

Symptoms and Signs of Spondyloarthritis: Relation to Diagnosis in Spondyloarthritis

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ABSTRACT

The present study has been shown that the significant diagnostic symptoms and signs were 7 of 11 features characteristic of spondyloarthritis, [e.g. inflammatory back pain/low back pain, enthesitis (hell pain), alternating buttock pain, dactylitis, enthesitis, asymmetric arthritis, positive response to non-steroidal anti-inflammatory drugs and elevated acute phase reactants], and additionally Mennell sign, positive diminished or lost patellar tendon and/or ankle reflexes and negative diminished or lost H wave of gastrocnemius and negative delay of motor conductivity velocity(MCV) of tibial nerve in EMG, and that the reasonable diagnostic methods were 5 steps approaches in patients with spondyloarthritis.

Key words: Spondyloarthritis, Symptoms and Signs, Diagnosis.

Article Information

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1. INTRODUCTION

The term spondyloarthritis is used for a family of disorders, including ankylosing spondyloarthritis, non-radiographic axial spondyloarthritis, and forms of arthritis associated other conditions. The different forms of spondyloarthritis share a group of clinical features; the most distinguishing features are inflammation of axial joints (especially the sacroiliac joints), asymmetrical oligoarthritis (especially of the lower extremities), dactylitis (sausage digits), and enthesitis (inflammation at sites of ligamentous or tendon attachment to bone). Additional features include skin and genital lesions, eye and bowel inflammation, an association with preceding or ongoing infectious disorders, positive family history, elevated acute reactants, and a strong association with the human leucocyte antigen (HLA-B27) [1]. The spondyloarthritis family consists of the following members, which can be classified further according to the distribution of joint involvement as being predominantly axial or peripheral: Ankylosing spondyloarthritis, Non-radiographic axial spondyloarthritis, Peripheral spondyloarthritis, Spondyloarthritis associated with psoriasis or psoriatic arthritis,

Spondyloarthritis associated with Crohn disease and ulcerative colitis, Reactive arthritis, and Juvenile-onset spondyloarthritis.

The reasons for the classification of spondyloarthritis into these categories are both historical and practical, but each category does not necessarily represent a discrete entity, and the clinical, laboratory, and imaging findings can overlap. The diagnosis and management approaches for patients suspected of having any type of spondyloarthritis are also generally similar [2, 3].

Axial spondyloarthritis patients with definite radiographic sacroiliitis usually can be diagnosed with ankylosing spondylitis while patients with axial spondylitis who do not show radiographic changes of sacroiliitis or have only very mild changes are classified as having non-radiographic axial spondylarthritis [4].

The smaller number of patients with predominantly peripheral manifestations of spondyloarthritis (e.g. Arthritis, enthesitis, and dactylitis, rather than back and spine pain) who do not meet established classification criteria for ankylosing spondylitis, reactive arthritis, psoriatic arthritis, or spondylarthritis related to inflammatory bowel disorders can be

considered as having peripheral spondylarthritis, but often evolve to develop a specific diagnosis [5] .

The symptoms of spondylarthritis can be divided as major musculoskeletal features and major non-musculoskeletal features.

Major musculoskeletal features include low back pain/inflammation back pain [6,7,8,9] , peripheral arthritis [10, 11, 12] , enthesitis [10, 13, 14] , dactylitis [15] . Major non-musculoskeletal features include inflammatory eye disease [16, 17, 18, 19, 20] , inflammation of the bowel mucosa [21] , psoriasis [21,22,23,24] .

There are no laboratory findings that are absolutely specific for spondyloarthritis. Most noticeable are human leukocyte antigen (HLA-B27) [5,9,25] and elevated acute phase reactants [26,27,28,29] .

There are several characteristic imaging findings that may be seen in patients with spondylarthritis. Sacroiliitis , especially on plain radiography, is relatively specific for spondyloarthritis. Typical syndesmophytes and changes of spondylitis in the spine are also relatively specific for spondyloarthritis, but are usually seen in more longstanding disease and are not often present early in the disease course [30] . Magnetic resonance imaging (MRI) can reveal changes consistent with spondyloarthritis. Ultrasonography, CT scintigraphy can also be used for diagnosis of spondylarthritis [31, 32, 33, 34] .

There are classification criteria for axial spondyloarthritis and peripheral spondyloarthritis [30] . The classification criteria for axial spondyloarthritis include inflammatory back pain [35] , arthritis, Heel anthesis, uveitis, dactylitis, psoriasis, inflammatory bowel disease, good response to nonsteroidal anti-inflammatory drugs (NSAIDs), family history of spondyloarthritis and elevated C-reactive protein (CRP) or erythrocyte sedimentation rate (ESR). These criteria exhibited sensitivity of 83 percent and specificity of 84 percent.

