Reviewer's report

Title: Prevalence and determinants of osteoporosis in patients with type 1 and type 2 diabetes mellitus: a cohort study

Version: 2
Date: 13 December 2013

Reviewer: Hillary Keenan

Reviewer's report:

These are recommendations for overall improvement of the manuscript, they may all be considered discretionary based on the availability of data but the choice to not make the change needs to be clarified.

1. Is the question posed by the authors well defined?

The question of the presence and comparison of osteoporosis in type 2 diabetic patients is well defined, along with its relationship with risk factors associated with diabetes. However, the underlying question which the investigators are touching is more complex. This is the question of risk factors and essentially mechanisms of bone health deterioration in type 1 versus type 2 diabetes. It is a complex question that requires many data points to answer thoroughly, however, they compare non-diabetic controls, and those within diabetes patient groups with and without fractures which adds novelty to the study.

2. Are the methods appropriate and well described?

Methods are appropriate and well described, however, a few things still need clarification. How were type 1 and type 2 diabetes differentiated? It may be helpful to examine age at diagnosis or when in the course of the disease insulin therapy was initiated- the range of age at diagnosis (0-55) for T1DM patients is well beyond the norm.

a. Please clarify what the ophthalmologist described as a “pathological” finding. Is this a few microaneurysms or as severe as proliferative diabetic retinopathy? If an ETDRS rating is available, that would be extremely helpful. This is relevant as there has recently been documentation of possible regression of retinopathy stages, additionally, development of lesions has been associated with pregnancy which may interfere with findings.

b. Please note in the legend of the coefficient tables or the methods section what the covariates were used in the models. Please also clarify how the models were constructed.

3. Are the data sound?

The data are sound and good be enhanced for strengthening the support of the conclusion.

a. Presentation of systolic and diastolic blood pressure from the control population would fill out the table and provide further information on the representativeness of this group, it is likely available from a population from
which BMI can be obtained.

b. T1DM patients are expected to be younger at diagnosis that what is presented, please present a histogram of age at diagnosis for clarity of the trends. Those T1DM patients not on insulin therapy should be excluded from the study as the effects of insulin on bone formation are quite controversial. Additionally, these individuals prohibit the results from being generalizable to individuals with T1DM putting into question the findings for this group of the study.

c. Comorbidities and medication should also be presented if available.

d. Models comparing T1DM and T2DM should adjust for duration and BMI, demonstrate/clarify that they are collinear with another covariate, or another cause for exclusion.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?

   Yes

5. Are the discussion and conclusions well balanced and adequately supported by the data?

   a. The authors cite that the T1DM patients were younger than T2DM patients, however, duration was greater among T1DM indicating longer exposure to hyperglycemia. This should be considered as part of the discussion as it is currently considered a major contributor to bone health. T

   b. The comorbidities of T1DM and medications will also play a significant role in bone health and should be presented.

   c. Post-pubertal diagnosis of T1DM patients has been associated with preservation of bone mass compared to those diagnosed prior to this developmental milestone. How might this influence the findings, and was this considered?

   d. The conclusions regarding femoral neck BMD differences between those with T1, T2 and controls need to be interpreted with caution as this has often been associated with BMI; T2DM, even as documented in this study, is associated with greater BMI.

6. Are limitations of the work clearly stated?

   Limitations of the study are stated. As definitions of phenotypes are clarified more may become apparent and need to be addressed. The lack of data on medications and comorbidities should be addressed.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?

   The authors appropriately cite the literature and the study from which they have extracted their data.

8. Do the title and abstract accurately convey what has been found?
a. This is not a longitudinal study. The title should not state that it is a “cohort study”.
b. The abstract needs to more clearly define each BMD group (FN and LS).

9. Is the writing acceptable?
There are some grammatical and spelling errors.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests