

Concise Report

Comparison of musculoskeletal ultrasound practices of a rheumatologist and a radiologist

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Objective. There is considerable debate regarding the role of the rheumatologist ultrasonographer and how this development will impact on musculoskeletal ultrasound (MSUS) performed by radiologists. We compared the MSUS practices of a rheumatologist and a radiologist working within the same National Health Service Trust.

Methods. A retrospective review of MSUS reports of consecutive scans performed by a consultant rheumatologist with a special interest in MSUS and a consultant musculoskeletal radiologist. Reports were analysed for referring specialities, indications for MSUS, joint regions scanned, MSUS findings, frequency with which patients were referred for injection and how often injection was performed.

Results. A total of 170 patients were referred to the rheumatologist for MSUS of 282 joint regions (91% referred by rheumatologists). Of those, 84 (49%) patients had MSUS examination of more than one joint region, with up to five regions scanned per sitting. One hundred patients were referred to the radiologist for MSUS of 111 joint regions (49% referred by orthopaedic surgeons). The most frequently requested primary indication for MSUS performed by the rheumatologist was detection of synovitis [74 (44%) patients] while MSUS performed by the radiologist was most frequently for assessment for major structural changes [44 (44%) patients]. The rheumatologist performed MSUS-guided injection in 59 of 170 (35%) patients scanned and the radiologist in 13 of 100 (13%).

Conclusion. MSUS performed by the rheumatologist was predominantly requested by rheumatologists to aid diagnosis of synovial and tendon inflammation and to guide injections, while MSUS performed by the radiologist was predominantly requested by orthopaedic surgeons to aid diagnosis of structural pathology. Curricula in MSUS designed for rheumatologists may need to place appropriate emphasis on the identification of synovial and tendon inflammation, and injection guidance.

KEY WORDS: Musculoskeletal, Ultrasound, Rheumatologist, Radiologist, Injection.

Introduction

Musculoskeletal ultrasound (MSUS) is being used by rheumatologists for an ever-expanding number of clinical indications [1], impacting both diagnosis and management of musculoskeletal conditions [2]. MSUS is particularly useful in the detection of synovitis and tenosynovitis [3, 4], and the detection of erosions in early RA [5–7]. It is likely that the musculoskeletal clinician will seek to develop MSUS skills in indications that are relevant to the patients they attend in clinical practice [8].

There is interest among rheumatologists in the UK to train in MSUS [9, 10]. The expansion of MSUS performed by UK rheumatologists has raised legitimate concerns among UK radiologists, including the potential impact on their MSUS workload and case mix which may erode their expertise, as well as how rheumatologists will be trained in MSUS [11]. Rheumatologists argue that MSUS in their hands is used differently, particularly for new indications that have not previously been performed in the radiology department and that radiologists and rheumatologists will develop different case mixes and interests when performing MSUS [9].

A survey aimed at establishing standards for rheumatologists training in MSUS has provided evidence of different clinical

interests among radiologists and rheumatologists, more radiologists deeming orthopaedic-related pathology pertinent to their practice [9]. However, there is no direct or detailed comparison of the MSUS practice of radiologists and rheumatologists when working in the same referral base. This information would be useful in informing the debate regarding the role of MSUS within rheumatology, and aid in the development of training for rheumatologists in MSUS. This study compared the MSUS practice of a rheumatologist who routinely performs MSUS and a musculoskeletal radiologist, who both provide MSUS services in the same National Health Service (NHS) Trust. The purpose was to compare their MSUS case mixes and also to assess the clinical impact of a rheumatologist performing MSUS.

Methods

A database of MSUS reports of all scans performed by a single operator rheumatologist between 14 November 2003 and 12 August 2004 was analysed. The operator (D.K.) was a consultant rheumatologist with over 5 yrs of experience in performing MSUS. He performed MSUS on patients from Newcastle and Northumbria NHS Trusts from November 2003; his services had been advertised to rheumatologists

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Submitted 6 July 2006; revised version accepted 15 August 2006.

