FRI0586

LONGITUDINAL ASSESSMENT OF CORTICAL INTERRUPTIONS AND VBMD IN RA AND HEALTHY SUBJECTS USING HR-PQCT

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Background: Preservation, repair and progression of cortical interruptions in finger joints has been observed in RA using conventional radiography, MRI, ultrasound and high-resolution peripheral quantitative computed tomography (HR-pQCT). Accurate and quantitative information about such changes over time, however, is still lacking.

Objectives: To evaluate changes over one year in cortical interruptions (number, surface area and volume), bone density (vBMD) and micro-structural parameters from HR-pQCT scans of finger joints in RA and healthy subjects (HS) using a recently developed semi-automatic algorithm for cortical interruptions detection.¹

Methods: Baseline and 1 year follow up HR-pQCT scans of finger joints of 32 patients with RA (221 joints, 53% on biologic DMARDs (bDMARDs)) and 32 HS (117 joints) were analysed for changes in cortical interruption, density and morphological parameters. Mean changes (at the group level) and proportions of joints (at the joint level) with changes beyond least significant changes were calculated after correction for baseline damage.

Results: At baseline, 530 interruptions (3.25/joint) were identified in RA, and 136 (1.45/joint) in HS. The mean of the interruption parameters did not change in either group, except for a significant increase in number of interruptions in PIP joints in RA. However, the proportion of joints showing repair in interruption volume was higher in RA than in HS (6.6% versus 1.7%, $p=0.041$). Changes in cortical interruption parameters were negatively correlated with changes in cortical BMD and thickness ($p<0.01$). Mean vBMD decreased more and more joints showed loss of vBMD in RA than in HS (-4.4 versus -1.1 mgHA/cm³ and 26.7% versus 12.9%, respectively, both $p<0.01$). Proportionally more joints showed interruptions and loss of vBMD in patients with synthetic DMARDs (sDMARDs) compared to bDMARDs (6.1% versus 1.8% and 31.3% versus 17.2%, respectively, both $p<0.05$).

Conclusions: Using HR-pQCT based semi-automatic cortical interruption analysis a large number of interruptions was identified in RA and HS. Cortical interruptions, vBMD and micro-structural parameters were more impaired in RA, of which vBMD and micro-structural parameters further deteriorated. Patients on sDMARDs had more joints with progression in number of interruptions and more loss of vBMD compared to bDMARDs.

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FRI0587

LOW BACK PAIN DUE TO ENTHESOPATHY OF ERECTOR SPINE MUSCLE: A COMPARATIVE US AND MRI STUDY IN PATIENTS WITH ILIAC CREST PAIN SYNDROME

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Background: Iliac crest pain syndrome (ICPS) is a regional pain syndrome, that is particularly common in patients with low back pain (LBP). It is characterised clinically by pain perceived maximally at the most medial part of the posterior iliac crest, and patients' recognition of the pain provoked by a systematic digital palpation in this area, as "their" typical one. Though ICPS is very frequently encountered in LBP, the exact etiology of this syndrome was not established. Based on anatomical data, it was suggested that ICPS could be caused by a tendopathy/ enthesopathy of erector spine (ES) muscle attachments to the medial iliac crest (MIC).¹ In a previous anatomical and ultrasound (US) study we showed that this in fact might be the case.

Objectives: The purpose of this study was, regarding the existing clinical diagnostic criteria for the ICPS as a "gold standard", to establish the sensitivity,

specificity, positive and negative predictive values (PPV and NPV) and the overall accuracy of the US and the Magnetic Resonance Imaging (MRI) assessment of the entheses of the ES muscle at the MIC in patients with LBP and features indicative of ICPS.

Methods: 25 patients (9 men, 16 women, mean age 43.12±11.83, mean BMI 25.07±2.36) with anamnesis of chronic "nonspecific" (after lateral X-ray and standard clinical examination) LBP perceived maximally in the region of the MIC uni- or bilaterally were included. First a systematic palpation of the posterior MIC bilaterally was performed to diagnose ICPS clinically. Then in two successive days each patient underwent MRI examination of the lower back (lumbar and sacroiliac regions), with an enlarged field of view in the sagittal plane, and a standardised US examination of the ES terminal tendons and entheses bilaterally. The MRI were assessed by a radiologist with 10 years of experience in MRI. The sonographies were performed by a rheumatologist with 7 years of experience in US and analysed in regards with the OMERACT definition of enthesopathy. As a single US lesion at any enthesis is a common finding, the presence of at least two pathological features were required to classify given entheses as abnormal.