Classification criteria for peripheral spondyloarthritis were based upon arthritis, enthesitis and/or dactylitis with sensitivity of 78 percent and specificity of 83 percent [11] .

Physical examination of patients with spondyloarthritis including ankylosing spondylitis include Modified Schober test, Chest expansion, sacroiliac joint tenderness, examination of the hip for flexion deformity, examination of sacroiliac joint involvement that is called Mennell sign, which the patient is instructed to flex one of the knee and then abduct as well as externally rotate the corresponding hip, press on the flexed knee causes pain at the corresponding sacroiliac joint [36, 37] .

A patient with at least 4 of 11 features characteristic of spondyloarthritis can usually be diagnosed as patients with spondyloarthritis. These characteristic features of spondyloarthritis are inflammatory back pain, Heel pain (enthesitis), Dactylitis, Uveitis, Positive family history for Spondyloarthritis, Inflammatory bowel disease, Alternating buttock pain, Psoriasis, Asymmetric arthritis, Positive response to nonsteroidal anti-inflammatory drugs (NSAIDs) and Elevated acute phase reactants (ESR or CRP) [38] .

1. METHODS

1.1. Study design and participants

All the participants gave written informed consent before entering the study. They were informed about purpose, content and the protocol of the study.

The study was conducted at the Rheumatology department of clinical institute, Pyongyang medical university. The design of study was approved by the Ministry of Health.

Participants were selected among patients with the following inclusion criteria; for spondyloarthritis with study group at least 4 of the 11 characteristic features of spondyloarthritis and no finding of herniated disc in MRI. These 11 features characteristic of spondylarthritis are Inflammatory back pain, Heel pain(enthesitis), Dactylitis, Uveitis, Positive family history for spondylarthritis, Inflammatory bowel disease, Alternating buttock pain, Psoriasis, Asymmetric arthritis, Positive response to nonsteroidal anti-inflammatory drugs (NSAIDs) and Elevated acute phase reactants (ESR or CRP). Inclusion criteria are lower back pain, positive straight leg raising test, normal acute phase reactants(ESR) and certain herniated disc in

MRI for patients with herniated disc(radiculopathy) in control group.

The study was conducted between January 2020 and November 2025. 117 participants with spondyloarthritis were included to study group, and 117 participants with herniated disc to control group. A total of 234 participants were included in the study according to the inclusion criteria and fulfilled inclusion criteria. In patients with spondyloarthritis Mean±SD age was 42.17±19.8 years and 36(30.8%) were women, Mean±SD symptom duration was 4.8±1.3 years, in patients with herniated disc Mean±SD age was 36.8±12.8 years and 43 (71.7%) were women, Mean±SD symptom duration was 3.1±1.2 years.

1.2. Statistical analysis

The data found via the electronic medical records were imported into Microsoft Excel. Positive incidence rates in both study and control group and P-value via test of clinical symptoms and signs, laboratory and Electromyographic findings were evaluated. Findings with P-value <0.05, were chosen up in the study group.

1.3. Procedure

In present study, it was considered that findings with P-value<0.05, higher sensitivity and

specificity become of significant diagnostic items, and several preliminary diagnostic criteria with the items were made. We considered that the diagnostic criteria with the most high sensitivity and specificity among several preliminary diagnostic criteria of spondylarthritis.

So we can postulate that is reasonable diagnostic method for spondyloarthritis.

Spondyloarthritis and herniated disc share the lower back pain and diminished knee jerk or ankle jerk, and then spondylarthritis and knee osteoarthritis share the asymmetric arthropathies. This is reason that herniated disc and knee osteoarthritis were selected as control group diseases.

2. RESULTS

3.1 Incidence rates of characteristic features for spondyloarthritis

The incidence rates of inflammatory back pain/low back pain (100%), Heel pain (enthesitis)(33%), Dactylitis (14.5%), Alternating buttock pain (56.4%), Asymmetric arthritis(77.8%), good response to nonsteroidal anti-inflammatory drugs (86.3%) and Elevated acute phase reactants (ESR)(75.2%) were higher in spondyloarthritis (P<0.05) (Table 1).

Table 1. Positive incidence rates of characteristic features of Spondyloarthritis.

