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Ocular manifestations of various spondyloarthropathies

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ABSTRACT

Background: Eye inflammation has been described as a crucial prominent feature of several rheumatic diseases. Uveitis, conjunctivitis, and episcleritis have been reported in patients with known spondyloarthropathies or may be significant symptoms for the diagnosis of previously undiagnosed spondyloarthropathy.

Materials and Methods: A hospital-based, cross-sectional, observational study was conducted over twenty-one months, from January 2021 to September 2022. Patients aged more than 18 years with a definitive diagnosis of Spondyloarthropathy, attending the Department of Orthopedics outpatient clinics, SGMH, Rewa, were screened for presence of eye disorders.

Results: A total of 100 cases were recruited in the study. The mean age of the study group was 34.58 years (female 33.5 years and male 35.6 years) with a majority of cases (72%) in the study group aged between 20 and 39 years. Ankylosing spondyloarthropathy was the most common diagnosis in the study, with 49% cases being diagnosed with it. Patients with Psoriatic arthropathy were also found to have a significant association with foreign body sensation and diminution of vision while ciliary congestion was significantly associated with ankylosing spondylitis. In addition, uveitis was observed to have a statistically significant association with incidence of ankylosing spondylitis.

Conclusion: The various manifestations of seronegative spondyloarthropathies include uveitis, which is a potentially blinding complication was noted in 19% of the patients, that needs to be identified early and treated right away to avoid irreparable vision loss.

1. Introduction

Spondyloarthritis (SpA) is a group of relatively common rheumatic diseases, with a prevalence of 1.5% to 2% in the general population.[1] SpA may present with a group of symptoms, including inflammatory low back pain, peripheral arthritis, enthesitis, recurrent episodes of diarrhoea and eye inflammation. Ocular manifestations in seronegative spondyloarthropathies have been studied by researchers worldwide. Ocular inflammation has been described as a cardinal and characteristic element of numerous rheumatic diseases. Uveitis, conjunctivitis, and episcleritis have been reported in patients with known spondyloarthropathies or may be important findings in the diagnosis of previously undiagnosed spondyloarthropathies.Uveitis can be classified based on parameters such as anatomical location, clinical course or laterality. Therefore, depending on the anatomical location, uveitis can be defined as an inflammation of the anterior segment of the eye when it affects the iris or the ciliary body (also called iridocyclitis or iridocyclitis); posterior, when it concerns the choroid or consequently the retina (also called

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uveitis or chorioretinitis); intermediate uveitis, in which inflammation is limited to the vitreous, peripheral retina, and ciliary bodypars plana (sometimes called pars planitis); or panuveitis, when the inflammatory process affects all parts of uvea including iris, ciliary body and choroid.

The exact pathogenesis of SpA and uveitis remains unknown. However, there appears to be a close connection between the two diseases, which arises from the interaction of a specific, usually common, genetic inheritance, external factors such as the microbiome, bacterial infections or mechanical stress, as well as the activation of the immune system and inflammation.[2] Several tissue-specific explanations are suggested:

1. Mechanical stress in the entheses or in the lens and the ciliary body
2. Increased expression of HLA-B27
3. Increased susceptibility to deposition of molecular patterns associated with microbes or ER stress
4. Molecular mimicry between infectious agents and eye or joint patterns
5. Increased membrane adhesins or vascular adhesion molecules may increase infiltration of immune cells from the intestine or other sites.

This study was conducted to assess the various ocular manifestations of various spondyloarthropathies.

2. Materials and Methods

After receiving Institutional Review Board approval, a hospital-based cross-sectional observational study was conducted over a period of twenty-one months, from January 2021 to September 2022. Patients with a final diagnosis of spondyloarthropathy presenting to the outpatient department of SGMH Orthopedic unit, Rewa were screened for eligibility for the study. Patients under 18 years of age or those who have undergone eye injury, surgery or laser treatment, patients with other known uveal diseases such as fuchs heterochromic iridocyclitis, posner-Schlossman syndrome, patients with another ocular or systemic disease (not SpA). Patients who were associated with uveitis or might masquerade as uveitis were excluded from the study.

