FRI0638

LUMBAR SPINE BONE MASS DENSITY AS A PREDICTOR OF FRACTURES IN PATIENTS WITH COELIAC DISEASE: AN OBSERVATIONAL STUDY

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Background: Previous studies have indicated that Lumbar spine Bone Mineral Density (BMD) could be used as an indicator to predict fractures in patients with coeliac disease (1). Patients with coeliac disease are at a higher risk of developing fragility fractures as a result of the underlying metabolic pathology. Despite previously highlighting the lumbar spine BMD usefulness in predicting fractures, score systems, like the FRAX score still has not acknowledged it. Additionally recent data suggested that using a ratio of Body mass index (BMI) to BMD could increase the predictive models for fracture.

Objectives: Through a large observational study, we set out to determine the various predictors of fractures in patients with coeliac disease. Age, gender and lumbar BMD were some of the factors that were considered in relation to fractures. This data was scrutinised to assess specifically the lumbar BMD's ability to predict fractures with and without using the BMI ratio.

Methods: A sample of 788 patients with coeliac disease referred for bone density estimation to a scanner in the North west of England from 2004-2010 was used to assess various predictors of fractures. Data were initially analysed using simple statistical analyses (chi-squared for categorical variables and T-test for continuous variables) to compare patients who had sustained a fracture to those that had not sustained a fracture.

The data was then subject to further analysis initially using univariate and then multivariate logistic regression models. Variables analysed included Lumbar spine L1-L4 BMD, BMI/BMD ratio, gender, age at scan, family history of fractures, alcohol, smoking and rheumatoid arthritis. In order to further assess the Lumbar spine BMD's vs BMI/BMD in predicting fractures, the data was further adjusted for age and gender and models compared using areas under the receiver operating characteristic (ROC) curve.

Results: Out of the 788 patients referred in the analysis period, 159 (20.2%) sustained a fracture. The mean age at the time of the scan was 55.4 (SD 14.4). A total of 576 (73.1%) were female and of those 127 (22%) had sustained a fracture. Female gender was significantly associated with fracture ($p < 0.003$). Patients with fractures were older 59.2 years (SD 14) compared to 54 years (SD 14) ($p < 0.001$). Using the multivariate model, it was evident that even after being adjusted for age and gender, the lumbar spine BMD was a good predictor of fractures (OR 0.08 95%CI 0.02, 0.3). This performed better than the ratio of BMD/BMI. AUC 0.64 vs AUC 0.62.

Conclusion: The FRAX tool should consider using lumbar spine BMD as an indicator of fragility fractures in patients with coeliac disease. We have shown using both univariate and multivariate analyses that many factors are associated with fragility fractures, but the lumbar spine BMD was the best predictor. This study took the data another step further and adjusted the data for gender and age and added the ratio of BMI to BMD, but still reached a similar conclusion. Lumbar spine BMD should be taken into consideration with more care in this group of patients.

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FRI0639

A NOVEL SCREENING METHOD FOR HYDROXYCHLOROQUINE MACULOPATHY

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Background: Hydroxychloroquine maculopathy is irreversible, primary prevention is done by early screening. Published data show that thinning of the retinal outer nuclear layer (ONL) is an early feature which has been described as "The flying saucer sign".

Objectives: To determine the effect of retinal outer nuclear layer thinning on the progression of hydroxychloroquine retinopathy.

Methods: We used a Heidelberg Spectralis(R) Spectral Domain Optical Coherence Tomography (SD OCT) scanner to record the volume of the ONL in 194 eyes of 100 patients who have been on Hydroxychloroquine for 5 years or more. Volume data was analysed using the Statistical Package for Social Sciences (SPSS), we used logistic regression method to determine the probability of developing maculopathy based on the degree of reduction of the ONL volume. We correlated the loss of ONL to changes in visual fields.

Results: Mean age: 62.2 years, 20% males and 80% females. Diagnosis: 68% rheumatoid arthritis, 14% Sjogren's syndrome, 16% Systemic Lupus and 2% others. Mean duration of use was 6.3 years. Logistic regression results show strong negative correlation between the ONL volume and probability of toxicity, a reduction of 0.5 mm³ of the ONL volume carries a 51% chance of developing maculopathy ($P = 0.001$), the Hosmer-Lemeshow test indicates a high significance with a high P value of 0.61. Onset and progression of visual field defects strongly correlate to loss of ONL volume of 50% or more ($P = 0.000$) and age above 35 years ($P = 0.0001$).