Indicators	Study group (n=117)		Control group (n=117)		P-value
	Positive no, %		Positive no, %		
Inflammatory back pain/lower back pain	117	100	111	94.8	>0.5
Heel pain(enthesisitis)	39	33.3	0	0	<0.05
Dactylitis	17	14.5	0	0	<0.05
Uveitis	2	1.7	1	0.9	>.0.1
Positive family history for spondylarthritis	5	4.3	1	0.9	>.0.1
Alternating buttock pain	66	56.4	1	0.9	<0.05
Inflammatory bowel disease	4	3.4	1	0.9	>0.1
Psoriasis	1	0.9	1	0.9	>0.1
Asymmetric arthritis	91	77.8	3	2.5	<0.05
Positive good response to NSAIDs	101	86.3	4	3.4	<0.05
Elevated acute phase reactants (ESR*)	88	75.2	0	0	<0.05

※ ESR; Erythrocyte Sedimentation rate.

3.2. Incidence rates of Mennell sign, diminished or lost patellar tendon and ankle reflex, and diminished or lost H wave of gastro- cnemius and delay of motor conductivity velocity of tibial nerve in EMG.

Incidence rates of Mennell sign (98.2%), diminished or lost patellar tendon reflex

(83.8%), diminished or lost ankle reflex (97.4%) were higher in spondylarthritis.

Incidence rates of Mennell sign was significantly higher in comparison with control group ($P < 0.05$), but there were not significant differences in patellar tendon reflex and ankle reflex ($P > 0.05$) (Table 2).

Table 2. Positive incidence rates of Mennell sign, patellar tendon reflex and ankle reflex in spondyloarthritis.

Indicators	Study group (n=117)		Control group (n=117)		P-value
	Positive no, %		Positive no, %		
Mennell sign	115	98.2	2	3.3	<0.05
Diminished or lost Patellar tendon reflex	98	83.8	81	69.2	>0.5
Diminished or lost ankle reflex	114	97.4	116	99.1	>0.5
Diminished or lost H wave of gastrocnemius in EMG*	4	3.4	102	87.2	<0.05
Delay of motor conductivity at the tibia nerve in EMG	5	4.3	110	94.2	<0.05

※ EMG; Electromyography

3.3. Sensitivity and specificity of significant findings in spondyl- arthritis.

Sensitivity and specificity of inflammatory back pain/ low back pain (100% and 5.1 % respectively), heel pain/ Achilles tendon tenderness (33.3% and 100% respectively), dactylitis (14.5% and 100% respectively) Alternating buttock pain (56.4% and 99.1 % respectively), good response to nonsteroidal anti-inflammatory drugs (NSAIDs) (86.3%

and 96.5% respectively), Elevated acute phase reactants (ESR) (75.2% and 99.1% respectively), Mennell sign (95.7% and 98.2% respectively), diminished or lost patellar tendon reflex (83.8% and 30.7% respectively), diminished or lost H wave of gastrocnemius (3.4% and 99.1% respectively), delay of motor conductivity velocity of tibial nerve in EMG (3.4% and 99.1% respectively) were significant in spondyloarthritis (Table 3).

Table 3. Sensitivity and specificity of significant findings in spondyloarthritis.

Indicators	Study group (n=117)		Control group (n=117)	
	Positive no.	Sensitivity (%)	Negative no.	Specificity (%)
Inflammatory back pain/lower back pain	117	100	6	5.1
Heel pain/Achilles tendon tenderness	39	33.3	117	100
Dactylitis	17	14.5	117	100
Alternating buttock pain	66	56.4	116	99.1
Asymmetric arthritis	91	77.8	114	97.4
Positive good response to NSAIDs	101	86.3	113	96.5
Elevated accurate phase reactants (ESR*)	88	75.2	116	99.1
Mennell sign	112	95.7	115	98.2
Diminished or lost Patellar tendon reflex	98	83.8	36	30.7
Diminished or lost ankle reflex	114	97.4	1	0.9
Diminished or lost H wave of gastrocnemius in EMG*	4	3.4	116	99.1
Delay of motor conductivity at the tibia nerve in EMG	5	4.3	115	98.3

3.4. Sensitivity, specificity and accuracy of several preliminary diagnostic criteria in spondylarthritis

Sensitivity, specificity and accuracy of first preliminary diagnostic criteria were 98.2%, 9.4%, 53.8% respectively and 95.2%, 93.2%,

94.2% of the second preliminary diagnostic criteria, 86.3%, 95.7%, 91.0% of the third, 86.3%, 97.4%, 91.9% of the fourth and 85.5%, 99.1%, 92.3% respectively of the fifth (Table 4).

Table 4. Sensitivity, specificity and accuracy of severe preliminary diagnostic criteria in Spondyloarthritis.

