA-B27 positivity as leading causes, reflecting the regional infectious and autoimmune burden [7].

Early identification of the underlying etiology is critical, as it guides targeted therapy and helps prevent complications like glaucoma, cataract, and cystoid macular edema [8]. Recent advances in laboratory investigations, including polymerase chain reaction (PCR) and anterior chamber tap analysis, have improved diagnostic accuracy, enabling ophthalmologists to distinguish between infectious and noninfectious causes more effectively [9].

Despite this progress, the etiological distribution of anterior uveitis varies significantly across different populations and healthcare settings, underlining the need for region-specific data [10]. This study aims to establish the etiological distribution of anterior uveitis at a tertiary care center in India, providing insights that could improve diagnostic and management strategies in similar healthcare environments.

MATERIAL AND METHODS

This was a prospective, observational study conducted at the Department of Ophthalmology, a tertiary care center in India.A total of 85 patients diagnosed with anterior uveitis were enrolled in the study.

Inclusion criteria

- Patients aged ≥18 years presenting with clinical features of anterior uveitis.
- Both first-time and recurrent cases.
- Patients willing to provide informed consent.

Exclusion criteria

- Patients with intermediate, posterior, or panuveitis.
- Patients with traumatic uveitis.
- Patients with incomplete clinical records or who were lost to follow-up.

Detailed clinical history was obtained, including duration of symptoms, previous episodes, systemic illnesses, trauma, or infections. A complete ocular examination was performed, including:

- Best corrected visual acuity (BCVA)
- Slit-lamp biomicroscopy
- Intraocular pressure (IOP) measurement by applanation tonometry
- Fundus examination

Investigations

All patients underwent a standardized uveitis workup, which included:

- Complete blood count (CBC)
- Erythrocyte sedimentation rate (ESR)
- C-reactive protein (CRP)
- Mantoux test
- HLA-B27 typing (if clinically indicated)
- Serum angiotensin-converting enzyme (ACE)
- Chest X-ray
- Syphilis serology (VDRL/TPHA)
- Other tests (ANA, rheumatoid factor, aqueous PCR, or anterior chamber tap) as per clinical suspicion.

Based on clinical evaluation and investigation results, cases were classified into etiological categories such as:

- HLA-B27 associated anterior uveitis
- Tuberculosis-related uveitis
- Viral anterior uveitis (herpetic/zoster)
- Juvenile idiopathic arthritis (JIA)
- Sarcoidosis
- Fuchs heterochromic iridocyclitis
- Idiopathic anterior uveitis

Patients were managed as per standard treatment guidelines, including topical corticosteroids, cycloplegics, and systemic immunosuppressants or antimicrobials when necessary.

All data were recorded in Microsoft Excel and analyzed using SPSS version 15. Descriptive statistics such as frequency, percentage, mean, and standard deviation were calculated. Chi-square test or Fisher's exact test was applied to compare categorical variables, and a p-value <0.05 was considered statistically significant.

The Institutional Ethics Committee approved the study, and informed written consent was obtained from all participants prior to enrollment.

RESULTS

Table 1 shows the distribution of various etiologies of anterior uveitis among 85 patients. Idiopathic causes are the most common, accounting for 30 cases, followed by traumatic iridocyclitis with 23 cases, and tuberculosis with 15 cases. Other less frequent etiologies include herpes zoster, juvenile idiopathic arthritis, post-streptococcal, rheumatoid arthritis, scrub typhus, post-operative uveitis, breast carcinoma, and Covid vaccination, each contributing a smaller proportion.

Table 2 shows the overall categorical breakdown of anterior uveitis. Idiopathic cases make up 43% (37 cases), trauma accounts for 31% (26 cases), infectious etiologies contribute 11% (9 cases), and non-infectious causes make up 15% (13 cases) of the total sample.

Table 3 shows the specific infectious causes among 85 patients. Herpes zoster and tuberculosis each account for 32 cases (37.5%), making them the leading infectious etiologies. Scrub typhus and post-streptococcal uveitis follow with 11 (12.5%) and 10 cases (12.5%), respectively, highlighting the diversity of infectious agents involved.

Table 4 shows the breakdown of non-infectious causes among 85 patients. Breast carcinoma accounts for the majority with 46 cases (55%), followed by rheumatoid arthritis with 15 cases (18%). Juvenile idiopathic arthritis, Covid vaccination, and post-operative uveitis each contribute 8 cases (9%) to the non-infectious group.