Conclusion: Outer nuclear layer volume reduction provides an accurate and objective way of predicting the development of hydroxychloroquine retinopathy, this method also helps building a cooperative relationship between ophthalmologists and rheumatologists to establish an effective screening service.

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FRI0640

COMPARING DISEASE ACTIVITY IN THE WRIST BY REPEAT SYNOVIAL BIOPSIES, RAMRIS MAGNETIC RESONANCE SCORE AND EULAR-OMERACT ULTRASOUND SCORE: A 6-MONTH PROSPECTIVE TRIAL IN EARLY AND LONGSTANDING RHEUMATOID ARTHRITIS

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Background: Standardized scoring systems for Rheumatoid Arthritis (RA) joint disease activity are validated in different imaging modalities and

include Larsen score for radiographs, RAMRIS for magnetic resonance imaging (MRI) and EULAR-OMERACT score for ultrasound (US). However, pairwise correlations between all three imaging modalities and their correlations with synovial histopathological assessment have not been performed.

Objectives: To investigate the relationship between histological synovitis and radiological synovitis, assessed by conventional X-ray, US and MR of the wrist radio-carpal joint.

Methods: Forty patients, 20 with treatment naive early RA (ERA) and 20 with longstanding RA (LRA), were enrolled in a 6 month prospective study. RA patients underwent US guided synovial biopsy (USGSB) of the wrist at enrollment and after 6 months. Imaging was conducted on the same hand as biopsied. MRI was performed at baseline for all, and also at 6 month for the ERA group, and scored with the RAMRIS system. Wrist X-ray was scored by Larsen score at baseline and after 6 month. Hand US examination at baseline, 3 and 6 months was scored by the EULAR-OMERACT US system. Synovial biopsy inflammation at baseline and 6 months was determined by the Krenn score, scores for CD20, CD3, CD138, CD68 staining, and classification of synovial pathotypes.

Results: In the ERA group at baseline, Krenn score was strongly correlated with both EULAR-OMERACT US combined score ($r = 0.77$ $p < 0.001$) and RAMRIS MRI synovitis score ($r = 0.85$ $p < 0.001$), while uncorrelated at 6 months ($r = 0.18$, $p = 0.38$ and $r = 0.14$, $p = 0.65$). In the LRA group at baseline, these scores correlated strongly ($r = 0.83$, $p < 0.001$) to moderately ($r = 0.61$, $p = 0.002$), and persisted at 6 months for US score ($r = 0.81$ $p < 0.001$). Larsen score was not correlated with Krenn score at any point in any group. For all RA patients, change in Krenn score between baseline and 6-month biopsy, was correlated with both change in EULAR-OMERACT US combined score ($r = 0.65$, $p < 0.001$) and change RAMRIS MRI synovitis score ($r = 0.50$, $p = 0.03$), but not to change in Larsen score. Patients with the lymphoid pathotype had higher US combined score, MRI synovitis score and Krenn-score at baseline compared to other pathotypes (all $p < 0.05$).

Conclusion: The MRI RAMRIS synovitis score and EULAR-OMERACT US scoring system are sensitive measures of histological synovitis in LRA and ERA. After 6 months, this correlation persists in the established RA group despite effective treatment, but not in the ERA group. This suggests that ERA and LRA may have different responses to treatment intensification, possibly due to an immunological "window of opportunity" in the ERA group. Overall, significant fall in MRI/US synovitis are associated with significant fall in histological synovitis. These findings validate the use of MRI RAMRIS and EULAR-OMERACT US scores as surrogate markers of histological synovitis in established RA and early untreated RA. Synovial pathotypes have differences at baseline in degree of synovial inflammation and US and MRI imaging scores.

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FRI0641

THE 'SLOPE SIGN': A FEATURE OF LARGE VESSEL VASCULITIS?

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Background: Ultrasonography in large vessel vasculitis (LVV) has become popular as a non-invasive, radiation-free, point of care examination that allows assessment of entire temporal and axillary vessels. EULAR recommends ultrasound as first line imaging of giant cell arteritis (GCA) and LVV (1) and polymyalgia rheumatica (PMR).

Cranial and large vessels GCA (LV GCA) are considered the two sub types of the disease. Ultrasound in cranial GCA is well established, with the non-compressible halo of temporal arteries considered the key diagnostic finding. In LV GCA, increased intima-medial thickness (cut off > 1.0 mm), is the preferred method of diagnosis.