Results: ICPS was identified clinically in 20 of the patients (15 unilateral and 5 bilateral), thus 25 of the total 50 entheses were clinically pathological. Comparing to the clinical findings, the calculated sensitivity, specificity, PPV, NPV and overall accuracy of the US and the MRI assessments of the ES entheses at the MIC are placed in table 1:

	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	Accuracy (95% CI)
US	88% (69%–97%)	80% (60%–93%)	82% (67%–91%)	87% (69%–93%)	84% (71%–93%)
MRI	64% (43%–82%)	80% (59%–93%)	76% (58%–88%)	70% (56%–80%)	71% (59%–85%)

Conclusions: This study shows that enthesopathy of the ES muscles could be the unrecognised cause for most of the cases of ICPS – a regional syndrome particularly common in LBP. US performed better than the MRI in diagnosing this pathological condition, that may reflect the fact that radiologists are not used to assess these structures. The good diagnostic properties of US in ICPS could be of value when assessing patients with otherwise "nonspecific" LBP.

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FRI0588

ULTRASOUND COULD HAVE PREVENTED DMARD ESCALATION IN RHEUMATOID ARTHRITIS WITH FIBROMYALGIA

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Background: Despite the growing body of evidence, the proper use of ultrasound (US) in monitoring disease activity still needs better understanding.^{1,2} As an objective measure, US could prevent overtreatment in situations of overestimation of clinical disease activity, such as fibromyalgia, present in up to 20% of patients with rheumatoid arthritis (RA).^{3–5}

Objectives: To verify how ultrasound (US) could impact rheumatoid arthritis (RA) treatment decision in real life when fibromyalgia (FM) was also present.

Methods: A retrospective cohort study was performed from 2011 through 2016, including RA patients with FM. Patients were grouped according to US examination (Group DAS28: never performed US examination; Group US: at least one US exam). RA was considered active if DAS28 ≥ 3.2 in Group DAS28 or PD ≥ 2 in any single joint in Group US.

Results: Out of 230 RA patients, 22 women with concomitant FM (Group DAS28=10 and Group US=12) were seen in 280 visits from 2011 through 2016. DAS28 was 4.4 (2.5–6.3) vs. 4.0 (2.0–5.0) ($p=0.592$) in Groups DAS28 and US, respectively.

DMARD treatment was escalated in 12.9% of visits in Group DAS28 versus 8.2% in Group US ($p=0.791$) (table 2). The relative risk (RR) for DMARD escalation in Group US compared to Group DAS28 was 1.08 (95%CI 0.60–1.95). However, in 74% of visits in Group US, DMARD was escalated despite a negative US result. In a theoretical scenario where US result oriented treatment decision, DMARD was escalated in 3.6% of visits in Groups DAS28 and US, respectively (table 1). Also, in this US-based scenario, the RR for DMARD escalation in Group US compared to Group DAS28 was 0.39 (0.19–0.83).

The proportion of visits with US evaluation increased over time, nonetheless the level of agreement between US synovitis (PD ≥ 2) and DMARD escalation

decreased (figure 1). Despite indicating US examination more frequently, rheumatologists did not base their DMARD escalation decision on PD synovitis.

Abstract FRI0588 – Table 1. Visits distribution according to DMARD escalation and groups

	Group DAS28 (n=175)	Group US (n=105)
	DAS28	Observed Theoretical
DMARD escalated*	36 (12.9)	23 (8.2) 10 (3.6)
DMARD not escalated*	139 (49.6)	82 (29.3) 95 (33.9)

*Numbers (%) of visits; $p=0.791$ (chi-square test) between Group DAS28 and Observed Group US; $p=0.012$ (chi-square test) between DAS28 and Theoretical Group US

Abstract FRI0588 – Figure 1. Proportion of visits with US evaluation (bars) and level of agreement between US synovitis (PD ≥ 2) and DMARD escalation (kappa coefficients; $P < 0.001$ for all).

Conclusions: In this real-life study of RA patients with FM, the growing use of US for evaluating RA activity over time was associated with an increasing discordance between US result and clinical judgement. When clinical judgement and US findings were discordant, RA treatment decision was mostly based on clinical judgement. If US result oriented treatment decision, DMARD escalation risk would be 61% smaller.