The diagnosis of SpA, in each case, was made as per "The Assessment of Spondyloarthritis international Society" (ASAS) criteria, which includes - insidious inflammatory back pain, pain at night, age at onset <40 years, improvement with exercise and/or no improvement with rest. The diagnosis was made by a physician in the department. (Table 1)

The Table 1 shows the diagnostic criteria applied for recruiting the patients in the study. Clinical, radiological, biochemical and serological methods were used to diagnose cases according to respective spondyloarthropathy.

Table 1: Diagnostic criteria utilised in the study for recruitment of patients

Ankylosing spondylitis	X ray shows inflammation of the sacroiliac joint(sacroiliitis) with at least one of the following- 1. At least three months of lower back pain that gets better with exercise and does not improve with rest. 2. Limited movement in the lower back (lumbar spine). 3. Limited chest expansion compared with what is expected for particular age and sex.
Psoriatic arthritis	1. Inflammatory arthritis (peripheral arthritis and /or sacroiliitis or spondylitis) 2. The presence of psoriasis The absence of serological tests for rheumatoid factor
Reactive arthritis	Identification of characteristic symptoms (fever, chills, malaise, headache, general weakness, joint pain, and swelling), HLA-B27 positivity, presence of chlamydia, elevated ESR, joint fluid tests, and specialized imaging, including an X-ray of the sacroiliac joint.
IBD associated Spondyloarthropathy	Diagnosis is largely clinical based on the presence of peripheral or axial arthritis in the setting of IBD.
Undifferentiated Spondyloarthropathy	diagnosis is based on excluding the other four seronegative Spondyloarthropathy in a patient with sacroiliitis or other joint arthritis, absence of rheumatic factor

The patients were enrolled in the study after taking informed consent.

The following was noted in the patients- Relevant ocular history, duration of spondyloarthropathy, best corrected visual acuity, Slit lamp evaluation of the anterior segment,

Posterior segment evaluation with an indirect ophthalmoscope, Slit lamp bio-microscopy using 90D, IOP measurement using a non-contact tonometer, dry eye evaluation by Schirmer test using Whatmann 41 filter paper, Schirmers'- 1 tests both basal and reflex tear secretion(It is done by placing the filter paper in an un-anesthetized cornea for 5 minutes. Wetting less than 10mm after 5 min is considered abnormal), Schirmers'- 2 tests the basal secretion (It is done after applying paracaine drops. Wetting less than or equal to 5mm after 5 min is considered abnormal), Tear break-up time- a TBUT of <10 seconds was taken as abnormal.

The type of uveitis and their characteristics were defined as per the SUN (Standardization of Uveitis Nomenclature) Working Group criteria. (Table 2)

Table 2: Definition and type of uveitis with their characteristics as defined by the SUN (Standardization of Uveitis Nomenclature) Working Group criteria

Active uveitis	If Grade 0.5+ or more cells in the anterior chamber and fresh keratic precipitates were present, along with one or more of the following signs: 1. Circumcorneal congestion 2. Hypopyon 3. Posterior synechiae 4. Posterior synechiae 5. Vitreous haze and cells 6. Active inflammatory lesions in the retina or choroid
Inactive uveitis	If Grade 0 cells were present in anterior chamber, pigmented keratic precipitates and/or pigments were present on the corneal endothelium, and pigments were present on the anterior lens capsule were present, along with one or more of the following: 1. Posterior synechiae, 2. Peripheral anterior synechiae on gonioscopy, 3. Chorioretinal scars suggestive of old inflammatory lesions in the retina and choroid, 4. History of previous episode of pain in the eye with redness, photophobia and blurring of vision.
Episcleritis	Evident congestion of episcleral vessels - blanching with 2.5% phenylephrine
Scleritis	Congestion of scleral plexus of vessels, blanching with 10% phenylephrine differentiated episcleritis from scleritis

The Table 2 shows how the type and characteristics of active and inactive uveitis. The diagnosis of uveitis was based on the Standardization of Uveitis Nomenclature) Working Group criteria. Additionally, standardised tests were employed to diagnoses episcleritis and scleritis

Data was entered, cleaned and coded in a MS Excel spreadsheet. Analysis of data was performed using SPSS Version 20.0. Continuous parametric variables were expressed as means and standard deviation, while continuous non-parametric variables were expressed as median and interquartile range. Categorical variables were expressed as percentages. Comparison of categorical variables between two groups was done using Chi square test. P-value of less than 0.05 was considered statistically significant.