Indicators	Study group (n=117)		Control group(n=117)		
	Corresponding no.	Sensitivity (%)	Non-Corresponding no.	Specificity (%)	Accuracy%
<<Preliminary diagnostic criteria>>1)	115	98.2	11	9.4	53.8
<<Preliminary diagnostic criteria>>2)	112	95.2	109	93.2	94.2
<<Preliminary diagnostic criteria>>3)	101	86.3	112	95.7	91.0
<<Preliminary diagnostic criteria>>4)	101	86.3	114	97.4	91.9
<<Preliminary diagnostic criteria>>5)	100	85.5	116	99.1	92.3

※Content of <<Preliminary diagnostic criteria>>1); ①Inflammatory back pain/lower back pain, ②positive Mennell sign, ③positive diminished or lost patellar tendon or ankle reflex

Content of <<Preliminary diagnostic criteria>>2); ①Content of <<Preliminary diagnostic criteria>>, 1); ②Any one of Heel pain, Dactylitis, Alternating buttock pain and Asymmetrical arthritis

Content of <<Preliminary diagnostic criteria>>3); ①Content of <<Preliminary diagnostic criteria>>1), ②Any one of positive response to NSAIDs and elevated ESR value

Content of <<Preliminary diagnostic criteria>>4); ①Content of <<Preliminary diagnostic criteria>>1), ②Any one of heel pain, dactylitis, alternating buttock pain and asymmetric arthritis, ③Any one of positive response to NSAIDs and elevated ESR

Content of <<Preliminary diagnostic criteria>>5); ①Content of <<Preliminary diagnostic criteria>>4) plus negative EMG findings.

3. DISCUSSION

At the precedent studies, it was emphasized that the 11 features are characteristic symptoms and signs of spondylarthritis. At the present study was newly lightened that Mennell sign and diminished or lost patellar tendon and ankle reflex are significant in spondylarthritis, though 11 features characteristic of spondyloarthritis are important, of course. It has been proved in dissertations and articles that symptoms and signs with high incidence rate, sensitivity and specificity are significant in diagnosis of corresponding disease [39, 40].

At present study, it was certified that inflammatory back pain/low back pain, Mennell sign, diminished or lost patellar tendon and ankle reflex, asymmetric arthritis,

alternating buttock pain, heel pain(enthesisitis), dactylitis, good response to NSAIDs, elevated acute phase reactant(ESR), additionally negative diminished or lost H wave of gastrocnemius and negative delay of motor conductivity velocity at tibial nerve in EMG become of significant diagnostic items in spondyloarthritis, because they have higher incidence rate, sensitivity and specificity.

It is presumably considered that the reason of low incidence rate of family history for spondyloarthritis, uveitis, inflammatory bowel disease and psoriasis is that patients could not correctly know the pedigree chart for diseases and could visit to ophthalmologists, gastrologists and dermatologists before rheumatologists.

At present study, it was presented that patients with inflammation/low back pain should have Mennell sign, patellar tendon and ankle reflex certified at step one, and at step two, patients with fulfilled step one content should have asymmetric arthritis, alternating buttock pain, heel pain(enthesisitis) and dactylitis certified, at step three, patients with fulfilled step two content should have good response to NSAIDs and elevated acute phase reactants(ESR) certified, and at step four patients should have the second and third step contents, and at fifth step, certifying negative diminished or lost H wave of gastrocnemius and negative delay of motor conductivity velocity at EMG. We considered that at fifth step, the accuracy of diagnosis was the most high, so preliminary diagnostic criteria five become of reasonable diagnostic method. This is reasonable diagnostic method for spondyloarthritis.

4. CONCLUSION

In conclusion, this study has shown that significant clinical symptoms and signs in diagnosis of spondyloarthritis are as follows; inflammatory back pain/low back pain, Mennell sign, diminished or lost patellar tendon and ankle reflex, asymmetric arthritis, heel pain(enthesisitis), dactylitis, good response to NSAIDs, elevated acute phase reactant(ESR).

The reasonable subsequent diagnostic steps are as follows; in step one patients with inflammatory/low back pain should have presence of Mennell sign, Patellar tendon and ankle reflex certify, and in step two, patients with fulfilled step one should have any one of asymmetric arthritis, alternating buttock pain, heel pain(enthesisitis) and dactylitis, and in step three, patients with step two contents should have any one of good response to nonsteroidal anti-inflammatory drugs and elevated acute phase reactant(ESR), and in step four, patient should have preliminary criteria two and three fulfilled, and in step five, patients should have fulfilled preliminary diagnosis criteria four plus negative EMG findings.

Such clinical symptoms and signs as well as coupled findings, related to diagnosis of spondyloarthritis need to be investigated in further research.

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