*Une promesse pour la vie

HUMIRA® adalimumab

Abbott
A Promise for Life®

The Journal of Rheumatology

The Journal of Rheumatology Volume 32, no. 12

Musculoskeletal ultrasound including definitions for ultrasonographic pathology.

Richard J Wakefield, Peter V Balint, Marcin Szkudlarek, Emilio Filippucci, Marina Backhaus, Maria-Antonietta D'Agostino, Esperanza Naredo Sanchez, Annamaria Iagnocco, Wolfgang A Schmidt, George A W Bruyn, George Bruyn, David Kane, Philip J O'Connor, Bernhard Manger, Fred Joshua, Juhani Koski, Walter Grassi, Marissa N D Lassere, Nanno Swen, Franz Kainberger, Andrea Klauser, Mikkel Ostergaard, Andrew K Brown, Klaus P Machold, Philip G Conaghan and OMERACT 7 Special Interest Group

J Rheumatol 2005;32;2485-2487
http://www.jrheum.org/content/32/12/2485

1. Sign up for our monthly e-table of contents
http://www.jrheum.org/cgi/alerts/etoc

2. Information on Subscriptions
http://jrheum.com/subscribe.html

3. Have us contact your library about access options
Refer_your_library@jrheum.com

4. Information on permissions/orders of reprints
http://jrheum.com/reprints.html

The Journal of Rheumatology is a monthly international serial edited by Duncan A. Gordon featuring research articles on clinical subjects from scientists working in rheumatology and related fields.

Musculoskeletal Ultrasound Including Definitions for Ultrasonographic Pathology

RICHARD J. WAKEFIELD, PETER V. BALINT, MARCIN SZKUDLAREK, EMILIO FILIPPUCCI, MARINA BACKHAUS, MARIA-ANTONIETTA D'AGOSTINO, ESPERANZA NAREDO SANCHEZ, ANNAMARIA IAGNOCCO, WOLFGANG A. SCHMIDT, GEORGE BRUYN, DAVID KANE, PHILIP J. O'CONNOR, BERNHARD MANGER, FRED JOSHUA, JUHANI KOSKI, WALTER GRASSI, MARISSA N.D. LASSERE, NANNO SWEN, FRANZ KAINBERGER, ANDREA KLAUSER, MIKKEL OSTERGAARD, ANDREW K. BROWN, KLAUS P. MACHOLD, and PHILIP G. CONAGHAN

ABSTRACT. Ultrasound (US) has great potential as an outcome in rheumatoid arthritis trials for detecting bone erosions, synovitis, tendon disease, and enthesopathy. It has a number of distinct advantages over magnetic resonance imaging, including good patient tolerability and ability to scan multiple joints in a short period of time. However, there are scarce data regarding its validity, reproducibility, and responsiveness to change, making interpretation and comparison of studies difficult. In particular, there are limited data describing standardized scanning methodology and standardized definitions of US pathologies. This article presents the first report from the OMERACT ultrasound special interest group, which has compared US against the criteria of the OMERACT filter. Also proposed for the first time are consensus US definitions for common pathological lesions seen in patients with inflammatory arthritis. (J Rheumatol 2005;32:2485–7)

Key Indexing Terms:
ULTRASOUND EROSIONS SYNOVITIS TENOSYNOVITIS ENTHESOPATHY

Ultrasound (US) has been used for the investigation and management of patients with musculoskeletal disease for at least 30 years[1]. Its initial use was limited to investigating larger joints and soft tissue structures such as Baker's cysts. Technological improvements in the early 1990s, however, greatly improved image resolution and tissue contrast and

From the Academic Unit of Musculoskeletal Disease, University of Leeds, Leeds, UK; Third Rheumatology Department, National Institute of Rheumatology and Physiotherapy, Budapest, Hungary; University of Copenhagen and Hvidovre Hospital, Copenhagen, Denmark; Department of Rheumatology, University of Ancona, Jesi, Italy; Rheumatology Department, Charité Hospital, Berlin, Germany; Rheumatology Division, Cochin Hospital and Rene Descartes University, Paris, France; Department of Rheumatology, Severo Ochoa Hospital, Madrid, Spain; Rheumatology Unit, University La Sapienza, Rome, Italy; Medical Center for Rheumatology BerlinBuch, Berlin, Germany; Medical Centre Leeuwarden, Leeuwarden, The Netherlands; University of Newcastle, Newcastle, UK; Department of Radiology, Leeds General Infirmary, Leeds, UK; Department of Rheumatology, University of Erlangen, Erlangen, Germany; St. George Hospital and University of New South Wales, Sydney, Australia; Mikkeli Central Hospital, Mikkeli, Finland; Department of Rheumatology, Hospital Westfries Gasthuis, Hoorn, The Netherlands; University of Vienna, Vienna, Austria; Department of Radiology II, University Hospital Innsbruck, Innsbruck, Austria; Division of Rheumatology, Department of Internal Medicine III, University of Vienna, Vienna, Austria.

R.J. Wakefield, BM, MRCP, Senior Lecturer and Consultant in Rheumatology, Academic Unit of Musculoskeletal Disease, University of Leeds; P.V. Balint, MD, PhD, Consultant Rheumatologist, Third Rheumatology Department, National Institute of Rheumatology and Physiotherapy; M. Szkudlarek, MD, PhD, Consultant Rheumatologist, University of Copenhagen and Hvidovre Hospital; E. Filippucci, MD, Clinical Research Fellow, Department of Rheumatology, University of Ancona; M. Backhaus, MD, Associate Professor of Rheumatology, Rheumatology Department, Charité Hospital; M-A. D'Agostino, MD, Consultant Rheumatologist, Rheumatology Division, Cochin Hospital and Rene Descartes University; E. Naredo, MD, Consultant Rheumatologist, Department of Rheumatology, Severo Ochoa Hospital; A. Iagnocco, MD, Consultant Rheumatologist, Rheumatology Unit, University La Sapienza; W.A. Schmidt, MD, Consultant Rheumatologist, Medical Centre for Rheumatology BerlinBuch; G. Bruyn, MD, PhD, Consultant Rheumatologist, Medical Centre Leeuwarden; D. Kane, MD, PhD, Consultant and Senior Lecturer in Rheumatology, University of Newcastle; P.J. O'Connor, MBBS, MRCP, FRCR, Consultant Skeletal Radiologist, Department of Radiology, Leeds General Infirmary; B. Manger, MD, PhD, Professor of Rheumatology, Department of Rheumatology, University of Erlangen; F. Joshua, MD, Fellow in Rheumatology, St. George Hospital and University of New South Wales; J. Koski, MD, Consultant Rheumatologist, Mikkeli Central Hospital; W. Grassi, MD, Professor of Rheumatology, Department of Rheumatology, University of Ancona; M. Lassere, MBBS (Hons), Grad Dip Epi, PhD, FRACP, FAFPHM, Staff Specialist in Rheumatology, Senior Lecturer in Medicine, Department of Rheumatology, St. George Hospital and University of New South Wales; N. Swen, MD, PhD, Consultant Rheumatologist, Department of Rheumatology, Hospital Westfries Gasthuis; F. Kainberger, MD, Consultant Skeletal Radiologist, University of Vienna; A. Klauser, MD, Consultant Skeletal Radiologist, Department of Radiology II, University Hospital Innsbruck; M. Ostergaard, MD, PhD, DMSc, Professor of Rheumatology/Arthritis, Copenhagen University Hospital at Hvidovre; K. Machold, MD, Associate Professor in Rheumatology, Division of Rheumatology, Department of Internal Medicine III, University of Vienna; A.K. Brown, Lecturer in Rheumatology, Academic Unit of Musculoskeletal Disease, University of Leeds; P.G. Conaghan, MB, BS, PhD, FRACP, FRCP, Professor of Musculoskeletal Medicine, Academic Unit of Musculoskeletal Disease, University of Leeds.

Address reprint requests to Dr. R.J. Wakefield, Academic Department of Musculoskeletal Disease, Chapel Allerton Hospital, Leeds LS7 4SA, UK. E-mail: medrjw@leeds.ac.uk

Personal non-commercial use only. The Journal of Rheumatology Copyright © 2005. All rights reserved.

allowed access to the smaller joints[2]. In rheumatology, its use has recently been directed towards the assessment of patients with inflammatory arthritis[3]. This includes the detection of bone erosions, synovitis, tendon disease, and enthesopathy. US has a number of distinct advantages over magnetic resonance imaging (MRI), including its ability to scan multiple joints in a brief period of time. Additionally, patient tolerability is good, and the rheumatologist with clinical understanding of the patient's problem can scan in the clinic (rather than sending the patient for another appointment), thereby allowing rapid interpretation of the images and immediate decision-making.

US, however, is often perceived as an imperfect and operator-dependent tool. This is compounded by a lack of data regarding its validity, reproducibility, and responsiveness to change, making interpretation and comparison of studies difficult. In particular, there are limited data describing standardized scanning methodology[4] and standardized definitions of US pathologies. As a result of these difficulties, a group of interested international ultrasonographers came together under the auspices of OMERACT.

Prior to OMERACT 7

Support for a future OMERACT group was decided at the EULAR Working Party for Ultrasound meeting held at the 2003 EULAR conference in Lisbon. A subsequent meeting was held in Orlando in October 2003 during the American College of Rheumatology meeting. There was general agreement that in the first instance, the focus of the group should be on those features commonly measured by ultrasonographers in inflammatory arthritis. In order to address US issues using the OMERACT filter, it was further decided that 2 preliminary exercises would be performed prior to the OMERACT 7 meeting.