3. Results

A total of 100 cases were recruited in the study. The mean age of the study group was 34.58 years with a majority of cases (72%) in the study group aged between 20 and 39 years. Seventy three percent of study participants were male patients, while 81% patients resided in a rural area. (Table 3)

Table 3: Distribution of cases according to socio-clinical parameters (N = 100)

Socio-clinical parameters	Number of cases (%)
Age of the patient	
20 – 29 years	34 (34%)
30 – 39 years	38 (38%)
40 – 49 years	21 (21%)
50 years and above	7 (7%)
Mean age of the patient in years (SD)	34.58 (9.04)
Sex of the patient	
Male	73 (73%)
Female	27 (27%)
Type of residence	
Rural	81 (81%)
Urban	19 (19%)
Type of spondyloarthropathy	
Ankylosing spondylitis	49 (49%)
IBDAA	17 (17%)
Psoriatic	13 (13%)
ReA	6 (6%)
USpA	15 (15%)
Duration of disease	
Less than 1 year	14 (14%)
1 – 2 years	14 (14%)
2 – 5 years	28 (28%)
5 – 10 years	33 (33%)
More than 10 years	11 (11%)
Mean duration of disease (SD)	5.74 (4.70)
Ocular symptoms	
Pain	25 (25%)
Redness	34 (34%)
Foreign body sensation	8 (8%)
Diminution of/Defective vision	34 (34%)

SD = Standard deviation; IBDAA = Inflammatory bowel disorder associated Spondyloarthropathy; ReA = Reactive arthritis; USpA = Undifferentiated Spondyloarthropathy

Ankylosing spondyloarthropathy was the most common diagnosis in the study, with 49% cases being diagnosed with it. Seventeen cases had inflammatory bowel associated arthropathy, fifteen cases had undifferentiated spondyloarthropathies, thirteen cases had psoriatic, while six cases had reactive arthritis. (Table 3)

The duration of illness in 44% cases was more than five years, while 28% cases had experienced their symptoms for 2-5 years. Fourteen cases had disease for less than a year. The mean duration of disease was 5.74 years. One-third of cases in the study group reported experiencing redness and diminution of vision while a quarter of cases reported suffering from local pain and eight cases had foreign body sensation. Approximately two-thirds (62%) of the cases had unilateral involvement, while four cases had bilateral involvement. Ciliary congestion was reported in twenty eyes on right side, while it was involved in seven eyes on left side and bilateral in one case. Similarly, conjunctival

congestion was present in thirty right eyes, fifteen left eyes and bilaterally four cases. Anterior chamber reaction, in the form of grade cells, was observed in nineteen right eyes and seven left eyes. Dry eye was observed in seven right and five left eyes and bilaterally three cases (as assessed by Schirmer‘s reaction). Lens involvement was present in three right and one left eye. Synechiae was observed in two right and four left eyes, while cornea involvement in the form of keratic precipitates was observed in seventeen right eyes and equal number of left eyes. Iris pigment dispersion was present in one right eye and two left eyes, arcussenilis in one left eye, fluorescein stain positivity in two left eyes and scleral congestion was present in one left eye. (Table 4)

It was observed that IBDAA and PsA were significantly associated with age of the patient (p value 0.023 and 0.001 respectively). Incidence of PsA was observed to be significantly higher amongst cases aged more than 30 years, while incidence of IBDAA was observed amongst cases aged less than 30 years. No statistically significant association (p values 0.097)was observed between type of spondyloarthropathy and sex of the patient. Ankylosing spondylitis was diagnosed significantly more amongst cases residing in urban area while IBDAA was observed to be significantly associated with cases residing in rural areas. (Table 5)

Local pain and redness in the eye were significantly associated with ankylosing spondylitis. Patients with Psoriatic arthropathy were also found to have a significant association with foreign body sensation and diminution of vision. Ciliary congestion was significantly associated with ankylosing spondylitis, while there was no statistically significant association between conjunctival congestion and any spondyloarthropathy. In addition, uveitis was observed to have a statistically significant association with incidence of ankylosing spondylitis. (Table 6)

