Reviewer's report

Title: Baseline new bone formation does not predict bone loss in ankylosing spondylitis - 10-year follow-up.

Version: 3 Date: 7 December 2010

Reviewer: Thomas Lang

Reviewer's report:

In this study, the authors follow a small cohort of subjects with ankylosing spondylitis over a period of ten years, employing DXA and QCT to track bone loss as a function of radiologic syndesmophyte scoring obtained at baseline. The authors observe bone loss with QCT, bone gain with DXA, and no significant changes in the hip. The authors observe no correlation between the baseline radiologic score and the loss of QCT spinal trabecular BMD. I have the following concerns about the study.

Major compulsory revisions

1. The subjects had an average age of 46 years at the time of the baseline measurements, and the followup was ten years. I have a concern regarding the confounding effect of age-related bone loss. Without some kind of healthy, age-matched control group, it is hard to separate the effect of the disease condition from the effect of aging. How representative is the Picker reference population of the Polish population?

2. The authors seek to explore a correlation between "new bone formation" at baseline and resulting bone loss. For readers not involved with treatment of AS patient, the authors could expand a bit on how the radiographic score corresponds to new bone formation. Also, what is the statistical power, given the variability in change measurements, and the small number of subjects, for detecting a correlation?

3. For the paper to have maximal clinical impact, the discussion should reinforce our understanding of how the evolution of the AS condition increases the fracture risk of the subjects over time. The authors could cite evidence from the wealth of QCT case-control fracture studies that associate these particular levels of QCT trabecular with vertebral fracture status.

4. In Figure 1, one of the subjects shows a very large increase in neck and wards BMD. What is occurring with this subject, and what is the potential effect on the statistical significance of the hip data?

5. Clearly the DXA spine BMD is changing artifactually over time. What is the relation between radiologic changes and QCT changes?

6. The paper lacks a precise description of the statistical techniques used.

MINOR essential revisions:
Please add a few sentences describing the QCT acquisition and processing for the benefit of those readers not familiar with the technique.

Please add a figure containing some QCT and radiographic images of one of the subjects.

**Level of interest:** An article of limited interest

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.