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and orthopaedic surgeons of both trusts at directorate level. The second database analysed consisted of NHS referral forms and Radiology Department reports from a sample of 100 consecutive scans performed during the same time period by a consultant musculoskeletal radiologist (G.H). Both operators undertook scanning as part of a funded service delivery commitment and neither had any set referral criteria. Both worked in Newcastle NHS Trust with a musculoskeletal department with six adult rheumatologists, two paediatric rheumatologists and 16 orthopaedic surgeons. The rheumatologist also worked in Northumbria NHS Trust with four rheumatologists and 19 orthopaedic surgeons but no radiologist providing routine MSUS services. The rheumatologists working in Northumbria NHS Trust also worked within Newcastle NHS Trust and had open access to both operators, while MSUS was infrequently requested by orthopaedic surgeons in Northumbria NHS Trust.

Reports were analysed for patient demographics, source of referral, joint regions scanned, the primary indication for the scan and any additional indications listed on the request for the scan [e.g. 'Examine for synovitis (primary indication) and joint erosions (secondary indication) and proceeded to inject if synovitis confirmed (secondary indication).'], the MSUS findings and whether the indications were confirmed or alternative pathology noted, frequency of referral for injection and how frequently injection was performed. The indications for MSUS were categorized as follows: (i) detection of synovitis, (ii) detection of tendonitis/tenosynovitis/enthesitis, (iii) identification of structural changes; e.g. tendon, ligament or muscle tear or presence of Morton's neuroma, (iv) diagnostic—if no particular diagnosis/pathology queried by referrer; e.g. assessment of undiagnosed lump, including soft tissue masses, or if scanning performed where no differential diagnosis was identified by the referring physician (e.g. 'joint pain – no cause identified clinically, is there any abnormality on MSUS?'), (v) detection of bursitis or bursal effusion and (vi) to perform aspiration and/or injection.

Results (summarized in Table 1)

Source of referral

MSUS performed by rheumatologist. MSUS by the rheumatologist was performed in 170 patients. Ninety-one percent of referrals were from rheumatologists and 7% from orthopaedic surgeons. Of all referrals, 29% were self referrals by the rheumatologist ultrasonographer.

MSUS performed by radiologist. In 100 MSUS scans performed by the radiologist, the main referral source was orthopaedics (49%), rheumatology contributing 22% of referrals. Six percent of referrals came directly from general practice, while the rheumatologist did not take those directly from general practice. The radiologist also took 1% of referrals from another radiologist and 13% from a biomechanical specialist who routinely performed MSUS in their clinic, the radiologist performing as a level-three specialist according to Royal College of Radiologists (RCR) guidelines [8].

Joint regions scanned

MSUS performed by rheumatologist. The rheumatologist scanned 282 regions on 170 patients. Eighty-four (49%) had more than one area scanned, not including the routine scanning of the contralateral joint region for comparison. The most frequently scanned areas were: hand [58 patients (34%)], shoulder [41 patients (24%)], wrist [23 patients (14%)], knee [20 patients (12%)], ankle [20 patients (12%)] and foot [19 patients (11%)].

The most frequent joint region combinations referred for MSUS were bilateral joints, often requested in patients with

TABLE 1. Comparison of MSUS scans performed by a rheumatologist and a radiologist

	Rheumatologist (n = 170)	Radiologist (n = 100)
Referral source		
Rheumatology	91%	22%
Adult	86%	22%
Paediatric	5%	0%
Orthopaedics	7%	49%
Biomechanics	0%	13%
General Practice	0%	6%
Other	2%	10%
Number of anatomical regions scanned per visit		
1	51%	90%
2	41%	9%
3	2%	1%
≥4	6%	0%
Most commonly scanned regions		
Hand ± wrist	41%	12%
Shoulder	24%	20%
Foot ± ankle	20%	39%
Knee	11%	8%
Injection		
Indication for scan (% total no. of scans)	35/170 (21%)	15/100 (15%)
Rate of injection when 1° or 2° indication	25/35 (71%)	12/15 (80%)
Rate of injection per all patients scanned	59/170 (35%)	13/100 (13%)

suspected inflammatory arthritis. Hand and wrist were requested in 11 of 58 hand scans, and foot and ankle in 5 of 19 scans of feet.