Exercise 1. To conduct a systematic literature review, similar to that performed by members of the OMERACT MRI group[5], focusing on erosions, synovitis, tenosynovitis, and enthesopathy at specific anatomical regions. Leaders were nominated to coordinate a multicenter group for each literature search. The following anatomical areas were considered most important: shoulder, hand, wrist, elbow, knee, forefoot, ankle, and hindfoot. Pubmed and Medline searches between 1980 and April 2004 were used for the majority of searches. Exclusions included non-English language articles, reviews, letters, and pediatric publications.

Exercise 2. To achieve consensus on pathological US definitions. A questionnaire was distributed to the group asking for individual definitions of common pathological lesions seen in patients with inflammatory arthritis. These were coordinated at one site and draft consensus definitions obtained.

At OMERACT 7

The US special interest group (SIG) offered the opportunity for presentation of the results of the different anatomical site literature reviews as well as the draft definitions obtained from the questionnaires. The group then met on 2 further occasions during the meeting to discuss the results of the exercises (including review of methodologies), achieve consensus on the definitions, and plan the future research agenda.

Exercise 1. Literature reviews. A large amount of literature was reviewed and it is intended that the results will be published separately. The following general comments can be made:

1. The hand was the most studied area and synovitis most studied pathology.
2. There was a paucity of validity data in terms of comparison with histology and MRI, although these data are increasing.
3. There was a paucity of reliability data. Interobserver reliability was the most investigated area, with scarce data relating to intraobserver, and virtually none relating to intermachine reliability. Reliability exercises were also often performed on different joints within the same study, making interpretation difficult.
4. Data on normal joint structures are scarce.
5. Longitudinal and blinded studies assessing responsiveness to therapies are scarce.

Exercise 2. Questions on definitions and methods of scoring for erosions, synovitis, tenosynovitis, and enthesopathy. These definitions served as a basis for the 2 further meetings held at OMERACT 7 to form a consensus. As some colleagues were unable to attend, the definitions were recirculated to all members for their comments. The following definitions were agreed on.

RA Bone Erosion

An intraarticular discontinuity of the bone surface that is visible in 2 perpendicular planes.

Synovial Fluid

Abnormal hypoechoic or anechoic (relative to subdermal fat, but sometimes may be isoechoic or hyperechoic) intraarticular material that is displaceable and compressible, but does not exhibit Doppler signal.

Synovial Hypertrophy

Abnormal hypoechoic (relative to subdermal fat, but sometimes may be isoechoic or hyperechoic) intraarticular tissue that is nondisplaceable and poorly compressible and which may exhibit Doppler signal.

Tenosynovitis

Hypoechoic or anechoic thickened tissue with or without fluid within the tendon sheath, which is seen in 2 perpendicular planes and which may exhibit Doppler signal.

Personal non-commercial use only. The Journal of Rheumatology Copyright © 2005. All rights reserved.

Enthesopathy

Abnormally hypoechoic (loss of normal fibrillar architecture) and/or thickened tendon or ligament at its bony attachment (may occasionally contain hyperechoic foci consistent with calcification), seen in 2 perpendicular planes that may exhibit Doppler signal and/or bony changes including enthesophytes, erosions, or irregularity.

Summary and Future Directions

US has many characteristics that make it potentially valuable for the investigation of the musculoskeletal system and in particular as a hands-on clinical tool. However, scarce data regarding important methodological and measurement issues need to be augmented before US will gain wider acceptance. Issues include lack of validation and reliability data, in addition to the role of US in assessing responsiveness to change. The group meeting at OMERACT 7 achieved a consensus on broad descriptive US definitions. It is possible, however, that as new data become available and technologies advance these may have to be modified.

A detailed research agenda includes testing the reliability of image acquisition and static image interpretation using the new OMERACT definitions, and testing intermachine reliability.

Although there is much work to be done, the OMERACT process has provided an excellent framework for ongoing collaborative studies on measurement issues.

REFERENCES

1. Kane D, Grassi W, Sturrock R, Balint PV. Musculoskeletal ultrasound. A state of the art review in rheumatology. Part 2: Clinical indications for musculoskeletal ultrasound in rheumatology. Rheumatology Oxford 2004;43:829-38.
2. Wakefield RJ, Gibbon WW, Emery P. The current status of ultrasonography in rheumatology. Rheumatology Oxford 1999;38:195-8.
3. Ostergaard M, Szkudlarek M. Imaging in rheumatoid arthritis — why MRI and ultrasonography can no longer be ignored. Scand J Rheumatol 2003;32:63-73.
4. Backhaus M, Burmester GR, Gerber T, et al. Guidelines for musculoskeletal ultrasound in rheumatology. Ann Rheum Dis 2001;60:641-9.
5. Lassere M, Bird P. Measurement of RA disease activity and damage using MRI: Truth and discrimination. Does MRI make the grade? J Rheumatol 2001;28:1151-7.

Personal non-commercial use only. The Journal of Rheumatology Copyright © 2005. All rights reserved.