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SHORT COMMUNICATION

Clinical implementation of musculoskeletal ultrasound in rheumatology in Austria

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Abstract The aim of the study is to assess the clinical implementation of musculoskeletal ultrasound (MSUS) in rheumatology in Austria. A survey was conducted among Austrian rheumatologists and physicians of other specialties with a focus on rheumatology. The questionnaire was designed by the members of the Austrian Radiology–Rheumatology Initiative for Musculoskeletal UltraSound including the following items: demographics, access to MSUS and MSUS training, application of MSUS to support diagnosis, monitoring and treatment decisions, and obstacles for the routine performance of MSUS. Eighty-eight (21.9 %) out of the 402 surveyed physicians responded. No access to MSUS and/or inadequate training in the technique was more commonly reported by senior (>50 years; 64.3 and 67.7 %, respectively) than by younger physicians (16.7 %, $p = 0.01$ and 18.5 %, $p < 0.001$, respectively). The lowest availability of sonography was found among senior rheumatologists (25.0 %, $p = 0.001$ compared to the total group). MSUS is routinely used for diagnosis and/or monitoring purposes by 12.5 % of physicians and 20.5 % perform sonography in clinically unclear cases. A limited number of physicians apply the method to support treatment decisions and/or to evaluate treatment success. The most important obstacles for routine application of MSUS in rheumatology are limited access to ultrasound machines, lack of training/education in the technique, and time constraints in daily routine. Low access to high-end ultrasound devices, lack of training, and time constraints may explain the low appreciation of MSUS among Austrian physicians evaluating patients with rheumatic diseases.

Keywords Ultrasound · Rheumatology · Cross-sectional studies · Health policy and practice

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Introduction

Musculoskeletal ultrasound (MSUS) was introduced in rheumatology more than a decade ago and an increasing amount of data now supports its high impact for diagnostic and monitoring purposes [1]. Advantages of MSUS include the safe and noninvasive approach, the lack of contraindications, and the relatively low costs compared to other imaging tools like magnetic resonance imaging [2]. The reproducibility of sonographic findings is high, and recent studies suggest a better reliability compared to clinical examination [3]. In addition, MSUS findings in rheumatoid arthritis (RA) are of prognostic value concerning future clinical and structural outcomes, particularly in the setting of clinical remission [4–6].

Interestingly, less than 10 % of European rheumatologists routinely utilize this technique in daily clinical practice [7]. Reasons for the limited use of MSUS are the lack of adequate compensation and the low expertise among practicing rheumatologists [7].

An international collaboration of ultrasonographers and rheumatologists recently formed the network "targeted ultrasound initiative (TUI)" with the scope to promote research, education, and appreciation of MSUS in European countries [8]. Austrian ambassadors of this network, rheumatologists, and radiologists constitute the national working group, Austrian Radiology–Rheumatology Initiative for Musculoskeletal UltraSound (ARRIMUS), which is under the auspices of the Austrian society of rheumatology. In accordance with the mission of the TUI initiative, the specific aims of ARRIMUS are to (1) establish adequate training possibilities in MSUS, (2) promote the application of MSUS in rheumatology, and (3) improve the quality of ultrasound scans in rheumatology [9].

To schedule national and international activities targeting the above-mentioned goals, an evaluation of the current state of MSUS training and clinical implementation in Austria is essential. We therefore performed a survey among Austrian rheumatologists and physicians of other specialties with a focus on rheumatology.

Methods

A German-language questionnaire (see Supplementary Material for English-translated version) was prepared by ARRIMUS including the following items: demographics; access to MSUS and MSUS training; application of MSUS to support diagnosis, monitoring, and treatment decisions; and obstacles to perform MSUS in Austria. An independent polling agency (Schütz Marketing service, Vienna, Austria) contacted 402 Austrian rheumatologists or physicians of other specialties with a focus on rheumatology listed in the marketing register of the company by phone, fax, and/or e-mail.

Statistical analysis was performed using the software program SPSS (version 19.0). Descriptive statistics summarize the data. Proportions were analyzed by the chi-square test. p values <0.05 were considered statistically significant.

Results

Response rate and demographics

The response rate was 21.9 % (88 out of the 402 surveyed physicians). Out of the non-responders, 11 (3.5 %) physicians did not care rheumatic patients anymore, 13 (4.1 %) were retired, 24 (7.6 %) were not reachable, and 266 (84.7 %) denied answering the questionnaire without giving a specific reason.

