and this subgroup may benefit from further treatment to better control inflammatory symptoms

**Disclosure statement:** The authors have declared no conflicts of interest.

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### Muscle disorders

#### 67. INFLUENCE OF OCCUPATIONAL FACTORS ON REGIONAL MUSCULOSKELETAL DISORDERS IN COAL MINERS

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**Background:** To determine the prevalence of specific musculoskeletal disorders in coal miners, and associated occupational risk factors in order to provide reliable epidemiologic data for targeted interventions.

**Methods:** 1900 coal miners in China were examined in a cross-sectional study. Musculoskeletal disorders in the neck, shoulder, upper-extremity, the back and lower limbs were assessed using the Standardized Nordic Questionnaire. Odds ratios and 95% confidence intervals (CIs) were calculated to examine occupational factors in relation to any specific musculoskeletal disorder using logistic regression.

**Results:** There were 1205 coal miners, in a year, who suffered from musculoskeletal disorders. Low back pain was the most common musculoskeletal disorder with 59.5% of prevalence. The prevalence of musculoskeletal disorders increased with age. The prevalence of underground workers was significantly higher than that of the surface workers (79.6% vs 74.5%, P < 0.001). Neck/shoulder and upper-extremity musculoskeletal disorders were associated with high repetitiveness (OR 1.6, 95% CI 1.3-2.0) and awkward work (OR 1.3, 95% CI 1.1-1.6). High repetitiveness (OR 1.5, 95% CI 1.1-1.8), high physical demand (OR 1.5, 95% CI 1.2-2.0) and extreme stooping posture (OR 1.9, 95% CI 1.4-2.7) were strongly related to low-back pain. Low limb disorders were associated with long standing (OR 1.4, 95% CI 1.1-1.7) and awkward work (OR 1.4, 95% CI 1.1-1.7).

**Conclusions:** This study identified associations between specific musculoskeletal disorders and occupational factors among coal miners. Intervention strategies of occupational factors may be helpful to reduce musculoskeletal disease burden.

**Disclosure statement:** The authors have declared no conflicts of interest.

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#### 68. USE OF ANABOLIC STEROIDS IN INCLUSION BODY MYOSITIS

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**Background:** Inclusion body myositis (IBM) prevalence is about 4-7/1,000,000 in patients below 50 years old and about 35/1,000,000 in patients above 50 years old. It remains debatable whether the pathology is autoimmune or degenerative like Alzheimer’s disease. Thus, the usual treatment applicable for inflammatory myopathies may not prove useful in inclusion body myositis. We present a case of use of nandrolone decanoate in IBM.

**Methods:** This 72-year-old male presented with a slowly progressive weakness and wasting of both quadriceps and forearm flexors musculatures for 15 years and was reviewed in 3 different hospitals. During this period his CK level was 522 - 1109 IU/L. He had no sensory abnormalities, his reflexes were normal. Electromyogram (EMG) revealed a slow progressive muscle disease. The biopsy from the right quadriceps muscle showed the presence of vacuolated fibres, consistent with the inclusion body myositis. He was treated with prednisolone, azathioprine and mycophenolate mofetil, without an improvement. FDG-PET showed no inflammation. He was also treated with nandrolone decanoate 50 mg IM every 3 weeks for 2 months with a controlled exercise regime. This did improve his quality of life and he started to manage 2 flights of stairs whereas previously he could manage only 1 flight of stairs with some difficulty. He continues to have a reasonable quality of life and his latest CK was 511 IU/L.

**Results:** Inflammatory myopathies are usually treated with steroids followed by immunosuppressants. However, in case of IBM, treatment with steroid, IVIG, cyclophosphamide, chlorambucil, azathioprine cyclosarin, and methotrexate were not successful. Cochrane review on treatment of IBM suggested use of anabolic steroids and muscle supplements, such as creatine. A randomized, placebo-controlled, crossover study demonstrated borderline significant effect in improving whole-body strength and a significant effect in improving upper-extremity strength, as measured by maximal voluntary isometric contraction testing with Oxandrolone, an anabolic steroid. Another review of oxandrolone in the treatment of catabolic disorders, HIV and AIDS-related wasting, neuromuscular and other disorders, showed an improvement in body composition, muscle strength and function, state of underlying disease or recovery from acute catabolic injury.

