

Clinicoepidemiological Study of Uveitis in Spondyloarthropathy

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Abstract

Background and Aim: Uveitis, an inflammation of the uveal tract, is a significant cause of ocular morbidity and accounts for up to 25% of blindness in developing countries. Spondyloarthropathy, a group of inflammatory disorders, is a common systemic association, with anterior uveitis being its most frequent extra-articular manifestation. This study aimed to explore the prevalence, clinical profile, and complications of uveitis in spondyloarthropathy, with a focus on HLA-B27 association and its implications for the Indian population.

Methods: Present study was a hospital based cross-sectional study conducted over a period of 22 months in the Dept. of Ophthalmology and the Dept of Rheumatology of a tertiary care hospital. A total of 249 patients with spondyloarthropathy were screened, of whom 99 had uveitis. Ethical approval and informed consent were obtained. Demographic, clinical, and laboratory data were collected, and statistical analysis was performed using SPSS version 16.0. Continuous variables were presented as Mean±SD, and categorical variables as percentages. P-values <0.05 were considered statistically significant.

Results: Anterior uveitis accounted for 95.9% of cases, with 77% being unilateral. Acute onset was observed in 91.9% of cases, and 56.8% of patients were HLA-B27 positive, particularly in ankylosing spondylitis (75.8%). Redness (90%), photophobia (86%), and pain (83%) were common symptoms. Complications included cataract (24%), posterior synechiae (17%), and raised intraocular pressure (9%).

Conclusion: The study underscores the strong association between anterior uveitis and HLA-B27 in spondyloarthropathy.

Early diagnosis and intervention are crucial to prevent complications and improve patient outcomes, particularly in the Indian population.

Keywords: Anterior Uveitis, HLA-B27, Spondyloarthropathy, Uveitis, Visual Impairment.

Introduction

Uveitis, the inflammation of the uveal tract comprising the iris, ciliary body, and choroid, is a significant cause of ocular morbidity worldwide. Derived from the Latin word *uva*, meaning grape, the term reflects the appearance of this vascular layer of the eye [1]. Uveitis manifests in varied clinical forms as acute, chronic or recurrent and may result in debilitating sequelae, including cataracts, glaucoma and irreversible visual impairment [1]. Globally, up to 25% of blindness in developing countries is attributed to uveitis, highlighting its public health relevance.

Among the systemic conditions linked to uveitis, spondyloarthropathies stand out as a critical association [2]. These inflammatory disorders, characterized by axial and peripheral arthritis, enthesitis and systemic manifestations, frequently present with anterior uveitis as the most common extra-articular manifestation [3]. Anterior uveitis accounts for 50-92% of all cases of uveitis in the West, it ranges between 28 and 50% in the Asian countries [4]. Up to 40% of spondyloarthropathy patients experience anterior uveitis, with HLA-B27, a genetic marker which plays a central role in its pathogenesis [5]. The mechanism, while not entirely elucidated, involves immune dysregulation and potential molecular mimicry triggered by gram-negative bacterial antigens [4,6,7]. In India, HLA-B27 positivity has been reported in 41- 56% of anterior uveitis cases, underscoring its clinical relevance in this population [3].

Despite its established association, the prevalence

and profile of uveitis in spondyloarthropathy show significant variability across studies. Factors such as age of onset, gender distribution, laterality, clinical presentation and complications like posterior synechiae and cystoid macular edema remain incompletely understood, particularly in regional contexts [7,8]. Early diagnosis and tailored interventions are crucial to mitigating vision threatening complications and improving patient outcomes.

The present study aimed to explore uveitis in spondyloarthropathy with a focus on its demographic, clinical and anatomical aspects. The study intended to provide insights that improve diagnostic accuracy and guide better management strategies suited to the Indian population.

Material and Methods

Present study was a hospital based cross-sectional study conducted over a period of 22 months in the Dept. of Ophthalmology and the Dept of Rheumatology of a tertiary care hospital. The study included 249 subjects diagnosed with spondyloarthropathy, of whom 99 had spondyloarthropathy-associated uveitis. Ethical approval was obtained from the ethical committee, and written informed consent was taken from all participants. The study adhered to the principles of the Helsinki Declaration.