Reactive arthritis was found to be significantly associated with blanching performed using 2.5% epinephrine, compared to blanching performed with 10% epinephrine which was not significantly associated with any spondyloarthropathy. Additionally, no statistically significant association was observed between incidence of episcleritis and spondyloarthropathy. (Table 6)

Incidence of dry eye, anterior chamber reaction, pupillary reaction, lens involvement, synechiae, corneal deposits and scleral congestion was not significantly associated with any type of spondyloarthropathy. (Table 6)

4. Discussion

Although SpA is primarily limited to the joints, it can also affect other organ systems in the human body. These extra-articular symptoms can affect the heart, lungs, kidneys, eyes (uveitis), skin (psoriasis), intestines and nerves. Accompanying symptoms can occur at any time during the course of the disease or can be an existing symptom, which is quite common (20 to 60%).[3] The various manifestations include uveitis, the most common finding, followed by dry eye, episcleritis and scleritis. Among them, uveitis is a potentially vision-disabling complication and needs to be detected early and treated promptly to avoid irreversible vision loss.In this study, the patients belonged to the age group between 20 and 75 years. with a clustering of patients in the average age of 34.58 years. Men predominated in the study, but this is likely due to men's greater access to health services in our country. According to Monnet et al. the male/female ratio was 1.3 to 1, and the average age at first attack of uveitis was 31 years.[4] According to a systematic review by Zeboulon et al, of 26,168 patients, 18,037 (68.9%) were men. The mean (SD) age was 43.9(2.7) years.[5] According to the study by Lima FB et al. the mean age of the patients was 53.9 ± 13.1 years.[6] The distribution of patients by gender was different: a maximum predominance of men in the age group of 40 to 49 years and an almost equal ratio of men to women in the age group of 50 years and above.

An equal proportion of cases in our study were symptomatic and asymptomatic. One-third of cases in the study group reported experiencing redness and diminution of vision which is similar to study by Libin Sam Baby et al (57.7% and 87.5% respectively).[7] Pain was reported in a quarter of the cases and a foreign body sensation in eight cases. In a study by Ninan F. et al. The study conducted found that the most common symptoms in patients diagnosed with uveitis are eye pain and redness.[8] 89% of patients had eye redness during the uveitis episode and 85.2% reported eye pain. In a study by Nidhee Jain et al., 62.66% of patients had no symptoms, while only 37.33% of patients had some symptoms.[9] The most common symptom was redness, followed by visual disturbances, irritation, pain, and photophobia. It was observed that pain and redness were significantly associated (p value 0.002 and 0.002 respectively)with ankylosing spondylitis. There is also a significant association between patients with psoriatic arthritis, foreign body sensation and vision deterioration(p values 0.032 and 0.025).Ocular symptoms such as conjunctivitis, episcleritis and uveitis have also been observed in asymptomatic patients. The presence of uveitis, complication which can lead to visual impairment, in an asymptomatic population, is a cause for concern and is a strong indicator of the need for screening in patients with spondyloarthropathy. In our study, it was observed that almost half of the study group had ankylosing spondyloarthropathy. Seventeen percent cases had inflammatory bowel associated arthropathy, 15% cases had undifferentiated spondyloarthropathies, 13% cases had psoriatic, while 6% cases had reactive arthritis. According to a systematic review by Zeboulon et al, uveitis prevalence varied with the type of SpA, as in 33.2% in ankylosing spondylitis, 25.1% in psoriatic arthritis, 36.9% in arthritis

Table 4: Distribution of cases according to clinical findings. (N = 100)