Table 1: Etiological distribution among the study Population

Etiology	Count (n=85)
Breast Carcinoma	1
Covid Vaccination	2
Herpes Zoster	3
Juvenile Idiopathic Arthritis	2
Idiopathic	30
Post Streptococcal	1
Rheumatoid Arthritis	2
Scrub Typhus	1
Post Operative	5
Tuberculosis	15
Traumatic Iridocyclitis	23

Table 2: Categorical Distribution of Etiology among study Population

Category	Percentage	Count (n=85)
Idiopathic	43%	37

Trauma	31%	26
Infectious	11%	9
Non-infectious	15%	13

Table 3: Distribution of Infectious Etiology among the study Population

Infectious Etiology	Count (n=85)
Herpes Zoster	32
Tuberculosis	32
Scrub Typhus	11
Post Streptococcal	10
Total	85

Table 4: Categorical Distribution among the Non-infectious etiology

Non-infectious Etiology	Percentage	Count (n=85)
JIA (Juvenile Idiopathic Arthritis)	9%	8
Rheumatoid Arthritis	18%	15
Covid Vaccination	9%	8
Post Operative Uveitis	9%	8
Breast Carcinoma	55%	46
Total	100%	85

DISCUSSION

The present study evaluated the etiological distribution of anterior uveitis at a tertiary care center in India with a sample of 85 patients. Idiopathic anterior uveitis emerged as the most prevalent etiology, accounting for 43% of cases. This finding aligns with global reports suggesting that despite advances in laboratory testing and imaging, a significant portion of anterior uveitis cases remain idiopathic, likely due to subtle autoimmune mechanisms or self-limiting inflammatory processes [11].

Traumatic iridocyclitis was the second most common cause in this cohort, comprising 31% of cases. Trauma is a well-established precipitant of anterior chamber inflammation, particularly in younger, active populations or individuals engaged in manual labor [12]. This highlights the importance of public health measures such as eye protection in high-risk occupations and prompt treatment of ocular trauma to prevent chronic inflammation.

Infectious etiologies accounted for 11% of cases, predominantly herpes zoster and tuberculosis. Herpetic uveitis, known for its recurrent nature and risk of causing secondary glaucoma, demands early antiviral treatment and long-term monitoring [13]. Tuberculous anterior uveitis remains highly relevant in tuberculosis-endemic regions like India, where diagnosis can be challenging and often relies on systemic evaluation and adjunctive investigations such as Mantoux testing, chest imaging, and aqueous PCR [14]. Scrub typhus and post-streptococcal uveitis, though less common, are emerging infectious causes in certain endemic zones, underscoring the evolving landscape of infectious uveitis.

Non-infectious causes represented 15% of cases, including juvenile idiopathic arthritis (JIA), rheumatoid arthritis, post-operative uveitis, Covid vaccination-related inflammation, and breast carcinoma-associated uveitis. The inclusion of Covid vaccination-associated uveitis reflects the expanding reports of ocular immune responses following vaccination, which are typically self-limiting and respond well to corticosteroids [15]. Breast carcinoma-related uveitis, although rare, emphasizes the need to consider paraneoplastic syndromes or masquerade syndromes in patients with atypical or treatment-resistant anterior uveitis.

Compared with international data, our study reinforces regional differences in etiological patterns. While European studies frequently highlight HLA-B27-associated uveitis, tuberculosis and trauma are more prevalent in developing countries like India [12,14]. This underscores the importance of adapting diagnostic protocols to local disease patterns and maintaining a high index of suspicion for endemic infectious causes.

Although the study provides valuable insights, limitations include its single-center design and limited sample size, which may restrict the generalizability of the findings. Future multicenter or population-based studies with larger cohorts are warranted to better characterize the epidemiological trends and long-term outcomes of anterior uveitis in India and similar regions [11,15].

CONCLUSION

The present study highlights the diverse etiological distribution of anterior uveitis in a tertiary care setting in India, with idiopathic causes emerging as the most common, followed by trauma, infectious etiologies like herpes zoster and tuberculosis, and non-infectious causes such as rheumatoid arthritis and juvenile idiopathic arthritis. The inclusion of rare causes such as breast carcinoma-associated uveitis and Covid vaccination-related uveitis underscores the evolving

nature of uveitis patterns in contemporary clinical practice. These findings emphasize the importance of a thorough clinical examination, and a tailored investigative approach based on local disease prevalence to ensure timely diagnosis and optimal management. Future large-scale, multicenter studies are warranted to validate these findings and to better inform region-specific diagnostic and treatment protocols.

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