MSUS performed by radiologist. A total of 111 regions were scanned in 100 patients, 90% of patients had one area scanned. Most frequently scanned areas were: foot in 22 (22%) patients, shoulder in 20 (20%) patients and ankle in 19 (19%) patients. The hand and wrist were scanned in 6 (6%) patients each, but not in combination.

Clinical indications

MSUS performed by rheumatologist. The most common primary indications for scanning were: synovitis in 74 (44%) patients, tendonitis/tenosynovitis/enthesitis in 40 (24%) patients, structural changes in 21 (12%) patients, diagnostic scan in 13 (8%) patients, bursitis/effusion in 10 (6%) patients and aspiration/injection in 10 (6%) patients.

The two most frequently scanned joint regions were hand and shoulder. Detection of synovitis was an indication for scanning in 47 of 58 patients who had MSUS of the hand; detection of erosive disease was a secondary indication in 25 patients. The primary indications for MSUS of shoulder (41 patients) were for diagnosis of structural change of the rotator cuff (14 patients) and tendonitis (18 patients). Injection guidance was the secondary indication for MSUS shoulder in 14 patients, to be performed if scan findings confirmed an indication for injection.

MSUS performed by radiologist. The primary indications (one per patient in 100 patients scanned) for MSUS were: assessment for structural changes [44 (44%) patients], diagnostic [32 (32%) patients], tendonitis/tendonopathy/tenosynovitis [17 (17%) patients], synovitis [3 (3%) patients], aspiration/injection guidance [4 (4%) patients]. The diagnostic scans requested were performed almost exclusively to further assess soft tissue masses that had been identified clinically.

Injection guidance

MSUS performed by rheumatologist (Fig. 1). Where injection was an indication for MSUS, injection was performed in 25 of 35 patients (71%). MSUS-guided injection was the primary indication for scanning in nine patients, performed in six of the nine (66%). In the three patients not injected, the reasons were: (i) supraspinatus tendonitis with resolving symptoms, (ii) initial diagnosis of trochanteric bursitis, unresponsive to blind injection, at time of scan had diffuse pain and no inflammatory changes on MSUS and (iii) advanced degenerative changes identified in MSUS of shoulder, with no evidence of any indication for injection. The patient had already had an adequate response to physiotherapy.

Injection was requested as a secondary indication in 26 patients, 19 receiving an injection on confirmation of inflammation on ultrasound. In total, guided injection was performed in 59 patients (35%), with injection performed in 34 patients where it had not been requested, the decision to inject being based on MSUS and clinical findings.

MSUS performed by radiologist. MSUS-guided injection was the primary indication for scanning in three patients (performed in 3/3) and a secondary indication in 12 patients (performed in 9/12). Overall guided injection was carried out in 13 of 100 patients. Requests for injection guidance were principally from rheumatology (eight) and biomechanics (six).

Case-mix differences

The principal difference observed between the operators MSUS practice was that the rheumatologist performed MSUS more frequently for synovitis (rheumatologist, 44%; radiologist, 3%) and tendon and ligament inflammation (rheumatologist, 24%; radiologist, 17%), while the radiologist performed MSUS more frequently for assessment of structural changes (rheumatologist, 12%; radiologist, 44%) and diagnostic scans (rheumatologist, 8%; radiologist, 32%). The rheumatologist's MSUS practice involved more hand imaging [58 of 170 (34%) patients, 79% for synovitis] as compared with the radiologist's [6 of 100 (6%) patients, 33% for synovitis].

