Reviewer's report

Title: Early Low Bone Mass in Schizophrenic Patients as Compared with Normal Populations

Version: 1 Date: 27 June 2008

Reviewer: Rajesh Patel

Reviewer's report:

This study aims to report differences in bone mass between schizophrenic patients and community dwelling members of the normal local population as measured using quantitative ultrasound (QUS) at the calcaneus. Whilst the topic is of interest, I have major concerns about the methodology as detailed below.

MAJOR COMPULSORY REVISIONS

The current practice in bone densitometry is to express bone mineral density (BMD) measurements as T-scores and base their clinical interpretation on the WHO study group definition of osteoporosis [1]. T-scores are calculated by taking the difference between a patient’s measured BMD and the mean BMD in healthy young adults matched for gender and ethnic group and expressing the difference relative to the young adult population SD:

\[
T\text{-score} = \frac{\text{Measured BMD} - \text{Young adult mean BMD}}{\text{Young adult standard deviation}}
\]

A T-score indicates the difference between the patient’s measured BMD and the ideal peak bone mass achieved by a young adult. A negative T-score means that either the patient failed to achieve the optimum peak bone mass as a young adult or has subsequently lost bone tissue due to the effects of ageing or disease. The WHO report classifies a patient as having osteoporosis if the T-score is –2.5 or below at the hip, spine or forearm. A T-score greater than –1 is regarded as normal, while an intermediate state of osteopenia is defined by a T-score between –2.5 and –1.

While there is a widespread consensus that DXA measurements of hip and spine BMD should be interpreted according to the WHO study group report, the uncritical application of the WHO definitions of osteoporosis and osteopenia to other types and sites of measurement raises a number of serious difficulties. One of these is the relatively poor correlation between different types of measurement, which leads to discordance in the classification of patients’ results as normal, osteopenic or osteoporotic when measurements made at different sites are compared. A second problem is that even if the discrepancies between the individual patients are ignored, significant differences in the numbers of patients diagnosed with osteoporosis arise because of differences in the way in which the mean T-score changes with age at different measurement sites and between different measurement devices.
It is therefore not appropriate to apply these thresholds to quantitative ultrasound (QUS) measurements performed on the QUS-II device used in the reported study. Lu et al. reported that, based on a threshold of $T = -2.5$, the prevalence of osteoporosis in the Study of Osteoporotic Fractures (one of the largest prospective fracture studies reported in the literature) population varied from 3% to 60% depending on the type of measurement [2]. This problem was also discussed by Faulkner et al., who used reference data to plot the mean T-score as a function of age for different types of measurement [3]. The age at which the mean T-score fell below -2.5 varied from 55 to over 100.

It is clear that it is inappropriate to use the same T-score thresholds to interpret all types of DXA and QUS measurement. The paper will therefore need to be revised substantially.

There are 2 ways in which this issue can be resolved. Firstly the authors can rewrite the paper reporting differences in calcaneal QUS between schizophrenic and community dwelling control patients without referring to the different BMD thresholds (-2.5, -1.0 etc) at all.

The second (and scientifically more robust) option would be to report the prevalence rates based upon the use of device specific thresholds [4] for the QUS II scanner. It may not be necessary for the authors to establish their own thresholds as this has been done previously by Clowes et al. [5].

**MINOR ESSENTIAL REVISIONS**

Some of the text is difficult to follow due to poor English

Page 3 Line 11 can be changed to “…in chronic schizophrenic patients on a large population has not previously been reported.”

Page 4, Line 8 – instead of “whom rejected to join the study ..” use “… those who did not give consent.”

Page 5 Line 16 – change the word ‘detecting’ to ‘measuring’.

Page 7 Line 11 – “better mean BUA” should be changed to “higher mean BUA”.

Page 8 Line one – The sentence beginning “The trend change …” should be replaced with “A significant trend in BUA with ageing was observed in community dwelling females and males”.

Page 8 Line 9 – “Table 1 revealed..” should be changed to Table 1 show ..”

Throughout the results and discussion sections (which should actually be separated rather than left combined) please note my main criticism above relating to osteoporosis (and osteopenia) T-score thresholds.

Page 4: Study Population – when reporting the patients age for each group, it should be reported as “… age 20 years (mean ** years, range ** to ** yrs)”

Page 5 line 2 and (particularly) line 8: The authors refer to the accuracy of the machine. However, when calculating the short-term coefficient of variation, it is
the precision (reproducibility) of the device (not the accuracy) that is being estimated.

Page 7 results – The mean age of patients need not be reported to 2 decimal places. One decimal place is adequate.

Page 10 Line 13 – The authors’ statement that “ageing appeared to provide some protection against the development of osteoporosis” is speculative based on the non-significant results.

Conclusions Line 2/3: change to ..“QUS measurements in the present study did not decline significantly with ageing”.

Table 1: remove Pearson correlation coefficients as these are confusing in the table. If the authors wish, the coefficients can be reported in the results section.
Table 2: This table is confusing and can perhaps be replaced with a figure (or a few figures) showing the variation of BUA with demographic parameters.

References


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

**Quality of written English:** Needs some language corrections before being published

**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