Responders (specialties depicted in Table 1) were employed at a university hospital/tertiary care center (22.7 %), at a regional hospital (54.5 %), or worked in a private practice (55.7 %). Most physicians were >50 years old (47.7 %) and 10.2 % were younger than 40 years. Rheumatologists ($n = 56$) more frequently worked in a private practice than physicians of other specialties (35.7 vs. 9.4 %, $p = 0.006$).

Availability of MSUS in Austria

No access to MSUS was reported by 44 (50.0 %) physicians, 35 (39.8 %) had direct access to an ultrasound device, and 9 (10.2 %) collaborated with a radiologist performing MSUS. Stratifying results according to the work settings of physicians revealed no difference; however, senior physicians (>50 years, 64.3 vs. 16.7 %, $p = 0.01$) and rheumatologists (57.1 vs. 37.5 %, $p = 0.016$) less frequently had access to MSUS compared to younger (≤50 years) physicians and non-rheumatologists, respectively. Senior rheumatologists ($n = 32$) had the lowest access rate to MSUS, whereas for the majority of non-rheumatologists up to 50 years of age ($n = 10$),

Table 1 Specialties of physicians responding to the survey

Specialty	Number (%)
Rheumatologists	56 (63.6)
General practitioners	11 (12.5)
Pediatricians	10 (11.4)
General internists	7 (8.0)
Orthopedists	2 (2.3)
Specialist in physical medicine	1 (1.1)
Radiologist	1 (1.1)

sonography was directly available (25.0 vs. 80 %, $p = 0.001$).

Out of the 35 physicians with direct access to an ultrasound machine, 77.1 % had (time-) unlimited access; most used an high-end (31.4 %) or mid-class (31.4 %) device usually not older than 4 years (54.2 % of valid responses).

Thirty-five physicians stated (50.0 % of valid responses) that no physician is trained in MSUS at their institution/in their practice. No difference was found stratifying responses by work settings or specialties; however, 67.7 % of physicians >50 years versus 18.5 % of those ≤50 years ($p < 0.001$) reported not being trained in MSUS or having colleagues with adequate education in it.

MSUS to support diagnosis and monitoring of rheumatic diseases

Eleven physicians (12.5 %) stated to use MSUS routinely for diagnosis and/or monitoring purposes, 18 (20.5 %) perform sonography in clinically unclear cases, and 46 (52.3 %) do not use MSUS for this application. No difference was found between rheumatologists and other specialists in this regard. No or invalid answers were given by 16.7 % of questioned physicians.

Twenty-one out of the 29 physicians (72.4 %) using sonography routinely or in unclear cases also apply this technique for remission assessment, 75.9 % of them stated to investigate structural changes, and 27.6 % reported to quantify synovitis by a semiquantitative scoring system.

Eighty-seven percent of those 46 physicians not using MSUS also had no access to an ultrasound machine, whereas to 90.9 % of those physicians routinely performing MSUS an ultrasound device was directly available.

When questioned whether MSUS would be a new standard of care tool in rheumatology, 82.8 % of those regularly performing MSUS agreed, whereas 82.6 % of those not using the technique gave no or an invalid response.

Out of those 44 physicians with either direct access to an ultrasound device or a cooperation with a radiologist, 43.2 % and 45.5 % performed MSUS in less than 25 % of patients at presentation and/or follow-up, respectively, whereas a minority (13.6 and 11.4 %, respectively) used MSUS in >75 % of cases.

MSUS to support treatment decisions in rheumatology

One-fifth of those 44 colleagues with access (either direct or because of a collaboration) to MSUS recognized that sonography results are of prognostic value; 52.3 and 40.9 % of them used MSUS to support treatment decisions (for example, in cases when a biologic agent is initiated) and/or to evaluate treatment success, respectively. In case of disagreement between clinical and ultrasound results, 56.8 % of these physicians considered sonography findings to support treatment changes.

Major obstacles for the routine application of MSUS

The most important obstacles to implement MSUS in routine rheumatologic practice in Austria are listed in Table 2. Thirty-eight out of 41 physicians (92.7 %) were of the opinion that MSUS could be better introduced in clinical practice if adequate compensation was provided by health insurance.

