Improvement of delayed diagnosis of ankylosing spondylitis in a Chinese population

Yuhan Sun[1], **Zhuoran Hu**[1], **Xuecheng Zhang**[2], **Jun Qi**[1], **Zhiming Lin**[1]

[1]Division of Rheumatology, The Third Affiliated Hospital of Sun Yat-sen University, Guangzhou, Guangdong, China;
[2]Department of Nephrology, Baoan Central Hospital of Shenzhen, Shenzhen, Guangdong, China.

To the Editor: Delayed diagnosis is a challenge in ankylosing spondylitis (AS), a representative phenotype of axial spondylarthritis (ax-SpA). Such delay might be improving,[1] as there have been several updates on the diagnosis criteria of AS and ax-SpA, especially the 2009 Assessment of SpondyloArthritis International Society (ASAS),[2] which recognized MRI as a powerful approach to detect early-stage lesions. However, there is still limited knowledge of whether the diagnostic delay has been improved in China. Therefore, we performed a comparative study of two datasets from the same hospital collected over 14 years.

Five hundred and sixty-six patients were enrolled in the present study, including 212 patients from the 2006 cohort and 354 patients from the 2020 cohort. Most of the participants were male (81.3%) and aged <30 years when they were correctly diagnosed (406 of 566, 71.7%). We then divided these patients into two subgroups according to their epochs of correct diagnosis—before and after 2009. According to the 2009 ASAS criteria, we divided patients into those aged under 40 years and over 40 years. To scrutinize the younger group, we further separated those aged under 40 years into five subgroups in 5-year age intervals. The composition of the correct diagnostic age in these two groups has no statistically significant difference; however, more female patients ($P = 0.003$) were diagnosed at or after 2009. The specific data information mentioned in the full text is detailed in the Supplementary Tables 1–3, http://links.lww.com/CM9/A887.

The validity and reliability of WeChat questionnaires over traditional paper-based questionnaires have been verified in a previous study.[3] Our results showed a valid response rate of 96.5% for the WeChat questionnaire, compared with 91.3% for the traditional telephone call-back. Professionally designed electronic data collection will have the potential to gradually replace the traditional data collection methods of scientific research.

Delayed diagnosis of AS patients has improved significantly in China after 15 years. The time is taken from the first symptoms to correct diagnosis improved from 4.5 years to 1.1 years. The overall diagnostic delay reduced significantly after 2009. After the 2009 diagnostic criteria change, the reduction in the time to delayed diagnosis was statistically significant in 20 to 24 and 25 to 29 age groups. Figure 1 shows more visually the differences in delayed diagnosis times by age group compared with the pre-2009 and 2010 to 2020 subgroups. Notably, Figure 1 also shows that in the statistically significant age subgroups, which are the 20 to 24 and 25 to 29 age groups, the distribution of delay times for the 2009 to 2020 cohort is more concentrated in a narrower range than for the pre-2009 cohort. The more focused delay may mean a more efficient and reliable diagnosis for SpA patients after 2009. And there was no significant gender difference in the time to delayed diagnosis among people aged 20 to 30 years before 2009, after 2009, and during the entire time period. Therefore, we can believe that the delayed diagnosis of SpA in the whole population aged 20 to 30 years has been significantly improved after the change of 2009 diagnostic criteria.

Potential explanations for these include the following: increased awareness amongst physicians and the general population; adoption and implementation of the 2009 ASAS criteria, which promotes the widespread use of MRI. In addition, the more perfect perception of AS, and the popularity of X-rays, are also very likely to be favorable factors for the reduction of delayed diagnosis time. However, whether those with less diagnostic delay were made on MRI scans is not clear, though our center has been proactive in using this criterion.

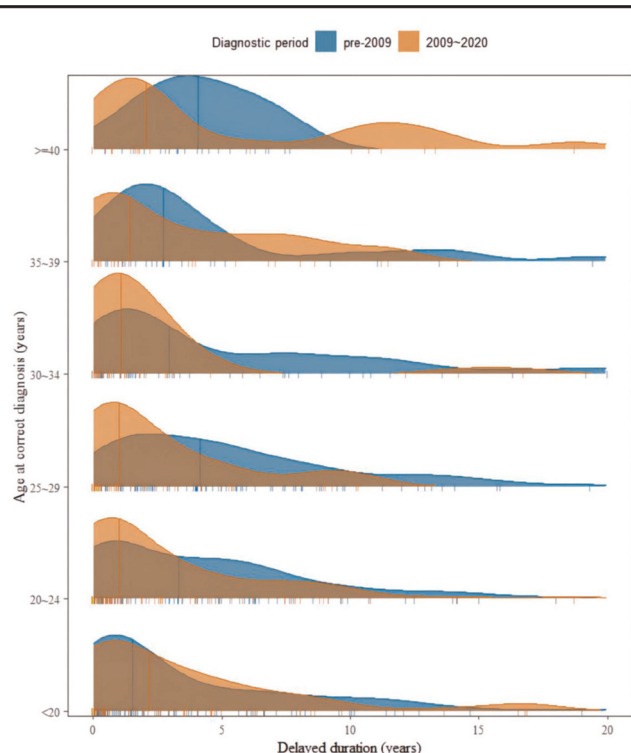| Access this article online	
Quick Response Code:	**Website:** www.cmj.org
	DOI: 10.1097/CM9.0000000000001950

Figure 1: The distribution of delayed duration of two diagnostic periods, stratified by age at the correct diagnosis.

sufficient clinical samples for rheumatic immune diseases. The head of this center participated in the development of the 2009 ASAS standard. Therefore, when the 2009 ASAS standard is applied for diagnosis, this center is more advanced, rigorous, and professional.

This study has some limitations, and we will add more related influencing factors for exploration in future studies. For example, examine whether the HLA-B27 test has an effect on shortening the time to diagnosis, and record and analyze the time between the onset of symptoms and the first radiological examination. In addition, the way of the questionnaire is greatly influenced by patient subjectivity, and recall bias is likely to exist. Whether those with less diagnostic delay were made on MRI scans is not clear, though our center has been proactive in using this criterion. We next plan to collect data on which radiological methods that patients diagnosed after 2009 were implemented at their first visit.

To conclude, delay to diagnosis has improved in the past 14 years in China after the 2009 ASAS criteria application. Reasonable use of MRI might contribute to the improvement.

Conflicts of interest

None.

After the introduction of the new 2009 ASAS criteria, the proportion of female patients in the total number of patients increased from 14.3% to 24.6%. The increase in the detection rate of female patients may be related to the emphasis on the important role of MRI in the diagnosis of SpA in the new criteria. In the past, the empirical diagnostic preferences of physicians may have led to a proportion of female patients with atypical symptoms being overlooked. Previous studies have shown that women have higher the Assessment of Spondyloarthritis International Society Health Index than men. Shortening the time to delayed diagnosis and increasing the detection rate in female patients are more helpful to help female patients detect the disease early and manage it.[4]

This study is a retrospective study on the comparison of follow-up visits for delayed diagnosis of SpA patients before and after the enactment of the 2009 ASAS criteria in South China. The study site is the earliest and largest rheumatic immune center in South China and has

References

1. Sorensen J, Hetland ML. all Departments of Rheumatology in Denmark. Diagnostic delay in patients with rheumatoid arthritis, psoriatic arthritis and ankylosing spondylitis: results from the Danish nationwide DANBIO registry. Ann Rheum Dis 2015;74:e12–e112. doi: 10.1136/annrheumdis-2013-204867.
2. Rudwaleit M, van der Heijde D, Landewé R, Listing J, Akkoc N, Brandt J, et al. The development of assessment of spondyloarthritis international society classification criteria for axial spondyloarthritis (part II): validation and final selection. Ann Rheum Dis 2009;68:777–783. doi: 10.1136/ard.2009.108233.
3. Zhang X, Chen X, Kourkoumelis N, Gao R, Li G, Zhu C. A social media-promoted educational community of joint replacement patients using the WeChat app: survey study. JMIR Mhealth Uhealth 2021;9:e18763. doi: 10.2196/18763.
4. Chen HH, Chen YM, Lai KL, Hsieh TY, Hung WT, Lin CT, et al. Gender difference in ASAS HI among patients with ankylosing spondylitis. PLoS One 2020;15:e235678. doi: 10.1371/journal.pone.0235678.