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FRI0589

A JOINT PROCEDURAL RECOMMENDATION ON FDG-PET/CT(A) IMAGING IN LARGE VESSEL VASCULITIS AND POLYMYALGIA RHEUMATICA FROM THE CARDIOVASCULAR AND INFLAMMATION & INFECTION COMMITTEES OF THE EANM, THE CARDIOVASCULAR COUNCIL OF THE SNMMI, THE PET INTEREST GROUP (PIG), AND ENDORSED BY THE ASNC

R. Slart on behalf of Members of EANM Cardiovascular, EANM Infection & Inflammation Committees, SNMMI Cardiovascular Council, PET Interest Group, and ASNC. Medical Imaging Center, departments of Nuclear Medicine and Radiology, University Medical Center Groningen, Groningen, Netherlands

Background: [18F]-fluorodeoxyglucose positron emission tomography combined with anatomical computed tomography angiography, (FDG-PET/CTA) is increasingly used in Large Vessel Vasculitis (LVV), consisting of Giant Cell Arteritis (GCA) and Takayasu Arteritis (TA) and Polyomyalgia Rheumatica (PMR), and may be of value for optimal diagnosis, disease activity monitoring, and evaluation

of damage development. There are currently no general accepted procedural guidelines regarding PET imaging acquisition for LVV and PMR.

Objectives: The aim of our study is to provide recommendations and statements, based on the available evidence in the literature combined with consensus of experts in the field, for patient preparation, FDG-PET/CT(A) acquisition and interpretation.

Methods: A systematic literature review was conducted to retrieve data on FDG-PET/CT(A) imaging in LVV and PMR. Expert consensus was used to propose recommendations in the absence of sufficiently robust data. Levels of evidence and grades of recommendations were attributed to the statements of different indications according to published criteria.

Results: Based on the literature review combined with expert consensus recommendations and statements that could be formulated: see table 1.

Recommendations and statements	Level of evidence	Grade
Fasting the patient for at least 6 hours prior to FDG administration	II	B
Normal blood glucose levels are desirable, but glucose levels below 10 mmol/L (180 mg/dL) are acceptable	II	B
FDG/PET within three days after start of GC is optional as an possible alternative	III	B
A minimum interval of 60 minutes is recommended between FDG administration and acquisition for adequate biodistribution	III	B
Use of a standardized grading system	II	B
Typical FDG joint uptake patterns should be evaluated and reported if present	II	B
Normalization of the arterial wall uptake to the background activity of venous blood pool provides a good reference to assess vascular inflammation	II	B
Normalization of the arterial wall uptake to the background activity of venous blood pool provides a good reference to assess vascular inflammation	II	B
Based on the available evidence, FDG-PET imaging has high diagnostic performance for the detection of LVV and PMR	II	B
CTA and FDG-PET have complementary roles in the diagnosis of LVV	III	B
CTA has incremental value in detecting structural vascular changes and potential complications of vasculitis	II	A
FDG-PET/CT(A) may be of value to evaluate response to treatment by monitoring functional metabolic information and detecting structural vascular changes	III	C

Conclusions: This joint recommendation highlights that standardisation and general consensus regarding the optimal procedural performance of FDG-PET/CT(A) imaging in LVV and PMR are highly needed. Some recommendations and statements could be formulated however, there are also a lot of open issues which need to be studied for optimal performance of FDG-PET/CT(A) in the diagnosis, (treatment) monitoring and future theranostics in LVV/PMR to increase the levels of evidence and improve the grades of the recommendations.

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FRI0590

ULTRASOUND EXAMINATION OF THE WRIST JOINTS: FREQUENCY OF CRISTAL DEPOSITS (CHONDROCALCINOSIS) IN PATIENTS WITH DIFFERENT ARTHROPATHIES

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Background: Hand involvement in the rheumatic diseases is often precocious and predominant as compared to other skeletomuscular regions. The Ultrasound (US) has an important role in early calcium pyrophosphate deposition disease (CPPD) diagnosis. Recent studies suggest a positive associated of CPPD and other rheumatic disease.^{1,2}

Objectives: To investigate the frequency of the US features of chondrocalcinosis (CC) at the triangular fibrocartilage complex (TFC) of the wrist in patients (pts) with different arthropathies.

Methods: A total of forty persons were included in the study and were divided into 4 groups (on ten in each group): basic group – CPPD pts (crystal-proven at synovial fluid analysis; median age 58.5 (range 45–63) years; 6M/4F) and the control groups – rheumatoid arthritis pts (RA, ACR/EULAR 2010 age 50.5 (44–56) years; 3M/7F), psoriatic arthritis pts (PsA, CASPAR criteria; age 50(37–59) years; 3M/7F), healthy volunteers (age 37.5 (33–55) years; 3M/7F). All subjects were carefully age and gender matched with the CPPD pts. US examinations (“Voluson-i” (GE, USA), 4–13 MHz probe) were performed by one examiner. TFC of the wrist was assessed to detect US findings of crystal deposits.³ The Mann-Whitney U-test was applied for intergroup comparison.

Results: In all CPPD pts (100%) CC of TFC was detected in at least one joint. In the control groups intra-cartilaginous hyperechoic spots were found in 6 of 10