Study Sample Size

The sample size was calculated based on the presumed prevalence of spondyloarthropathy in the Indian population (6%) with a relative precision of 3% and a 95% confidence interval. Using the formula:

$$N = \frac{Z^2 \cdot P \cdot (100 - P)}{d^2}$$

Where P=6%, d=3%, and z=1.96. The required sample size was determined to be 240.64. After accounting

for a 4% dropout rate, the final sample size was adjusted to 249 participants.

Selecting Criteria

Patients were selected based on specific inclusion and exclusion criteria. The inclusion criteria encompassed patients with spondyloarthritis-associated uveitis attending the ophthalmology and rheumatology outpatient departments, aged 18 years or older, and providing informed consent. Exclusion criteria included unwilling participants, individuals with corneal pathology, previous intraocular surgery, secondary causes of high intraocular pressure (IOP), systemic conditions like diabetes or cardiovascular diseases, and those using specific medications like chemotherapeutic agents. Pregnant and lactating women, as well as individuals with other ocular diseases apart from glaucoma and cataract, were also excluded.

Study Procedure

A structured questionnaire was used to collect demographic and clinical details, including age, gender, residence and family history. Comprehensive clinical examinations were conducted for all participants. Ocular assessments included visual acuity using Snellen's chart, refraction and best-corrected visual acuity. Anterior and posterior segment evaluations were performed using slit-lamp biomicroscopy with 90D lenses and IOP was measured using a Goldmann applanation tonometer. Direct and indirect ophthalmoscopy was also performed. Systemic examinations focused on musculoskeletal assessment, while laboratory investigations included complete blood count (CBC),

HLA-B27 testing, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP).

Intraocular Pressure Measurement

Intraocular pressure measurement involved topical anaesthesia using 0.5% proparacaine hydrochloride, followed by staining the tear film with sodium fluorescein. The Goldmann applanation tonometer was used under cobalt blue light to determine the IOP, with readings adjusted to ensure accuracy.

Statistical Analysis

Statistical analysis was conducted using SPSS version 16.0. Continuous variables were presented as Mean \pm SD, while categorical variables were expressed as percentages. The chi-square test was used for categorical data comparisons, and unpaired t-tests were applied to compare means. A P-value <0.05 was considered statistically significant, with values <0.01 or <0.0001 deemed highly significant.

Results

The demographic and clinical characteristics of patients with spondyloarthritis-associated uveitis are shown in Table 1 and Figure 1. It highlights distributions across age, gender, laterality, duration and clinical presentations such as pain, redness, and photophobia, providing an insightful overview of the study's findings.