**Conclusions:** IBM has features of inflammatory and muscle atrophy. Immunosuppressants could be used to treat the inflammatory feature, whilst we need more studies to establish the use of anabolic steroids with exercise programme.

**Disclosure statement:** The authors have declared no conflicts of interest.

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#### 69. FATIGUE IN DERMATOMYOSITIS AND POLYMYOSITIS IS COMMON AND ASSOCIATED WITH DEPRESSION AND POOR QUALITY OF LIFE

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**Background:** Fatigue is common and has a major impact on quality of life in RA and SLE. In these conditions, fatigue correlates with central factors such as depression and mood. The frequency, origins and impact of fatigue in DM and PM have not previously been evaluated.

**Methods:** 100 patients with DM and PM were recruited from three South London teaching hospitals. Patients were first asked to rate seven typical RM symptoms (pain, weakness, fatigue, daily functioning, sleep, memory, gastrointestinal upset) in the order of impact on quality of life. They also rated each symptom on a severity scale out of 10. Fatigue was measured using the following generic tools (SF-36) and the vitality component of SF-36. The OHQ was measured using the hospital anxiety and depression scale.
(HADS), quality of life by SF-36 and pain with a visual analogue scale (VAS). Spearman’s correlation (r = 0.06, p < 0.05) evaluated fatigue against these measures.

Results: Mean fatigue was consistently high for each measure: FACT-F 25.62 (SD 13.3); FSS 5.427 (SD 4.2); SF-36 vitality 40.0/100 (SD 22.13); FACT-F scores correlated with FSS (r = -0.7, p < 0.05) and SF36 vitality scores (r = -0.8, p < 0.05). 26% of respondents reported fatigue as the symptom that most impacted on their quality of life: more than any other symptom combined (10%; pain; 21%; physical function limitation 15%; sleep 16.3%, memory and concentration 2.5% and digestive 6.3%). Mean symptom severity (3.8) was greater for fatigue than any other symptom. There was a large number of cases bordering cases of anxiety (52%) and depression (63%) identified by HADS. FACT-F correlated with HADS depression scores (r = -0.7, p < 0.05), SF-36 physical (0.7, p < 0.05) and mental (0.6, p < 0.05) component scores but not with pain.

Conclusions: Fatigue is common in IIM and impacts on quality of life more than any other typical IIM symptom. It is associated with depression and poor quality of life. If there is a causal relationship between fatigue and depression, it is not clear which comes first. An interventional study measuring fatigue while treating depression is required.

Disclosure statement: The authors have declared no conflicts of interest.

70. FATIGUE IN IDIOPATHIC INFLAMMATORY MYOPATHIES IS NOT CAUSED BY PERIPHERAL MUSCLE FATIGABILITY: STUDIES OF NON-VOLITIONAL QUADRICEPS MUSCLE ENDURANCE USING REPETITIVE TRANSCUTANEOUS STIMULATION

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Background: Fatigue is commonly reported by patients with idiopathic inflammatory myopathies (IIM). The relative contribution of physiological and psychological factors, however, is not known. Muscle endurance can be defined as the ability of a muscle to sustain repeated contractions against a resistance for a period of time. It has been suggested that poor muscle endurance is likely to be a key factor in IIM. We used a non-volitional technique to assess quadriceps muscle endurance in IIM patients and healthy age matched controls. We also assessed whether there was a relationship between self-reported fatigue and muscle endurance.

Methods: Endurance Protocol: muscle endurance was assessed using repetitive transcutaneous electrical stimulation applied using pads placed over the quadriceps muscle. The muscle was stimulated repeatedly for 3 mins, at 30Hz 250 ms on, 750 ms off, at a voltage which initially elicited 30% of the maximal voluntary contraction (MVC) force measured prior to the endurance test. The force generated by each quadriceps contraction (Kg) was recorded using a strain gauge attached to the to the subject’s ankle via an inelastic strap. Self-reported fatigue was measured using the FACT-F questionnaire. We compared mean time for initial starting force to decline to 70% from MVC between patients and controls (unpaired t tests). We also investigated whether this correlated with fatigue (FACT-F) using Spearman’s correlation.