Diagnostic scans made up a larger proportion of the radiologist's case mix, performed in 32 (32%) of patients, with diagnosis of a soft tissue mass being the indication in 30 patients. The rheumatologist was requested to carryout a diagnostic scan in 13 (8%) patients. The rheumatologist would recommend assessment by the musculoskeletal radiologist for swellings not related to articular disease or if a soft tissue mass was considered potentially neoplastic by the referrer.

Discussion

It is increasingly likely that MSUS will become an integral part of clinical rheumatology practice in the future [1]. Radiologists have legitimate concerns about the impact rheumatologists performing MSUS may have on their practices, but now recognize the interest among physicians for MSUS [8]. This is the first study to directly compare MSUS performed by a rheumatologist and a radiologist working in the same referral base. It highlights key differences in MSUS practices between a rheumatologist sonographer and a radiologist sonographer that can inform the ongoing debate about MSUS in rheumatology and in developing a training curriculum for rheumatologists in MSUS.

The analysis in this study reflects how clinicians identified and used the different expertises of each operator in a real-life setting. The case-mix difference identified may be partly due to the relatively short time the rheumatologist had been performing MSUS within these NHS trusts. It would be interesting to reassess practice over time to establish if any changes emerge, in particular

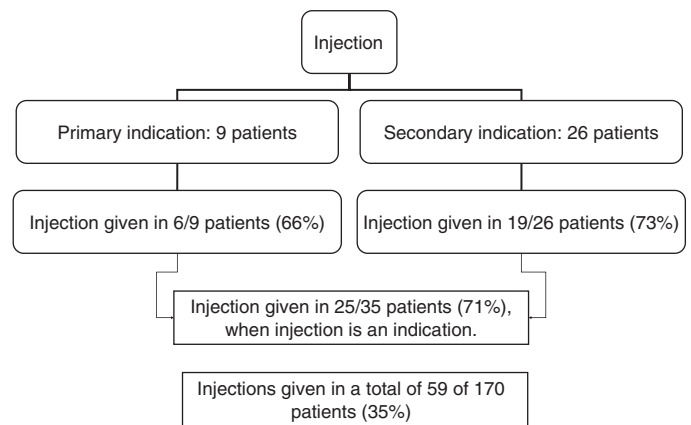


FIG. 1. MSUS-guided injection performed by a rheumatologist ultrasonographer.

as clinicians become increasingly aware of the potential of MSUS to inform management decisions [2]. The contrasting case mix of the 2 operators indicates that the MSUS training requirements of rheumatologists and radiologists may differ. The RCR currently recommends a modular approach to ultrasound performed by non-radiologists, tailored to an individual's clinical practice [8]. With this in mind, we suggest that curricula, specifically designed for the training of rheumatologists, place appropriate emphasis on the detection of inflammatory disease, particularly in the hand, wrist, foot and ankle.

MSUS-guided injection was a frequent indication for scanning. Our study shows that a rheumatologist performing MSUS had an extended role when scanning, basing the decision of whether to inject or not on a combination of clinical and ultrasonographic evaluation. A larger study would be useful to confirm whether this is the case for other MSUS-practicing rheumatologists. This study also adds weight to other published work which demonstrates that there is demand for rheumatologists practicing MSUS to perform guided injections [9]. It is likely that as MSUS becomes more accessible, guided injection will be increasingly utilized, particularly in those patients who have responded inadequately to blind injection.

This study illustrates several key differences in the practice of a rheumatologist and a radiologist which will inform the debate on the role of MSUS within rheumatology. It is of importance that radiologists are engaged in the expansion of MSUS services performed by non-radiologists. We hope this study will improve the understanding of how rheumatologists use MSUS and aid greater collaboration between rheumatologists and radiologists in training and clinical practice in the future.

Acknowledgment

D.K.'s work was funded by the arthritis research campaign.

The authors have declared no conflicts of interest.

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