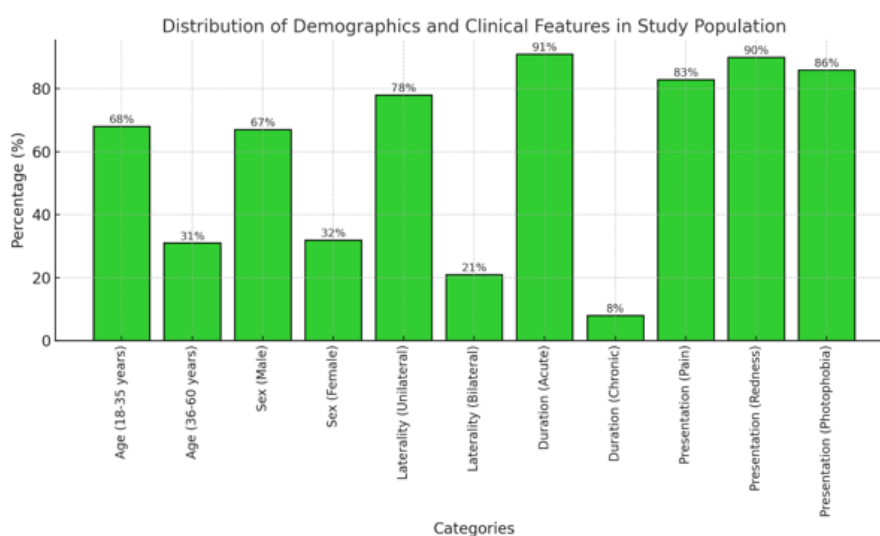


Figure 1: Demographic and clinical characteristics of patients in the study

Table 1: Demographic and clinical characteristics of patients in the study

Category	Number of Patients	Percentage (%)
Age (years)		
18-35	68	68%
36-60	31	31%
Sex		
Male	67	67%
Female	32	32%
Laterality		
Unilateral	78	78%
Bilateral	21	21%
Duration		
Acute	91	91%
Chronic	8	8%
Presentation		
Pain	83	83%
Redness	90	90%
Photophobia	86	86%

The comprehensive findings related to uveitis, including types (anterior, intermediate, posterior), family history, visual acuity, intraocular pressure (IOP), keratic precipitates, and HLA B27 status are shown in Table 2 and Fig-

ure 2. Key observations include anterior uveitis being predominantly unilateral (77%) and intermediate/posterior uveitis entirely unilateral. Family history was present in only 18% of cases, while most patients presented with low IOP (66%) and keratic precipitates (80%).

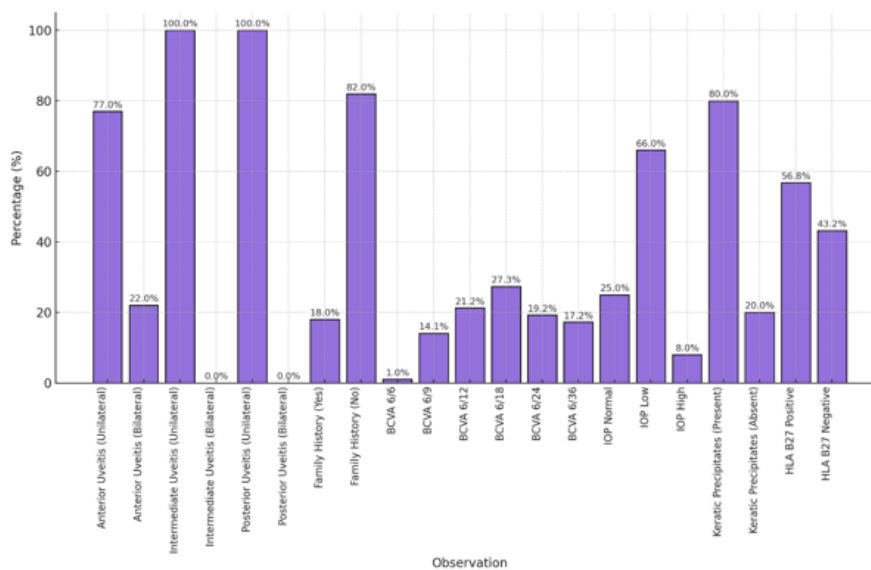
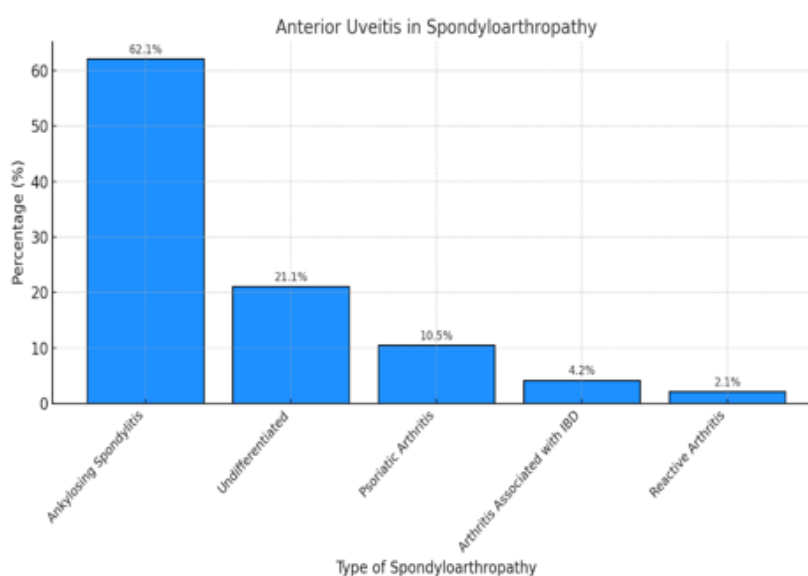
**Figure 2:** Comprehensive clinical findings