Results: We compared 20 IIM patients (16 dermatomyositis and 4 polymyositis; 10 females, 10 males) with age and sex matched controls. Fatigue measured by FACT-F and FSS was significantly reduced in the patients (Table 1). Quadriceps strength was also significantly reduced in the patients. In contrast, there was no difference in quadriceps endurance between the patients and controls. No relationship was found between measures of fatigue (FACT-F and FSS) and quadriceps endurance or strength in IIM patients.

Conclusions: Patients with IIM have greater self-reported fatigue than matched controls. However, although quadriceps muscle strength was reduced in IIM, there were no differences in quadriceps muscle endurance. Quadriceps muscle endurance and muscle strength were also unrelated to self-reported fatigue which is almost certainly driven by central mechanisms in IIM. The impact of IIM on quadriceps muscle strength rather than muscle endurance may influence types of rehabilitation programs offered for IIM.

Disclosure statement: The authors have declared no conflicts of interest.

Poster Viewing 1

71. MYOSITIS-ASSOCIATED AUTOANTIBODIES DETECTED USING RECOMBINANT PROTEIN IMMUNOBLOTTING IN INFLAMMATORY MYOPATHY

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Background: Screening for autoantibodies associated with idiopathic inflammatory myopathies (IIM) has conventionally been performed using radio-immunoprecipitation techniques which are not suitable for use in routine diagnostic laboratories. We have investigated the use of line-immunassay technology employing recombinant antigens as an alternative for this purpose.

Methods: Sera and clinical data were collected on 486 patients (256 PM, 183 DM, 20JD, 9 BM, 18 overlap syndrome) with IIM, according to Bohan and Peter or Grigg’s criteria, from 3 European centres as part of the EUMoyen study. These were tested using a line-immunassay system (Euroimmun, Lubeck, Germany). The system tested was able to detect 11 myositis associated antibodies (Jo-1, PL-7, PL-12, EJ, OJ, SRP, PM-Scl-75,PM-Scl-100, Ku, Mi-2B, U1-RNP). Patients were assessed for the presence of joint disease, interstitial lung disease (ILD), Gottron’s papules, heliotrope rash and cancer (>/> 3 years of diagnosis). Sera from control rheumatic diseases (SLE, RA, Scleroderma n = 399) were also tested.

Results: Anti Jo-1 was the commonest antibody detected in the cohort (12.6%). Antibodies to PM-Scl (3.7%); U1-RNP (5.5%); SRP (2.6%); Mi-2B (2.6%); Ku (1.6%)EJ, PL-7 and PL-12 (all <1%) were also detected in the cohort. Significant clinical associations are summarised in Table 1.

Conclusions: In this study, using recombinant protein line-immunassay technology, we have reported that antibodies to Jo-1, SRP and PM-Scl are associated with the presence of ILD, and that antibodies to Mi-2B are associated with the presence of Gottron’s papules. In addition antibodies to Jo-1 and U1 RNP show a negative association with the presence of Gottron’s papules and heliotrope rash. In addition anti-Ku is found more frequently in SLE than in IIM. Detection of myositis associated antibodies using line-immunassay technology employing recombinant protein antigens is a fast and reproducible method, which is easy to perform, and which will allow the assaying of these antibodies in routine clinical laboratory.

Disclosure statement: The authors have declared no conflicts of interest.

Table 1.

<table>
<thead>
<tr>
<th>Antibody specificity</th>
<th>Patients</th>
<th>Controls</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jo-1</td>
<td>p = 0.0001 OR 10.25 (9.56, 18.18) p = 0.01 OR 0.42 (0.13, 0.60)</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>SRP</td>
<td>p = 0.004 OR 5.6 (1.67, 19.0) ns</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>PM-Scl</td>
<td>p = 0.004 OR 5.8 (2.13, 15.80) ns</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Mi-2beta</td>
<td>p = 0.001 OR 12.57 (7.25, 57.44)</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>U1-RNP</td>
<td>p = 0.005 OR 0.29 (0.11, 0.72) ns</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>
Background: The idiopathic inflammatory myopathies (IM) are a heterogeneous group of rare autoimmune muscle disorders subclassified into polymyositis (PM), dermatomyositis (DM) and inclusion body myositis (IBM). Delays in diagnosis, poor response to treatment and difficulty in recognising active muscle disease may lead to irreversible muscle / internal organ damage. Careful investigation of disease mechanisms, refinement of classification and tools for earlier diagnosis are urgently required, to improve future IM clinical outcomes. Our aim was to obtain uniform, longitudinal follow-up data in large well-characterised IM cohorts as part of an international collaboration.