Findings		**Number of cases**	
Laterality			
Unilateral		62 (62%)	
Bilateral		4 (4%)	
NA		34 (34%)	
Ciliary congestion	R	L	B/L
Present	20 (20%)	7 (7%)	1 (1%)
Absent	80 (80%)	93 (93%)	99 (99%)
Conjunctival congestion	R	L	B/L
Present	30 (30%)	15 (15%)	4 (4%)
Absent	70 (70%)	85 (85%)	96 (96%)
AC reaction	R	L	B/L
Grade 1	2 (2%)	1 (1%)	0 (0%)
Grade 2	2 (2%)	2 (2%)	0 (0%)
Grade 3	7 (7%)	1 (1%)	0 (0%)
Grade 4	8 (8%)	3 (3%)	1 (1%)
Quiet	81 (81%)	93 (93%)	81 (81%)
Blanching present			
2.5% phenylephrine		Present: Absent = 6:5	
10% phenylephrine		Present: Absent = 4:1	
Pain	R	L	B/L
Present	20 (20%)	20 (20%)	3 (3%)
Absent	80 (80%)	80 (80%)	97 (97%)
Schirmer's reaction	R	L	B/L
< 10	7 (7%)	5 (5%)	3 (3%)
> 10	93 (93%)	95 (95%)	93 (93%)
Pupil	R	L	B/L
C/CL/RL	98 (98%)	97 (97%)	95 (95%)
Irregular/RTL	2 (2%)	2 (2%)	0
Occlusio	0 (0%)	1 (1%)	0
IOP	R	L	
Mean (SD)	13.16 (2.06)	13.75 (2.14)	
Lens	R	L	B/L
Clear	97 (97%)	99 (99%)	96 (96%)
IPD	3 (3%)	1 (1%)	0
Synechiae	R	L	B/L
Absent	98 (98%)	96 (96%)	94 (94%)
Present	2 (2%)	4 (4%)	0
Cornea	R	L	B/L
Clear	82 (82%)	78 (78%)	78 (78%)
Fine KPs	17 (17%)	17 (17%)	2 (2%)
IPD	1 (1%)	2 (2%)	0
AS+	0	1 (1%)	0
FL+	0	2 (2%)	0
Sclera	R	L	B/L
Normal	100 (100%)	99 (99%)	99 (99%)
Congestion present	0	1 (1%)	0

NA = Not applicable; R = right; L = left; B/L = Bilateral; AC = Anterior chamber; C = ;CL = ; RL = ; RTL = ; IOP = Intra-ocular pressure; SD = Standard deviation; IPD= ; KP = Keratitic precipitate; AS+ = ; FL+ =

Table 5: Association of SpA with patient socio-demographic characteristics (N = 100)

		AS	IBDAA	PsA	ReA	USpA
Age of the patient	20 – 29 years	16 (32.65%)	11 (64.7%)	1 (7.69%)	2 (33.33%)	4 (26.66%)
	30 – 39 years	24 (48.97%)	2 (11.76%)	4 (30.76%)	2 (33.33%)	6 (40%)
	40 – 49 years	7 (14.28%)	3 (17.64%)	4 (30.76%)	2 (33.33%)	5 (33.33%)
	50 years and above	2 (4.08%)	1 (5.88%)	4 (30.76%)	0 (0%)	0 (0%)
	p-value	0.097	0.023	0.001	0.814	0.422
Sex of the patient	Female	12 (24.48%)	4 (23.52%)	5 (38.46%)	2 (33.33%)	4 (26.66%)
	Male	37 (75.51%)	13 (76.47%)	8 (61.53%)	4 (66.66%)	11 (73.33%)
	p-value	0.579	0.723	0.318	0.719	0.975
Residence of the patient	Urban	46 (93.87%)	8 (47.05%)	11 (84.61%)	6 (100%)	10 (66.66%)
	Rural	3 (6.12%)	9 (52.94%)	2 (15.38%)	0 (0%)	5 (33.33%)
	p-value	0.001	<0.001	0.722	0.221	0.125
Duration of illness	<1 year	4 (8.16%)	3 (17.64%)	2 (15.38%)	2 (33.33%)	3 (20%)
	1 – 2 years	7 (14.28%)	2 (11.76%)	1 (7.69%)	2 (33.33%)	2 (13.33%)
	2 – 5 years	10 (20.4%)	8 (47.05%)	2 (15.38%)	2 (33.33%)	6 (40%)
	5 – 10 years	19 (38.77%)	4 (23.52%)	6 (46.15%)	0 (0%)	4 (26.66%)
	> 10 years	9 (18.36%)	0 (0%)	2 (15.38%)	0 (0%)	0 (0%)
	p-value	0.040	0.220	0.674	0.179	0.474
Symptoms reported	Pain	19 (38.77%)	2 (11.76%)	0 (0%)	1 (16.66%)	3 (20%)
	p-value	0.002	0.167	0.026	0.627	0.628
	Redness	24 (48.97%)	5 (29.41%)	0 (0%)	2 (33.33%)	3 (20%)
	p-value	0.002	0.661	0.006	0.972	0.214
	FB sensation	4 (8.16%)	0 (0%)	3 (23.07%)	1 (16.66%)	0 (0%)
	p-value	0.953	0.182	0.032	0.420	0.215
	DOV	17 (34.69%)	3 (17.64%)	8 (61.53%)	2 (33.33%)	4 (26.66%)
	p-value	0.886	0.118	0.025	0.972	0.515

