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● *Original Contribution*

ULTRASOUND FINDINGS ON HANDS AND WRISTS OF PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS: RELATIONSHIP WITH PHYSICAL EXAMINATION

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Abstract—Diagnosis of synovitis/tenosynovitis by physical examination can be difficult. Ultrasound (US) can be an effective tool for the evaluation of joint involvement in systemic lupus erythematosus (SLE). This study will describe musculoskeletal findings by US in SLE patients and the evaluation of their correlation with physical examination. SLE patients underwent clinical/sonographic evaluation of hand/wrists. In total, 896 joints were evaluated: at least 1 change on physical examination was found in 136 joints and at least 1 US abnormality was found in 65 of 896 joints. Out of the 65 joints with US changes, only 13 had findings on physical examination. Conversely, 111 joints had tenderness on physical examination with no sonographic abnormalities. Tenosynovitis was statistically significant more frequently with joint edema (41%) ($p = 0.0003$). US can detect musculoskeletal changes in only a minority of symptomatic SLE patients. Clinical findings may be related to some reasons that cannot be explained using US. (E-mail: kerolins@yahoo.com.br) © **2017 World Federation for Ultrasound in Medicine & Biology.**

Key Words: **Systemic lupus erythematosus, Musculoskeletal ultrasound, Physical examination.**

INTRODUCTION

Systemic lupus erythematosus (SLE) is a multi-systemic autoimmune disease whose course is marked by remissions and relapses that may affect various organs simultaneously (Ceccarelli et al. 2015). The musculoskeletal involvement in SLE occurs in 95% of cases and may be a result of the disease itself or its treatment (Lins and Santiago 2015). Regarding the joints, it is difficult to detect synovitis or tenosynovitis on the basis of only physical examination. Hence, some researchers have suggested the inclusion of ultrasound (US) as a tool in articular evaluation in SLE patients (Dale et al. 2014; Zayat et al. 2016).

US is a non-invasive diagnostic procedure, with good accuracy for detecting abnormalities such as synovial effusion, tendon/soft tissue involvement and visualization of cartilage/bone surface (Backhaus et al. 2001; Ball and Bell 2012; Kang et al. 2014) even in the subclinical phase. In some rheumatic diseases, such as rheumatoid arthritis, the use of sonographic imaging for joints is well defined; however, this procedure is not established in SLE yet (Filer et al. 2011; Kane et al. 2004).

The main objective of this study is to describe the US evaluation of joints and soft tissues in a group of SLE patients and correlate them with physical examination.

MATERIALS AND METHODS

This is a cross-sectional study on a group of SLE patients. The study was performed at the Rheumatology Clinic of Escola Bahiana de Medicina e Saúde Pública, Salvador, Brazil. Using the American College of Rheumatology criteria (Hochberg 1997), we diagnosed and enrolled patients with SLE in this study. All patients signed the informed consent, and this study was approved by the Research Ethics Committee of our institution.

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The exclusion criteria were (i) patients younger than 18 y of age and those older than 65 y of age (excluding patients in an older age range to avoid those who may have degenerative joint changes) and (ii) those with Jaccoud's arthropathy (excluding patients who might show positive findings even with no evidence of arthritis in the physical examination).

All patients underwent clinical evaluation, including demographic data and disease duration. A physical examination of the hands and wrists was performed by a rheumatologist with 5 y of experience. The rheumatologist used a standard evaluation for rheumatologic disease, according to a previous study by Almoallim et al. (2012), focusing on findings related to arthritis (joint edema and tenderness). In this way, radiocarpal (RC), proximal interphalangeal (PIP) and metacarpophalangeal (MCP) joints from the second to fourth fingers in both hands and wrists were analyzed. These anatomic sites were chosen because they are pathologically more representative sites according to previous studies (Delle Sedie et al. 2009; Yoon et al. 2014).

Physical examination was based on dichotomic evaluation (positive and negative). During the visual inspection of patients' hands and wrists, the rheumatologist observed the presence of edema by increasing the volume and reduction in skin roughness. The PIP joints were palpated with the physician's thumb and index finger positioned to assess the joint studied in the vertical and transversal planes, alternating between these planes. Palpation on MCP joints was also held between the physician's thumb and index finger, but the rheumatologist's hands were in the scissors position (ring and little fingers separated from the middle and index fingers by the patient's fingers). At the RC joints, palpation was performed by placing the thumbs on the dorsal side and index fingers on the ventral part of the examined joint.

Hands and wrists US

The US of all the patients' hands and wrists was performed using the HD11 XE US System (Koninklijke Philips N.V., Eindhoven, The Netherlands) with a 10- to 14-MHz transducer by a radiologist (C.F.L.) specialized in musculoskeletal system (>10 y of experience). In accordance with the guidelines for musculoskeletal US recommended by the European League Against Rheumatism (Backhaus et al. 2001), images were obtained in the transverse and longitudinal planes of RC joint at the dorsal wrist, second to fourth joints of both MCP and PIP joints and flexor tendons of the second to fourth fingers of both hands (Delle Sedie et al. 2009; Yoon et al. 2014).

The presence of synovial hypertrophy, joint effusion, tenosynovitis and bone erosions was evaluated. Synovitis was defined as the presence of non-compressible unusual hypoechoic material in the joint recess (Fig. 1), according to the protocol Outcome Measures in Rheumatology Clinical Trials (Mukherjee et al. 2016; Wakefield et al. 2005). Bone erosions were defined as defects in the superficial cortical bone that are identified both in the longitudinal and transversal planes. Tenosynovitis was defined as thickened and hypoechoic tendon with or without liquid in its synovial sheath (Fig. 2) (Delle Sedie et al. 2008; Filer et al. 2011).

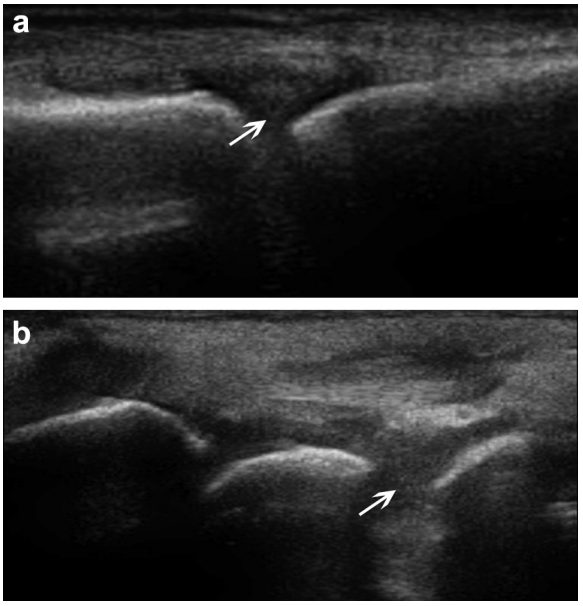

Fig. 1. (a) Ultrasonographic example of mild synovitis in the second metacarpophalangeal joint (*arrow*); (b) ultrasonographic example of radiocarpal moderate synovitis (*arrow*).

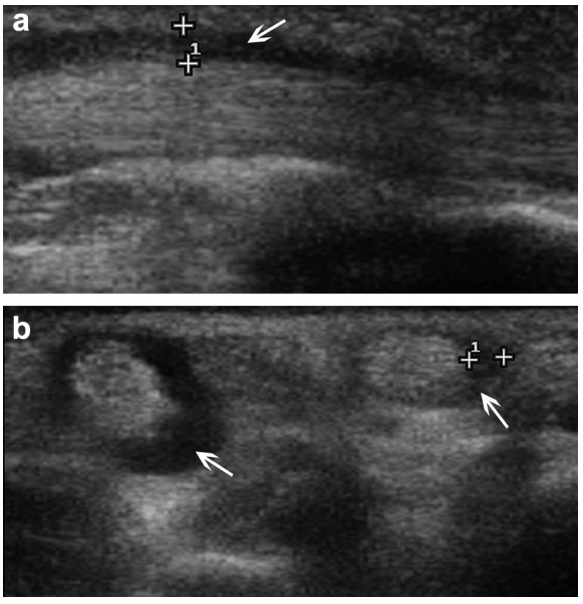

Fig. 2. (a) Ultrasonographic example of tenosynovitis at the third finger's flexor, in the longitudinal plane (*arrow*); (b) ultrasonographic example of tenosynovitis at the second and third fingers' flexors, in the transverse plane (*arrows*).