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● Original Contribution

ULTRASONOGRAPHIC ASSESSMENT OF FIFTH METATARSOPHALANGEAL JOINT EROSION IN RHEUMATOID ARTHRITIS: WHICH ASPECT IS BETTER?

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Abstract—In this study, the best ultrasound (US) aspect for detection of fifth metatarsophalangeal (MTP) joint erosions, the most frequently eroded joint, in rheumatoid arthritis (RA) patients is investigated. Forty-eight RA patients (F/M = 35/13, mean age and disease durations 50.3 ± 11.8 and 7.9 ± 6.9 y, respectively) were evaluated by B-mode US for erosion. Images were obtained from the dorsal, lateral and plantar aspect of the fifth MTP joint, in longitudinal and transverse scans. The fifth MTP erosions were detected in 36 of 48 patients (75%) and 67 of 96 feet (69.8%). Of the erosions, 15 (22.4%), 53 (79.1%) and 59 (88.0%) were observed at dorsal, lateral and plantar aspects, respectively. Despite not being statistically different, the detection rate of fifth MTP erosions was numerically higher in the plantar aspect than both the lateral and dorsal aspects. In conclusion, the fifth MTP erosions in RA patients are more commonly detected in the plantar aspect US than in dorsal and lateral assessments. (E-mail: inanc.nevsun@gmail.com) © 2015 World Federation for Ultrasound in Medicine & Biology.

Key Words: Rheumatoid arthritis, Fifth metatarsophalangeal joint, Erosion, Ultrasonography.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic disease characterized by joint inflammation and destruction. This destruction, which can be visible radiographically, is an important outcome in RA. Erosions are consequences of joint inflammation, are independently associated with functional capacity and are one of the most important prognostic factors for further structural damage (Combe et al. 2001; Welsing et al. 2001, 2004). Therefore, detection and follow-up of structural damage is an essential part of RA diagnosis, monitoring and evaluation of prognosis and optimal treatment.

Structural bone changes (joint space narrowing, erosions and malalignment) are still mainly determined by conventional radiography in routine clinical practice and also in clinical trials. However, during the last decade, other imaging techniques like ultrasonography (US) have been proven to be more sensitive than conven-

tional radiography and as sensitive and specific as magnetic resonance imaging (MRI) for the detection of bone erosions (Baillet et al. 2011; Szkudlarek et al. 2004). Furthermore, US is a readily accessible, reproducible and less expensive tool than MRI.

The metatarsophalangeal (MTP) joints, particularly the fifth MTPs, are the most common and the earliest eroded joints where damage can be visualized before hand joints (Hulsmans et al. 2000; Lopez-Ben et al. 2004). Therefore, for detection of erosive disease with US, the fifth MTP can be regarded as a starting point. Although an MRI study revealed that majority of the MTP erosions were located at the plantar aspect of the joint (Siddle et al. 2014), it is unknown whether a plantar-, dorsal- or lateral-aspect US examination is best to detect the fifth MTP erosions. In this study we aimed to determine the best ultrasonographic aspect for detection of fifth MTP joint erosions in RA patients.

MATERIAL AND METHODS

Study design and patients

For this cross-sectional study, RA patients fulfilling the 1987 American College of Rheumatology (ACR) and/

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or 2010 ACR/European League against Rheumatism (EULAR) classification criteria for RA and who were older than 18 y of age were recruited from two outpatient rheumatology clinics (Aletaha et al. 2010; Arnett et al. 1988). The exclusion criteria were severe deformity of the MTP or hand joints and having another inflammatory rheumatic disease such as gout. Demographic data and disease characteristics, including rheumatoid factor (RF) and/or anticyclic citrullinated peptide (CCP) positivity, extra-articular manifestations, all previous and current medications, 28 joint disease activity scores (DAS28), erythrocyte sedimentation rate (ESR) and health assessment questionnaire (HAQ) scores at the recruitment period were recorded. The patients underwent US evaluation of the fifth MTP joint at the same day as clinical examination. The study was approved by the local Institutional Research Ethics Board and informed consent was obtained from all patients according to the Declaration of Helsinki.