AS= Ankylosing spondyloarthropathy; IBDAA = Inflammatory bowel disorder associated Spondyloarthropathy; PsA = Psoriatic arthropathy; ReA = Reactive arthritis; USpA = Undifferentiated Spondyloarthropathy; FB = Foreign body; DOV = Diminution of vision

associated with IBD, 25.6% in reactive arthritis and 13.2% in undifferentiated SpA.[5] In a study of 236 patients with uveitis. Rosenbaum et al found AS in 5.5% and Reiter´s syndrome in 7.2%, especially when acute, unilateral anterior uveitis was present.[10] In a study by FabrizioCantini et al, across the SpA disease spectrum, AU has a frequency peak of 33.4% in patients with ankylosing spondylitis, while the estimated prevalence in psoriatic arthritis (PsA) and IBD-associated SpA is 2%-25%, and 25%, respectively.[11] In a study by SubhabrataParida et al, among the seronegative spondyloarthropathies, uveitis in ankylosing spondylitis is the most common ocular manifestation.[12] It occurs in approximately 25% of patients with ankylosing spondylitis, in up to 37% of patients with Reiter‘s syndrome, in approximately 20% of patients with psoriatic arthritis, and in up to 9% of patients with enteropathic arthritis. In a study by Roland Linder et al, prevalence of SpAs in patients with uveitis was Ankylosing spondylitis 17(38.6%), Reactive arthritis 9(20%), Psoriatic arthritis 2(4%) and Undifferentiated spondyloarthritis 8(16%).[13]

Table 6: Association of SpA with patient clinical characteristics. (N = 100)

			AS	IBDAA	PsA	ReA	USpA
Ciliary congestion	Right		14 (28.57%)	1 (5.88%)	2 (15.38%)	1 (16.66%)	2 (13.33%)
	p-value		0.036	0.110	0.656	0.833	0.484
	Left		4 (8.16%)	1 (5.88%)	1 (7.69%)	0 (0%)	1 (6.66%)
	p-value		0.655	0.843	0.916	0.488	0.956
Conjunctival congestion	Right		18 (36.73%)	4 (23.52%)	3 (23.07%)	2 (33.33%)	3 (20%)
	p-value		0.150	0.523	0.559	0.854	0.359
	Left		8 (16.32%)	3 (17.64%)	1 (7.69%)	0 (0%)	3 (20%)
	p-value		0.716	0.737	0.429	0.289	0.556
Episcleritis	Blanching with 2.5%		2 (4.08%)	2 (11.76%)	0 (0%)	2 (33.33%)	0 (0%)
	p-value		0.658	0.530	0.397	0.013	0.550
	Blanching with 10%		2 (4.08%)	1 (5.88%)	0 (0%)	0 (0%)	1 (6.66%)
	p-value		0.590	0.824	0.675	0.845	0.781
Schirmer's reaction	Right	Dry eye	3 (6.12%)	0 (0%)	2 (15.38%)	1 (16.66%)	1 (6.66%)
		Normal	46 (93.87%)	17 (100%)	11 (84.61%)	5 (83.33%)	14 (93.33%)
	p-value		0.736	0.214	0.204	0.338	0.956
	Left	Dry eye	1 (2.04%)	0 (0%)	2 (15.38%)	1 (16.66%)	1 (6.66%)
		Normal	48 (97.95%)	17 (100%)	11 (84.61%)	5 (83.33%)	14 (93.33%)
	p-value		0.183	0.299	0.065	0.176	0.748
Anterior chamber reaction	Right	Quiet	35 (71.42%)	16 (94.11%)	12 (92.3%)	5 (83.33%)	13 (86.66%)
		Gr 1	1 (2.04%)	0 (0%)	0 (0%)	0 (0%)	1 (6.66%)
		Gr 2	2 (4.08%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
		Gr 3	5 (10.2%)	0 (0%)	1 (7.69%)	1 (16.66%)	0 (0%)
		Gr 4	6 (12.24%)	1 (5.88%)	0 (0%)	0 (0%)	1 (6.66%)
	p-value		0.150	0.591	0.729	0.805	0.460
	Left	Quiet	45 (91.83%)	16 (94.11%)	12 (92.3%)	6 (100%)	14 (93.33%)
		Gr 1	1 (2.04%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
		Gr 2	2 (4.08%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
		Gr 3	1 (2.04%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
		Gr 4	0 (0%)	1 (5.88%)	1 (7.69%)	0 (0%)	1 (6.66%)
	p-value		0.133	0.846	0.792	0.975	0.827
Pupillary reaction	C/CL/RL		48 (97.95%)	16 (94.11%)	12 (92.3%)	5 (83.33%)	14 (93.33%)
	Irregular/RTL		0 (0%)	1 (5.88%)	1 (7.69%)	1 (16.66%)	1 (6.66%)

