Differences of ultrasonographic enthesitis between patients with non-radiographic axial spondylarthritis and ankylosing spondylitis

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To the Editor: Spondyloarthritis (SpA) is the umbrella term for a broad spectrum of inflammatory rheumatic diseases with different clinical manifestations and characteristic imaging features. Furthermore, enthesitis is considered a pathological, clinical, and imaginable hallmark of the SpA. In addition to ineffective clinical evaluation techniques of enthesitis, there are useful imaging methods to assess enthesitis, such as whole-body magnetic resonance imaging[1] and ultrasound (US)[2] examination. US has the advantage of real-time imaging and high-cost effectiveness performance. The difference in enthesitis detected by US between non-radiographic-axial SpA (nr-axSpA) and radiographic-axSpA/ankylosing spondylitis (AS) has been seldom researched. Recently, we compared the prevalence and severity of enthesitis between nr-axSpA and AS.

This study was approved by the Ethics Committee of the First Affiliated Hospital of Hainan Medical University (No. 202001). All study participants were 18 years of age or older and provided written informed consent. From July 2020 to June 2021, 104 patients with SpA and 30 patients with rheumatoid arthritis (RA) were recruited. They were either in-patients or out-patients of the Department of Rheumatology and Clinical Immunology in our hospital. All patients with SpA met the 2009 Assessment of Spondyloarthritis International Society criteria, and 29 patients were classified as nr-axSpA and the other 75 patients were AS. Data on demographics (sex, age, body mass index [BMI], and family history of SpA) and clinical features (symptom duration of disease, human leukocyte antigen (HLA)-B27, presence of peripheral arthritis, dactylitis, Achilles enthesitis, uveitis, psoriasis, and inflammatory bowel disease) were collected. Disease activity parameters, such as erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), and Ankylosing Spondylitis Disease Activity Score-CRP (aSDAS-CRP), were collected during the hospital visit. Functional impairment was also assessed by the Bath Ankylosing Spondylitis Functional Index.

The equipment used was the Mindray (M58, China), with a 7 to 18 MHz linear array transducer. The power Doppler US (PDUS) study bilaterally explored entheses at 6 sites: the common extensor tendons on the lateral epicondyle of the elbow, the quadriceps tendons on the superior pole of the patella, the proximal patellar ligaments on the inferior pole of the patella, the distal patella ligament on the tibial tuberosity, the Achilles tendon on the calcaneus, and the proximal plantar fascia. Each tendon was scanned in both the longitudinal and transverse planes. According to the Outcome Measure in Rheumatology Clinical Trials Ultrasound Working Group's[3] consensus-based ultrasonic definition and scoring for enthesitis in SpA and psoriatic arthritis, enthesitis is defined as a hypoechoic and/or thickened insertion of the tendon close to the bone (within 2 mm of the bony cortex), which exhibits Doppler signal when active and which may show erosions and entheso-phytes/calcifications as a sign of structural damage. In our study, the US exploration evaluated the following elemental lesions of the enthesis at each site: thickened enthesis, hypoechogenicity, Doppler signal, erosion, and calcification/enthesophyte. These components have the same weight and were scored as 0 or 1. The US assessment was performed by 2 rheumatologists experienced in musculoskeletal ultrasonography who have been certified by the Chinese Medical Association, and discrepancies were resolved by consensus. They were mutually blinded and were also blinded to the patients and subjects.

The study population consisted of 29 patients with nr-axSpA, 75 patients with AS, and 30 RA controls. In patients with nr-axSpA, 13 (44.8%) patients were HLA-B27 positive, and 24 (82.8%) patients had sacroiliac joint-magnetic resonance imaging (SIJ-MRI) changes. Eight (27.6%) patients showed both HLA-B27 positivity and SIJ-MRI changes. The percentage of female patients in patients with nr-axSpA was significantly higher than that in patients with AS ($P < 0.05$). Patients with nr-axSpA were younger than patients with AS ($P < 0.05$). Disease duration was

Access this article online

Quick Response Code:

Website: www.cmj.org

DOI: 10.1097/CM9.0000000000002084

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Chinese Medical Journal 2022;135(21)

Received: 13-12-2021; **Online:** 19-10-2022 **Edited by:** Lishao Guo

Table 1: Sonographic enthesitis in 29 patients with nr-axSpA, 75 patients with AS, and 30 RA controls

Items	nr-axSpA	AS	RA	*P* values nr-axSpA *vs.* AS	*P* values nr-axSpA *vs.* RA
Prevalence, *n* (%)	15 (51.7)	59 (78.7)	8 (26.7)	0.007	0.045
Severity (*n*), median (range)	2 (0, 7)	11 (5, 16)	0 (0, 0)	0.001	0.004

AS: Ankylosing spondylitis; nr-axSpA: Non-radiographic-axSpA; RA: Rheumatoid arthritis; SpA: Spondyloarthritis.

shorter in patients with nr-axSpA than in patients with AS. Patients with nr-axSpA had a significantly higher BASDAI, a lower frequency of peripheral arthritis, and a worse reaction to non-steroidal anti-inflammatory drugs than patients with AS ($P < 0.05$). Parameters of sex, age, and BMI were not significantly different between nr-ax patients with SpA and patients with RA [Supplementary Table 1, http://links.lww.com/CM9/A1000].

The prevalence of ultrasonographic enthesitis in the entire study population of nr-axSpA, AS, and RA were 51.5%, 78.7%, and 26.7%, respectively. Patients with nr-axSpA had a lower frequency of enthesitis than patients with AS and had a higher frequency of enthesitis than patients with RA ($P < 0.05$). The median interquartile range score of ultrasonographic enthesitis for nr-axSpA, AS, and RA was 2 (0, 7), 11 (5, 16), and 0 (0, 0), respectively. The level of enthesitis score was lower in patients with nr-axSpA than in patients with AS and higher in patients with nr-axSpA than in patients with RA ($P < 0.05$) [Table 1]. Spearman's rank correlation analysis showed that the enthesitis score was significantly associated with ASDAS, ESR, and CRP ($P < 0.001$) [Supplementary Table 2, http://links.lww.com/CM9/A1000]. Multivariate linear regression analysis showed that ESR and CRP were risk factors for enthesitis in patients with AS. The odds ratio and 95% confidence interval were 0.856 (0.736, 0.995) and 1.794 (1.132, 2.842) for ESR and CRP, respectively [Supplementary Table 3, http://links.lww.com/CM9/A1000].

In conclusion, our findings suggest that PDUS enthesitis is common in patients with SpA. Patients with nr-axSpA had a lower prevalence and less severe PDUS enthesitis than patients with AS. The patients with nr-axSpA were more frequently female and younger and had a shorter disease course than patients with AS.

Acknowledgments

The authors thank Drs. Huanan Wang, Ruiming Shen, Feng Guo, Yanping Zheng, Lihui Ma, and Yangqing Jiang for their involvement in managing these patients.

Conflicts of interest

None.

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How to cite this article: Li J, Wang M, Xu F, Li G, Ye F. Differences of ultrasonographic enthesitis between patients with non-radiographic axial spondylarthritis and ankylosing spondylitis. Chin Med J 2022;135:2640–2641. doi: 10.1097/CM9.0000000000002084