Methods: The EUROMYOSITIS register was developed within the European FP6 AutoCure project. Since 2010, further development and support has been via the European Science Foundation Research Networking Programme, EuMyoNet. A Delphi process, followed by consensus discussion among rheumatology / neurology experts, was employed to decide on included variables. DANBIO, a Danish-wide rheumatoid arthritis open source register, based on the core technologies Plane and R, was used as a basis. The EUROMYOSITIS register has 2 parts: 1) basic data including demographic data and diagnostic information; 2) outcome measures proposed and validated by the International Myositis Assessment and Clinical Studies Group (IMACS). Serial longitudinal data is displayed in scoreboard format for ease of clinical interpretation. Only physicians in a particular centre view individual patient data, although combined anonymised analyses are possible on steering committee application.

Results: To date, 893 prevalent and incident cases (median age 59, interquartile range 49-67, 72% female) have been enrolled from 4 hospitals in 4 countries (UK n=222, Sweden n=123, Czech Republic n=190, Hungary n=358). Numbers were as follows on stratification by clinical sub-group: 487 PM (54.5%), 287 DM (32.1%), 41 IBM (4.6%), 29 juvenile DM (3.2%), 5 amyopathic DM (0.6%) and 42 unspecified myositis (4.7%). Median disease duration at first input in the register was 4 years (interquartile range 1-10). Mean value of the following physicians rated parameters all on a visual analogue scale (0-100 ± standard deviation) at inclusion/last observations was: overall disease activity 4.6±1.1, overall muscle disease activity 11.1±14.2, overall muscle damage 15.5±19.7. Median HAQ score was 0.75 (0.38-1.25) and MMT8 (manual muscle testing ranging from 0-80) 75 (67-79).

Conclusions: The EUROMYOSITIS register is a novel electronic register for both clinical and research to follow IIM cases in a harmonised way for the benefit of the patient. Serial longitudinal data is displayed in spreadsheet format for ease of clinical interpretation. Only physicians in a particular centre view individual patient data, although combined anonymised analyses are possible on steering committee application.

Disclosure statement: The authors have declared no conflicts of interest.

Osteoporosis and metabolic bone disease

73. DO LOW VITAMIN D LEVELS PREDICT OSTEOPOROSIS?

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Background: Osteoporosis is a common chronic condition characterised by low bone mass and microarchitectural deterioration of bone tissue, with a resulting increase in bone fragility and susceptibility to fracture. Low vitamin D levels are associated with osteoporosis and may have negative effects on bone mineral density (BMD). The aim of the study was to investigate whether low vitamin D levels predict osteoporosis.

Methods: A retrospective analysis of patient data from a primary care based fracture liaison service on 67 post-menopausal women who had sustained a low trauma metatarsal fracture. Routine assessment of these patients included identification of risk factors for fracture (smoking, alcohol consumption, early menopause, family history of fracture, and medical conditions associated with low BMD); height and weight measurement; and measurement of peripheral bone density at the heel by DXA (Calscan, Demetech). To compare BMD levels in our group of fracture patients with the reference population in the Calcscan database, we evaluated the proportion of individuals with a Z-score of ≤ -1 Standard Deviation (SD). Assuming a normal distribution, the risk is 0.68 of being within +/ - 1 SD of the mean, and thus the expected proportion of Z-scores ≤ -1 SD is 16% by default. Similarly, the risk of being within 2 SD of the mean is 0.85, and therefore the expected proportion of Z-scores ≤ -2 is 2.5%. The 95% Confidence Intervals (CI) range for the proportions of patients with a Z-score ≤ -1 SD, and ≤ -2 SD, were calculated using the equation for binomial distribution.

Results: The mean age (SD) of the patients was 69.0 (9.8) years, and the mean Body Mass Index was 27.7 (5.47) Kg / m2. The 68 patients had the following risk factors: smoking, 17; osteopenia 1 patient, family history of fracture 1 patient, smoking 6 patients, and alcohol