Continued on next page

Table 6 continued

	Occlusio		1 (2.04%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	p-value		0.083	0.824	0.715	0.257	0.781
Lens findings		Clear	45 (91.83%)	16 (94.11%)	12 (92.3%)	6 (100%)	15 (100%)
	Right	IPD	2 (4.08%)	0 (0%)	1 (7.69%)	0 (0%)	0 (0%)
		IO	2 (4.08%)	1 (5.88%)	0 (0%)	0 (0%)	0 (0%)
	p-value		0.671	0.554	0.461	0.816	0.569
		Clear	47 (95.91%)	17 (100%)	12 (92.3%)	6 (100%)	14 (93.33%)
	Left	IPD	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (6.66%)
		IO	1 (2.04%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
		Pseudophakia	1 (2.04%)	0 (0%)	1 (7.69%)	0 (0%)	0 (0%)
	p-value		0.572	0.837	0.433	0.966	0.102
Synechiae	Present		2(4.08%)	1(5.88%)	1(7.69%)	1(16.66%)	1(6.66%)
	Absent		47(95.91%)	16(94.11%)	12(92.3%)	5(83.33%)	14(93.33%)
	p-value		0.428	0.982	0.783	0.256	0.906
Cornealfindings	Clear		38(77.55%)	13(76.47%)	7(53.84%)	4(66.66%)	13(86.66%)
	KP present		9(18.36%)	3(17.64%)	3(23.07%)	2(33.33%)	1(6.66%)
	p-value		0.959	0.946	0.367	0.370	0.210
Scleralfindings	Normal		48(97.95%)	17(100%)	13(100%)	6(100%)	15(100%)
	Congestion		1(2.04%)	0(0%)	0(0%)	0(0%)	0(0%)
	p-value		0.305	0.649	0.698	0.800	0.673
Uveitis	Present		6(12.24%)	1(5.88%)	1(7.69%)	1(16.66%)	0(0%)
	Absent		10(20.4%)	16(94.11%)	12(92.3%)	5(83.33%)	15(100%)
	p-value		0.001	0.291	0.499	0.808	0.083

AS = Ankylosing spondyloarthropathy; IBDAA = Inflammatory bowel disorder associated Spondyloarthropathy; PsA = Psoriatic arthropathy; ReA = Reactive arthritis; USpA = Undifferentiated Spondyloarthropathy; Gr = Grade; R = Right; L = Left; B/L = Bilateral; AC = Anterior chamber; C = ; CL = ; RL = ; RTL = ; IOP = Intra-ocular pressure; SD = Standard deviation; IPD = ; KP = Keratitic precipitate; AS+ = ; FL+ =

