**AUTOANTIBODIES TO OSTEOPROTEGERIN AND BONE MINERAL DENSITY IN AXIAL SPONDYLOARTHRITIS.**

Sizheng Zhao, Barbara Hauser, Micaela R Visconti, Philip L Riches, Stuart H Ralston, Nicola J Goodson

**Background**:

Axial spondyloarthritis (axSpA) is simultaneously associated with loss of bone mineral density (BMD) and pathological bone formation as osteophytes. Both may be due to an as yet unclear mechanism of bone-resorption/formation uncoupling. Neutralising autoantibodies to osteoprotegerin (OPG-Ab) may play a role; OPG-Abs were associated with lower BMD at the hip but not spine in axSpA.[ref]

Spinal and hip BMD should decrease similarly as duration of disease increases. However subsequent increase in syndesmophytes artificially inflates BMD measured by antero-posterior-DEXA.

The aim of this study was to see whether OPG-Ab status affect the discrepancy between spinal and hip BMD which may be an indicator of syndesmophyte formation.

**Methods:** Patients with a clinical diagnosis of axSpA were recruited from routine outpatient clinics at two centres in the UK between 2011-2015. Patient demographics and disease characteristics were recorded. All had BMD assessment using antero-posterior dual-energy X-ray absorptiometry (AP-DXA). Serum levels of OPG-Ab were measured using an in-house ELISA. Patients were considered to be positive for OPG-Ab if values were ≥13units (3sd above mean in healthy controls).

Duration of disease since diagnosis was divided by the median into long (≥6.5years) and short (<6.5years). The difference in BMD (g/cm2) between spine and hip was calculated and compared between OPG-Ab status and disease duration. We assume that where spinal BMD (g/cm2) is greater than hip, there is likely syndesmophyte formation. Simple descriptive statistics was performed using Fisher’s and Students T-test.

**Results:** We studied 134 patients, of whom 75% were male. The mean age was 47 (SD±15) years and median disease duration from diagnosis was 6.5 years. 16 patients tested positive for OPG-Ab (11.9%).

In those with longer disease duration, 100% of OPG-Ab positive patients had higher spinal BMD compared with 65% of negative patients (p=0.026) (table 1). This was not significant in those with shorter disease duration. The difference between spinal and hip BMD increased with disease duration; and in those with longer than 6.5years’ duration, OPG-Ab positivity was associated with greater difference (table 2).

**Conclusion:** This cross-sectional study demonstrates that in patients with longer disease duration, those positive for OPG-Ab seemed to have higher spinal than hip BMD. This may be a result of increased loss of BMD at the hip with increasing disease duration. Another explanation could be an association between OPG-Ab and formation of syndesmophytes. These findings warrant further studies into the role of OPG-Ab in axSpA.

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| Table 1 OPG-Ab is associated with higher proportion of patients with greater spine than hip BMD. |
|  | OPG-Ab | Bone mineral density g/cm2  | P-value |
| Spine ≤ hip | Spine > hip |
| Long duration n=68 | positive | 0 | 11 (100%) | 0.026 |
| negative | 20 (35%) | 37 (65%) |
| Short duration n=66 | positive | 1 (20%) | 4 (80%) | 0.645 |
| negative | 23 (38%) | 38 (62%) |

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| Table 2 OPG-Ab is associated with greater difference between spine and hip BMD |
|  | OPG-Ab | Mean (sd) | P-value |
| Long duration n=68 | positive | 0.424 (0.182) | 0.003 |
| negative | 0.227 (0.189) |
| Short duration n=66 | positive | 0.158 (0.152) | 0.275 |
| negative | 0.091 (0.115) |