Table 2: Comprehensive clinical findings

Characteristics	Frequency (n)	Percentage (%)
Type of Uveitis		
Anterior [Unilateral/ Bilateral]	74/ 21	77%/ 22%
Intermediate [Unilateral/ Bilateral]	3/0	100%/0%
Posterior [Unilateral/ Bilateral]	1/0	100%/0%
Family History of Spondyloarthropathy		
Yes /No	18 /82	18% / 82%
BCVA		
6/6	1	1%
6/9	14	14.1%
6/12	21	21.2%
6/18	27	27.3%
6/24	19	19.2%
6/36	17	17.2%
Intraocular Pressure		
Normal/Low/High	25/66/8	25%/66%/8%
Keratic Precipitates		
Present/ Absent	80/ 20	80%/ 20%
HLA B27		
Positive/ Negative	54/41	56.8%/ 43.2%

**Figure 3:** Distribution of anterior uveitis cases

The distribution of anterior uveitis cases across different types of spondyloarthropathies is shown in Table 3 and Figure 3. Ankylosing spondylitis accounts for the major-

ity of cases (62.1%), followed by undifferentiated spondyloarthropathy and psoriatic arthritis. Other types, including arthritis associated with IBD and reactive arthritis, represent a smaller proportion.

Table 3: Distribution of anterior uveitis cases

Type of Spondyloarthropathy	Number of Cases	Percentage (%)
Ankylosing Spondylitis	59	62.1%
Undifferentiated	20	21.1%
Psoriatic Arthritis	10	10.5%
Arthritis Associated with IBD	4	4.2%
Reactive Arthritis	2	2.1%

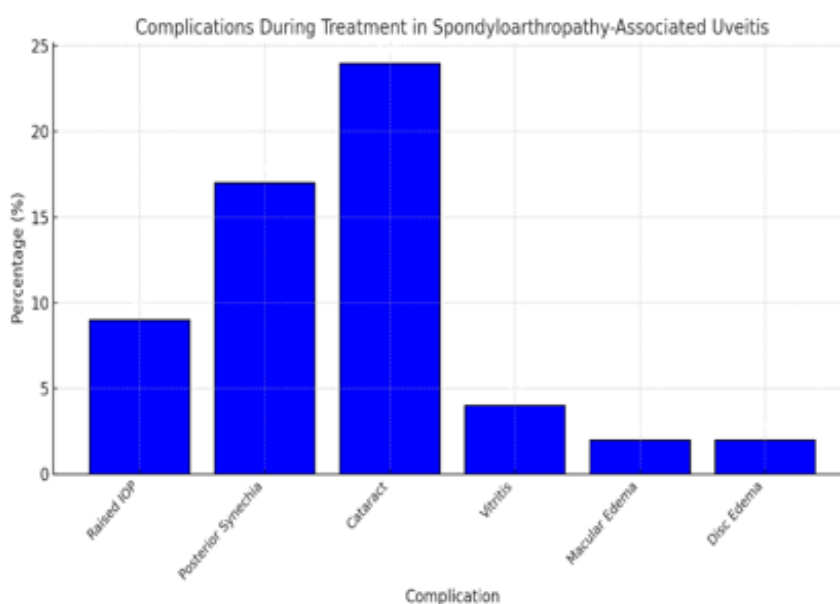


Figure 4: Complications observed during treatment of spondyloarthropathy-associated uveitis

Table 4: Complications during treatment of spondyloarthropathy-associated uveitis

Complication	Frequency (n)	Percentage (%)
Raised IOP	9	9%
Posterior Synechia	17	17%
Cataract	24	24%
Vitritis	4	4%
Macular Edema	2	2%
Disc Edema	2	2%

The complications observed during the treatment of spondyloarthropathy-associated uveitis is shown in Table 4 and Figure 4. Cataract was the most frequent complication (24%), followed by posterior synechia (17%) and raised intraocular pressure (9%). Other complications such as vitritis, macular edema, and disc edema were less commonly observed.

Discussion

Uveitis, an inflammation of the uveal tract, is a significant extra-articular manifestation of spondyloarthropathy. Globally, uveitis is reported to be the third leading cause of blindness, accounting for 15% of preventable vision loss worldwide. In our study, 39.7% of spondyloarthropathy patients (99 out of 249) had uveitis, a prevalence higher than the 32.7% reported by Sugar et al. [9] and the 18–25% range cited in other literature. The stringent diagnostic criteria and standardized examination techniques used in this study may explain this higher prevalence.

Age and Gender: Uveitis was most common in the 26–35 years age group, consistent with studies by Bacchiega et al. [10] (mean age 34.4 years), Foster et al. [11] (range 2–61 years), and Bisht et al. [12] (mean age 33.8 years). Male predominance (67.7%) in our study aligns with findings from other studies in developing countries, such as Northeast India (female-to-male ratio 1:2) and South India (1:3) [11,13,15]. However, developed countries report a more balanced or female-predominant gender ratio, as seen in studies by Frantz [16] and Rusman [17].

Type and Onset of Uveitis: Anterior uveitis was the most common type in our cohort (95.9%), higher than reported in Indian (39–49%) and Asian studies (28–50%) [13,18,19]. Most cases were acute (91.9%), aligning with the typical presentation of anterior uveitis in spondyloarthropathy as acute, recurrent, unilateral/alternating, and non-granulomatous. Studies by Cantini et al. [20] (42% anterior uveitis) and other global research corroborate this observation.

HLA-B27 Association: HLA-B27 positivity was found in 56.8% of anterior uveitis cases in our study, consistent with international findings showing higher prevalence in HLA-B27-positive spondyloarthropathy. Ankylosing

spondylitis patients demonstrated the highest HLA-B27 positivity (75.8%). Rademacher et al. [21] reported 33% HLA-B27 positivity in non-infectious anterior uveitis, which is lower than our study's findings.

Symptoms and Complications: Redness (90%), photophobia (86%), and pain (83%) were the most common symptoms. Unilateral involvement was more frequent than bilateral. Complications included cataract (24%), posterior synechiae (17%), and raised IOP (9%), consistent with complications documented in other studies. Less frequent complications like vitritis (4%), cystoid macular edema (2%), and disc edema (2%) were also observed.

In conclusion, our findings provide a comprehensive overview of the demographics, clinical characteristics, and complications of uveitis in spondyloarthropathy, while highlighting its significant association with HLA-B27 in the Indian population.

Strengths of the Study

The study employed stringent diagnostic criteria and standardized protocols, ensuring accurate identification and characterization of uveitis. Comprehensive data collection was allowed for detailed analysis of demographic, clinical, and laboratory findings. The focus on HLA-B27 prevalence in spondyloarthropathy-associated uveitis provided valuable insights, particularly for the Indian population, where data on this association are limited.

Conclusion

The present study concluded that the predominance of uveitis as the most frequent and clinically significant extra-articular manifestations of spondyloarthritis, especially in patients with axial involvement and HLA-B27 positivity. It usually presents as acute, unilateral, recurrent anterior uveitis and may precede or follow the onset of musculoskeletal symptoms. Common symptoms such as redness, photophobia and pain, along with sight-threatening complications as posterior synechiae, cataract, glaucoma, emphasize the need for early diagnosis and tailored interventions. Timely interventions by appropriate treatment options as topical corticosteroids, systemic immunomodulatory drugs and biological can significantly reduce recurrence

and improve both ocular and systemic outcomes. Occurrence of uveitis in spondyloarthritis reflects immune-pathogenic mechanisms, emphasizing the need of multidisciplinary approach and regular ophthalmologic screening of high risk patients in close collaboration with rheumatologists, is essential to minimize morbidity and preserve quality of life. Further longitudinal and multicenter studies are

needed to better understand regional variations, long-term visual outcomes and optimal therapeutic strategies in diverse populations.

Conflict of Interest

The authors declare no conflicts of interest

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