According to a study by Ninan F et al, prevalence of Ankylosing spondylitis 115 (69.3%), Undifferentiated spondyloarthropathy 37 (22.3%), Psoriatic arthritis 11 (6.6%), Inflammatory bowel disease (1.2%) and Reactive arthritis (0.6%).[8] Majority of the patients were having Ankylosing Spondylitis predominantly with joint involvement seen in 49% of the patients. In a study by Monnet D et al Ankylosing spondylitis was diagnosed in 81 patients (46.3%) and presumed in 17 (9.7%).[4] Undifferentiated spondyloarthropathy was observed in 21 patients (12%) and other HLA-B27–associated diseases in 17 patients (9.7%). The duration of the disease in most cases was between 5 to 10 years, as observed in 33% cases. More than a quarter of the cases had duration of disease for 2-5 years. Eleven percent cases had a disease for more than 10 years. Fourteen percent cases had disease for less than a year, the mean duration of disease was 5.74 years. In a systematic literature review by Zeboulon et al, mean disease duration was 17.7 (± 1.0) years for the whole sample but varied with the type of SpA: 17.0 (± 1.0) years for ankylosing spondylitis, 17.4 (± 1.0) years for psoriatic arthritis, 22 (± 10.0) years for arthritis associated with IBD, 5.8 (± 0.6) years for reactive arthritis and 5.8 (± 0.7) years for undifferentiated SpA.[5] The prevalence of uveitis increases with disease duration. While only 12% of those SpA patients experienced a flare of uveitis within the first 5 years of their disease, 43% of the patients with a long-standing disease (more than 30 years) had an ophthalmological manifestation. In a study by Muhammad J.S. et al, the mean duration of disease was 52 ± 10 months, and it was higher in patients with psoriatic arthritis and ankylosing spondylitis.[14] In our study, the incidence of uveitis is slightly higher (25%) than in the study by Ninan F et al., which is probably due to the less stringent criteria for diagnosing uveitis in our study.[8] The characteristics of uveitis and joint involvement were reported by Eduardo Paiva et al. described in the Annals of Rheumatic Disease. They reported that 100% of patients with uveitis and axial arthritis were male.[15] Likewise, the patients with uveitis in our study were predominantly male. They reported bilateral lesions in 37.5%, and in our study they were observed in 6% of patients. They reported chronic duration in 31% of patients and posterior uveitis in 44%. In our study, chronic anterior uveitis was observed in 13% of patients. The mean (SD) incidence of uveitis was 32.7%; This varies depending on the type of SpA: for example, 33.2% for ankylosing spondylitis versus 25.1% for psoriatic arthritis. Our study showed a strong correlation between the occurrence of anterior uveitis associated with ankylosing spondylitis in 82% of patients. The patient's most common symptom was redness and visual disturbances, while the most common symptom was acute anterior uveitis. This is similar to the results of other studies that have shown a higher incidence of acute and chronic anterior uveitis in patients with spondyloarthropathy. In the study by Zeboulon et al. the incidence of acute anterior uveitis was32.7%.[5] Dry eye syndrome occurs more frequently in patients with seronegative spondylarthropathies. In our study, patients had decreased TBUT and Schirmer values. Similar results were presented by Her Y and colleagues in 2013.[16] They examined dry eyes, tear film function, and ocular surface changes in 30 patients compared to 30 patients in the control group and found no significant changes in Schirmers values but a decrease in TBUT and changes in conjunctival cytology with a decrease in the number of goblet cells.

Our study had a few limitations. The study sample size was less so statistically significant associations could not be computed. In the diagnosis of uveitis, Slit lamp was used to classify uveitis, which is not standardised practice. Additionally, our institution did not have the facility to conduct HLA B27 test to assess relationship between severity of uveitis and HLA-B27 level.

5. Conclusion

The various symptoms of seronegative spondyloarthropathies include uveitis (19%), a common symptom, followed by dry eyes (7%), episcleritis (6%), and scleritis (4%). Among these, uveitis which may lead to visual impairment and must be promptly recognized and treated to avoid irreversible vision loss. Patients typically have no symptoms as symptoms are often subtle and easy to ignore. Uveitis can manifest only as visual disturbances and without other symptoms of acute uveitis. Therefore, early diagnosis and rapid treatment require strong suspicion. Ocular symptoms have traditionally been associated with joint involvement, but our study shows that they can also be seen in patients without joint involvement. Therefore, all patients with spondyloarthritis, regardless of joint involvement, should be evaluated for ocular symptoms. Due to the involvement of multiple systems, a combined therapeutic approach including screening and early treatment of ocular symptoms in patients with spondyloarthritis is necessary to reduce patients' ocular morbidity and ensure comprehensive care.

6. Source of Funding

None.

7. Conflict of Interest

None.

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