Discussion

This is the first survey assessing the implementation of MSUS in routine rheumatology practice in Austria, highlighting a number of interesting findings: first, half of physicians caring rheumatic patients still have no access to MSUS and/or are insufficiently trained in this imaging technique. This result is not related to the work settings (university, local hospital, or private practice), rather senior rheumatologists had the lowest access rate to this technique, whereas younger physicians perform MSUS more frequently. Second, only a minority of rheumatic patients undergoes ultrasound examinations at diagnosis and/or follow-up visits even if they are attended by physicians with direct access to an ultrasound device. Several of these colleagues nevertheless agreed that MSUS is the new standard of care tool in rheumatology.

Table 2 Most relevant obstacles for the implementation of musculoskeletal ultrasound in clinical routine

Answer	Rheum answers *n* (%)	Non-rheum answers *n* (%)
Limited access to ultrasound machines	13 (35.1)	5 (29.4)
Limited training/education in MSUS	8 (21.6)	3 (17.6)
Time-consuming method	6 (16.2)	6 (35.3)
Limited awareness about the value of MSUS	1 (2.7)	3 (17.6)

A total of 24 rheumatologists (rheum) and 12 non-rheumatologists (non-rheum) gave ≥1 valid answers. The number and percentage (parenthesis) of answers out of all answers in each group are shown

In addition to European surveys among EULAR members and/or national society ambassadors [7, 10], national surveys were performed in Canada [11], Japan [12], Romania [13], UK [14], and USA [15] focusing on training status and clinical implementation of MSUS, whereas 93 % of the UK rheumatologists used MSUS for patient management, 20 % of American, and 35 % of Romanian rheumatologists applied this technique in daily practice. In Austria, approximately one-third of surveyed physicians used MSUS either routinely or in clinically unclear cases.

The most important question arising from our data is how to promote the application of MSUS in Austria. Access to ultrasound machines appears to be the most relevant obstacle for the routine use of this method. High-end machines are not widely distributed, and although radiologists should generally be equipped with high-frequency probes as they are needed for small-parts sonography, only a limited number of collaborations exist between internists/rheumatologists and radiologists. An adequate compensation for MSUS (as it is already provided for magnetic resonance imaging) might increase the economic feasibility to purchase high-end machines and also to enhance the interest of radiologists to perform MSUS in private practice. Indeed, almost all physicians responding to this survey felt that MSUS could be better introduced in clinical routine if adequate refund was given.

Another unresolved issue is the question that patients should be investigated by MSUS in daily rheumatology practice: Should all new patients undergo sonography or only cases with unclear clinical symptoms? Is it useful to monitor patients with sonography during follow-up to document treatment success, and should patients be targeted at ultrasound remission? Currently, only a minority of rheumatic patients are routinely scanned for diagnosis, follow-up, and remission assessment in Austria, even in the case of unlimited access to ultrasound devices. This result is surprising as current studies clearly underline the high diagnostic impact of MSUS to detect inflammatory changes [1]. Awareness of these data might increase the proportion of patients undergoing MSUS in daily practice. ARRIMUS has therefore scheduled several activities including workshops and publications to increase the perception on the value of MSUS in rheumatology in Austria.

We acknowledge several limitations of our survey. First, due to the low response rate, our data reflect only a part of physicians caring rheumatic patients in Austria. Therefore, we cannot exclude a survey bias, as physicians being interested in ultrasound are more likely to respond to the questionnaire than other physicians [15]. On the other hand, our data are comparable to those obtained in other European countries making an overestimation of the real status of clinical implementation of MSUS in Austria unlikely [7, 13, 14]. Second, we received answers from a heterogeneous group of physicians including rheumatologists, internists, pediatricians, orthopedics, and physicalists, as all these different disciplines evaluate and treat rheumatologic patients in Austria. Fellows as well as senior rheumatologists were equally surveyed, and stratification of the results by age groups indicated higher appreciation of MSUS by younger than by more experienced physicians.

In summary, it seems that half of Austrian physicians caring rheumatic patients do not use MSUS and senior rheumatologists appear to have the lowest access rate to this technique. The most important obstacles for sonography in daily clinical practice seem to be limited access to high-end ultrasound devices as well as lack of adequate training and compensation.

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