There are other causes of thickening of arterial wall, such as atherosclerosis. Atherosclerotic US changes in US scan are localized and discrete; however, at times it may be challenging to differentiate vasculitic from atherosclerotic changes.

Objectives: We describe the 'Slope sign' as a unique additional finding in US scan of axillary arteries in LV GCA. Ultrasound scan of the axillary arteries of all these patients showed increased intima-medial thickness (IMT) $>$ cut off value of 1.0 mm. Here we report the study of the junctional transitional region between involved and uninvolved arteries in these patients.

Methods: Images of 28 patients, with confirmed LV GCA who attended a GCA/LVV clinic at Southend Hospital between 1st September 2018 and

18th January 2019, were reviewed. They were scanned with an Esaote MyLabTwice using a LA435 linear transducer (band width 12-18 MHz). The axillary arteries were assessed in the grey scale mode in the longitudinal axis using tissue harmonic imaging. LV GCA was confirmed with an IMT of 1.0 mm or above in all patients.

Results: We observed a sloping smooth transitional zone connecting involved and uninvolved arteries (the "slope sign") in the ultrasound scan of axillary arteries in 24/28 patients with confirmed LV GCA. The remaining 4 patients did not have the transition zone imaged and therefore could not be assessed for presence of the 'slope' sign.

Table: Mean maximum and normal IMT and length of 'slope' in LV GCA patients

	Maximum (Proximal) IMT	Normal (Distal) IMT	Slope Length
Mean (SEM) mm	1.23 (0.04)	0.52 (0.03)	9.26 (0.8)

Conclusion: Presence of the 'Slope sign' in the ultrasound scan of the axillary arteries in patients with LVGCA, is a secondary confirmation alongside the abnormal IMT, of LV disease.

Biologics therapy has reduced the utility of inflammatory markers in GCA and highlighted need for imaging in disease assessment (2). The 'slope sign' may not only differentiate increased IMT of LVV from atheroma but the area under the 'slope' could potentially be used to estimate disease extent. We suggest the 'slope' sign be included in axillary artery ultrasound scan protocols for all patients with suspected GCA and also for monitoring disease activity in LVGCA.

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FRI0642

USE OF MAGNETIC RESONANCE IMAGING FOR ASSESSMENT OF PATIENTS WITH IDIOPATHIC INFLAMMATORY MYOPATHIES – A SUBANALYSIS OF THE PROMETHEUS STUDY

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Background: Prometheus study was a prospective, randomized, assessor-blind multicenter trial, conducted to evaluate the efficacy and safety of the combination therapy with methotrexate and glucocorticoids (GC) compared to GC treatment only in patients with polymyositis (PM) and dermatomyositis (DM). Muscle MRI has been used to assess disease activity and response to treatment.

Objectives: To assess MRI findings we developed new semi-quantitative scoring method and used it for activity assessment and evaluation of treatment effect after 3 months of therapy.

Methods: In a novel semi-quantitative assessment of edema, we used scoring 0, 1, 2, and 3 according to intensity of signal in each of the 16 thigh muscles. Muscle damage was evaluated in 3 basic thigh muscle compartments and pelvic muscles using Goutallier grading (0 – 5) based on extent of fatty replacement. Both sides were assessed, an average was made for each muscle, and values were summed up in the total score. Images were scored by 2 independent evaluators and the mean was used. Manual muscle test (MMT8) and creatin kinase (CK) were measured and patient's global assessment (PGA), physician's GA (PhGA) and muscle disease activity (MDA) were recorded on visual analogue scales.

Results: Seventeen patients had MR images taken before the baseline visit, 8 had also the second MRI after 3 months of therapy. There was a significant reduction of total MRI edema score (MRI ES) after 3 months in patients with PM and DM (from the mean 17.4 points, SD 13.7 to 8.0 points, SD 12.3; $p = 0.025$). No significant progression of fatty atrophy was observed (from 16.0 points, SD 8.8, to 19.4, SD 4.6; $p = 0.3$). At baseline, a significant correlation between MRI ES and PGA was noted ($p = 0.027$). There was also a borderline association of MRI ES with muscle strength evaluated by MMT 8 ($p = 0.053$). In a subset of 8 patients with longitudinally performed two MRI evaluations we found a good correlation between