

JOURNAL CLUB

Journal Club: What Are the Implications of the Presence of Magnetic Resonance Imaging–Detected Erosions and Synovitis in Healthy People?

Rayan Najjar **Introduction**

Joint erosions are considered a feature of inflammatory arthritis such as rheumatoid arthritis. Along with historical and physical examination findings, the presence or absence of erosions is used in clinical practice to distinguish between inflammatory arthritis and osteoarthritis. The subtype of erosive osteoarthritis can have, as the name implies, erosions. However, these erosions are different as they are centrally located in the joint and, along with chondral loss and osteophytes, give the “gull-wing” appearance on X-ray, which is usually seen in the distal interphalangeal joint. This is in contrast to erosions in rheumatoid arthritis, which are marginally located.

The paradigm of marginal joint erosions denoting inflammatory disease was based on erosions detected by X-ray; these erosions had to be of a certain size to be visible on X-ray. However, we now possess more sensitive tools such as magnetic resonance imaging (MRI) and ultrasound that are capable of detecting small erosions not visible on X-ray. We should not automatically extend the same clinical meaning of bigger X-ray erosions to smaller MRI erosions. Similar questions can be asked relating to whether clinical synovitis and subclinical synovitis as detected by sensitive imaging tools should have similar conclusions. The study by Mangnus et al (1) helps address some of these questions.

Data and Results

The investigators conducted a cross-sectional study in 2013 to 2014 in the Netherlands, where they recruited asymptomatic people using advertisements in the newspaper and online, including people aged 18 years or older without history of rheumatoid arthritis or other inflammatory arthritis, without joint symptoms in the past month, and without evidence of arthritis on physical

examination during a clinic visit. Then, MRIs of the metacarpophalangeal (MCP), wrist, and metatarsophalangeal (MTP) joints on the dominant side were performed at a second visit within 15 days. MRI results were not shared with participants. MRIs were read by two experienced independent radiologists, and images were mixed with MRIs from patients with rheumatoid arthritis and arthralgia without clinical synovitis. The readers were blinded to clinical data. Features of inflammation, including synovitis (greater than normal postgadolinium enhancement), bone marrow edema, and tenosynovitis, were assessed by MRI. Erosions were scored according to Rheumatoid Arthritis Magnetic Resonance Imaging Scoring based on the affected volume of bone on a score from 0 to 10 (no erosions, 0–10%, 10–20%, etc.). An erosion on MRI appears as a sharply marginated bone lesion with correct juxta-articular localization and typical signal characteristics that is visible in two planes with a cortical break seen in at least one plane. The synovitis score was based on the volume of enhancing tissue in the synovial compartment (none, mild, moderate, and severe [range 0–3]).

The study included 193 participants from November 2013 to December 2014 with an average age of 49.8 years (SD = 15.8). The majority of subjects were female (70.5%). Approximately one-third of the subjects had signs of osteoarthritis of small joints on examination (Heberden nodes, Bouchard nodes, and hallux valgus). The majority of subjects had one or more marginal erosions at the examined joints ($n = 151$; 78.2%). The prevalence of erosions was 31.6% at the MCP joints, 68.4% at the wrists, and 24.4% at the MTP joints. In addition, 26.9% had erosion scores of 4 or higher. Erosions were present at more than one joint in 50% of subjects. There was no difference in erosion scores between men and women ($P = 0.11$). Inflammatory features were prevalent, including synovitis (48.2%) and bone marrow edema (57.5%). Tenosynovitis was less prevalent (16.6%). Only

Rayan Najjar, MD, MPH: Division of Rheumatology, University of Washington, Seattle.

No potential conflicts of interest relevant to this article were reported.

Address correspondence to Rayan Najjar, MD, MPH, Division of Rheumatology, University of Washington, 1959 NE Pacific Street, Box 356428, Seattle, WA 98195. Email: najjar@uw.edu.

Submitted for publication July 9, 2021; accepted in revised form July 14, 2021.

54 participants (28%) had no features of inflammation on MRI. The highest inflammation levels were seen in the wrist joints. The prevalence of inflammatory features in at least two joints was 22% for synovitis, 23% for bone marrow edema, and 4% for tenosynovitis. Higher inflammation and erosion scores were associated with older age, and this association was unchanged after excluding subjects with asymptomatic osteoarthritis physical signs.

Conclusions

This is an important study as it provides guidance that pertains to common clinical scenarios encountered at rheumatology clinics. We are often faced by diagnostic uncertainty when it comes to the nature of disease in our patients, and our decisions in deciding the presence or absence of inflammatory arthritis have significant implications as they guide treatment options that are very different for inflammatory joint disease versus other processes.

Study subjects were selected on the basis of online and newspaper advertisements; this was done to reach a sample of asymptomatic subjects that are outside the healthcare system. This is not a random sample of all asymptomatic subjects, so the study results are not generalizable to that population, but this does not influence the study conclusions that disease-free subjects have inflammatory features and erosions on at least some of their joints. MRI results were not shared with subjects, which is a strength in this study for the following two reasons: it avoids the potential bias of subjects wanting to enroll to obtain the MRI (which could have potentially caused selection bias) and it avoids potential unnecessary worry if subjects were told that they have erosions or inflammatory changes in their joints.

There were two independent blinded reads. In addition, the images were mixed with ones from patients with arthritis and arthralgia without synovitis; this was an important step to reduce bias because if readers knew that this was a study of asymptomatic subjects, there would be potential bias toward undercalling erosions and inflammatory signs. The intended sample had to be free of disease, and the investigators were careful to only include subjects without arthritis or arthralgia. However, they allowed the presence of asymptomatic Heberden nodes, Bouchard nodes, or hallux valgus; this was done to avoid selecting a sample that is too "healthy." Erosions were more common in older people. The investigators considered whether this was due to higher prevalence of asymptomatic osteoarthritis; however, this association remained after excluding subjects with signs of osteoarthritis. Additionally, the detected erosions were marginal, not central.

In conclusion, these patients had no arthritis, no arthralgia by history, and no synovitis on physical examination; therefore, the presence of inflammatory features (synovitis, bone marrow edema, and tenosynovitis) and erosions in these patients does not define disease. This leads us to the conclusion that small erosions and subclinical joint inflammation as detected by MRI are prevalent in healthy people and should not be used to identify a disease process or classify arthritis as inflammatory or otherwise.

AUTHOR CONTRIBUTIONS

Dr. Najjar drafted the article, revised it critically for important intellectual content, and approved the final version to be published.

REFERENCE

1. Mangnus L, van Steenberg HW, Reijnierse M, van der Helm-van Mil AH. Magnetic resonance imaging-detected features of inflammation and erosions in symptom-free persons from the general population. *Arthritis Rheumatol* 2016;68:2593–602.