9 **ELEVATED LEVELS OF WNT3A AND LOW LEVELS OF DICKKOPF-1 IN SERUM ARE ASSOCIATED WITH SYNDESMOPHYTE FORMATION IN ANKYLOSING SPONDYLITIS**

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10.1136/annrheumdis-2011-201237.9

Background and objectives Ankylosing spondylitis (AS) is associated with both pathologic formation of new bone and enhanced bone resorption. The objectives of this study were to assess a panel of biomarkers reflecting bone turnover and to determine their relationship with syndesmophyte formation, bone mineral density (BMD) and disease activity in AS.

Materials and methods Inclusion criterion was AS fulfilling modified New York criteria. Exclusion criteria were psoriasis and inflammatory bowel disease. The patients answered questionnaires. BASDAI, ASDAS and CRP were chosen as disease activity parameters. Spinal mobility was assessed for calculation of BASMI. Lateral spine radiographs were scored for syndesmophyte formation (mSASSS). BMD was measured with dual energy x-ray absorptiometry (DXA). Levels of biomarkers were measured with sandwich ELISA in patient sera and compared with levels of healthy blood donor controls. The biomarkers studied were: Wingless proteins (Wnt3a, Wnt5a), Dickkopf-1 (Dkk-1), sclerostin, soluble receptor activator of nuclear factors- κ B ligand (sRANKL) and osteoprotegerin (OPG).

Results 204 patients (57% men) with a mean age of 50 ± 13 years and disease duration 15 ± 11 years and 80 age and sex matched controls were included.

The AS patients demonstrated significantly higher levels of Wnt3a (3.72 ± 0.99 vs 2.88 ± 0.84 ng/ml; $p < 0.001$) and Dkk-1 (3.05 ± 1.05 vs 2.79 ± 0.70 ng/ml; $p = 0.048$) as compared with the controls, whereas the level of sclerostin (35.33 ± 21.54 vs 38.33 ± 13.96 pmol/l; $p = 0.014$) was lower in AS. No difference in serum levels between AS patients and controls were detected for Wnt5a, sRANKL or OPG.

None of the studied biomarkers showed any significant correlation with BASDAI or ASDAS. High CRP was significantly correlated with lower levels of sclerostin ($r_s = -0.208$, $p = 0.003$) and Dkk-1 ($r_s = -0.140$, $p = 0.045$).

Age and male sex were highly significantly correlated with increasing mSASSS ($p < 0.001$). After adjusting for age and sex in multivariate analysis high Wnt3a (Stand.B=0.140; $p = 0.017$) and low Dkk-1 (Stand.B=-0.132; $p = 0.025$) remained independently associated with increasing mSASSS ($R^2 = 0.333$). Low sclerostin (Stand.B=0.262; $p < 0.001$) and high mSASSS (Stand.B=-0.215; $p = 0.003$) were independently associated with low Z-score for BMD femoral neck ($R^2 = 0.103$).

Conclusions The understanding of bone biomarkers in AS is challenged by the two enhanced opposite bone remodelling processes of the disease. The findings that high Wnt3a and low Dkk-1 is associated with syndesmophyte formation and low sclerostin with low BMD, merit further investigation.