

Clinical Implementation of Musculoskeletal Ultrasound in Rheumatology

Introduction

Musculoskeletal ultrasound (MSUS) is a safe and a noninvasive technique that had a good satisfaction and acceptability from patients. It has been increasingly incorporated into rheumatologist's practices during the last decade. In fact, it has been established to evaluate joints lesions in patients with rheumatic diseases, to assess individual's response to treatment and to guide interventional procedures. MSUS may help the physician to diagnose early rheumatoid arthritis (RA) and provide many advantages over the other imaging tools. In addition to non-irradiant, ultrasound is a less costly technology providing comparative and dynamic exam [1]. Conversely, the main disadvantages of MSUS are the long training duration for operators before exercise and the operator depending.

About the Study

European countries were the first to incorporate MSUS into rheumatologist's practice and have developed training programs and curriculum under the umbrella of both the European League Against Rheumatism (EULAR) and the Outcome Measurement in Rheumatology Clinical Trials (OMERACT) group

Diagnosis of rheumatic diseases is difficult due to diverse symptoms that can involve the bone, joints, muscles, tendons, blood vessels, or nerves. In the past, physicians made diagnoses based on history-taking, physical examinations, serological tests, and X-rays. However, difficulties in diagnosing rheumatic diseases arose from limitations in the sensitivity

and specificity of serological tests and X-rays [2].

Magnetic resonance imaging (MRI) has a high sensitivity for detecting tiny inflammatory or destructive changes, which can help physicians in early diagnosis or in the monitoring of disease progression. However, MRI has a number of disadvantages, including its expense, time required, and its limited use in evaluating renal function, which hinder the use of MRI in routine practice. In contrast to MRI, musculoskeletal ultrasound (MSUS) has the advantage of being able to provide convenient, fast and real-time images for early diagnosis and routine follow-up. In evaluations of soft-tissue lesions, MSUS and MRI are more sensitive than plain radiography and computed tomography [3]. MSUS has the advantages of being non-radioactive, inexpensive, portable, and repeatable. It can provide high-resolution, power Doppler, real-time imaging of articular, periarticular and soft-tissue structures in the evaluation of rheumatologic disease. Furthermore, ultrasound-guided procedures allow for better assessment of target lesions with minimal injury to adjacent tissues such as nerves or blood vessels. There is growing evidence to show that MSUS can play a more important role in the diagnosis and treatment of rheumatic diseases.

Spondyloarthropathies are composed of five diseases with similar rheumatic presentations, including ankylosing spondylitis, psoriatic arthritis, reactive arthritis, spondylitis associated with inflammatory bowel disease (IBD) and undifferentiated spondyloarthropathy. Enthesitis is one of the most common features

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of spondyloarthropathies. However, the diagnosis is difficult to make due to lack of clinical awareness and there being no standard method for evaluation in the past [4]. MSUS is considered a good tool for evaluating enthesitis, with a high sensitivity and specificity. There are many sonographic quantitative scoring systems for enthesitis evaluation, including the Glasgow Ultrasound Enthesitis Scoring System (GUESS), Mander Enthesitis Index (MEI), and the Madrid Sonographic Enthesitis Index (MASEI). In this issue of the Journal of Medical Ultrasound, Hsiao et al report a pilot study using GUESS to evaluate enthesitis in patients with and without IBD. Subclinical enthesopathy with higher GUESS scores were found in patients with IBD. Thus, musculoskeletal involvement in IBD should not be overlooked by simple history-taking or clinical examinations. Further long-term MSUS follow-up is needed in IBD patients.

MSUS is more sensitive than plain radiography in the detection of synovial hyperplasia, effusion, bony erosions, and inflammation with emerging power Doppler signals, allowing earlier diagnosis of progressive rheumatoid arthritis. This is important as it is now possible to aim for low disease activity in rheumatoid

arthritis in this era of biological agents [5]. MSUS can be another tool to guide treatment other than clinical symptoms, laboratory examinations and radiography. Ultrasound is becoming a useful tool that is integrated into clinical practice and linked to decision-making.

Conclusion

According to Raftery et al, MSUS performed by a rheumatologist aided diagnosis of synovial and tendon inflammation and guided injections, while MSUS performed by a radiologist aided diagnosis of structural pathology. It is essential for rheumatologists to acquire ultrasonography skills in order to improve patient care. The accuracy of ultrasound examinations is operator-dependent and the technical capabilities of MSUS are a critical issue in the extensive application of MSUS in rheumatology practice. In this issue of the Journal of Medical Ultrasound, Chen et al present a study of MSUS and MRI in detecting full-thickness rotator cuff tears. With arthroscopic findings as the gold standard, MSUS performed by a qualified rheumatologist has good sensitivity and accuracy in detecting full-thickness rotator cuff tears, with good agreement with MRI.

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