Ultrasonographic assessment of fifth MTP joint erosions

A systematic multi-planar gray-scale US examination of the fifth MTP joints bilaterally was performed with MyLab 70 US machine (Esaote, Italy) using multi-frequency linear array transducers (6–18 MHz) by two rheumatologists who were experienced in musculoskeletal sonography (N.I. and S.Z.A.). Both sonologists have 7 y of experience in musculoskeletal US with 30 to 50 joint US evaluations weekly. US scanning technique, gray-scale machine settings and definitions of abnormality were standardized between investigators before the study. Ninety-six fifth MTP joints were examined both longitudinally and transversely from the dorsal, lateral and plantar aspects. Erosions were defined according to the Outcome Measures in Rheumatology (OMER-ACT) definition as an intra-articular discontinuity of the bone surface visible on two perpendicular planes (Wakefield et al. 2005). Each erosion in each aspect

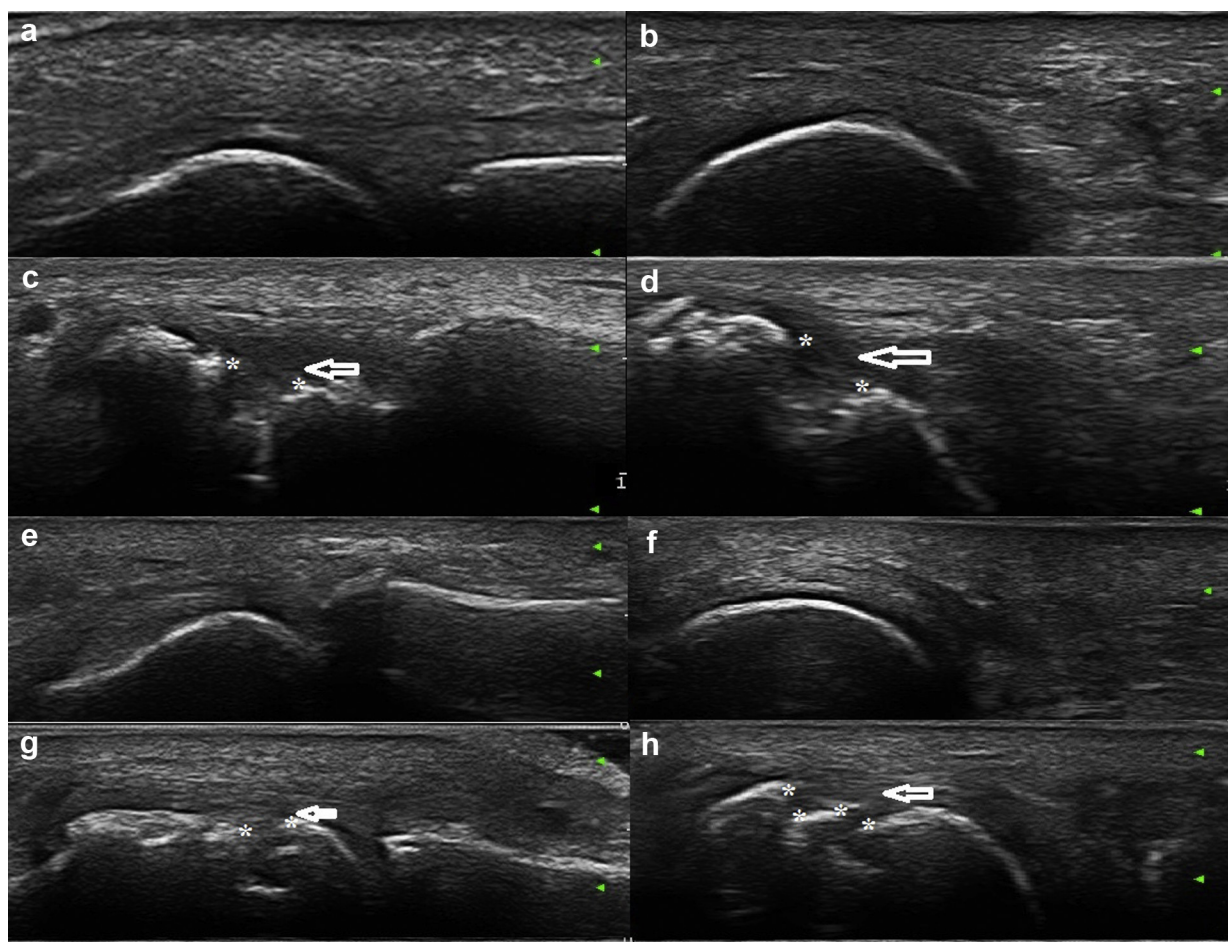


Fig. 1. Normal dorsal longitudinal (a), and dorsal transverse (b) views of the fifth MTP joint; erosions in dorsal longitudinal (c), and transverse (d) aspect of fifth MTP joint. Normal lateral longitudinal (e), and transverse (f) views of the fifth MTP joint; erosions in lateral longitudinal (g) and transverse (h) aspects of fifth MTP joint (*arrows and asterisk indicate cortical defects in the bone*).

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