Reviewer’s report

Title: Association between osteoporosis and benign paroxysmal positional vertigo: a systematic review

Version: 2 Date: 22 March 2014

Reviewer: Michael von Brevern

Reviewer’s report:

This is a literature review on the association between osteoporosis and benign paroxysmal positional vertigo (BPPV). The authors identified 7 studies on this subject. The paper is limited by the fact that the presented data does not allow a meta-analysis.

Major Compulsory Revisions:

The use of the terms “cohort study” and “case-control study” is problematic in this paper. The authors denominate several studies they have included in their review as cohort studies. I have checked references 12 and 15, which aren’t cohort studies but case-control studies. A cohort study is a longitudinal study that follows a group of people (see also below).

On page 5 the authors write that only one study had a follow-up that was long enough (ref. 12). However, this study was a case control study without any follow-up.

Minor Compulsory Revisions:

Page 3, line 12: Osteoporosis might be a risk factor for BPPV. It is not the cause of BPPV.

Page 3, line 18: “exeption” instead of “exemption”.

Page 5: the authors should specify whether the included studies were prospective or retrospective.

Page 5, line 11: The number of 1631 patients with BPPV reads impressive. However, one study (ref. 17) with 1092 patients might better be removed from this review as in this study only 13 patients had osteoporosis. It is highly likely that this retrospective study did not examine systematically for osteoporosis. Thus, the association between BPPV and osteoporosis can hardly be examined with this study. Furthermore, according to Fig. 1, studies examining multiple associations (as ref. 17) were an exclusion criterion in this review.

Page 5, line 17: “In all of four cohort studies, no one study had adequacy of follow-up, only one study followed long enough for outcomes to occur.” This is a contradiction. What do the authors consider as long enough for follow-up?

Page 5, line 19: “All of these three studies selected patients as controls.“ What
diagnosis had these patients?

Page 5, line 20: why were the cases not representative?

Page 6, line 2: what do the authors mean with “apparent correlation”. Was there a statistical significant association or not? The authors have used the term “apparent correlation” several times throughout the paper.

Page 6, line 4: What is meant with “prognosis of BPPV”? The rate of recurrence or the response to treatment or something else?

Page 6, line 15: This sentence does not make sense: “While one study found no correlation between serum vitamin D levels and the presence of BPPV.”

Page 6, line 18: “Only one study assessed the association between biochemical markers of bone turnover and BPPV, and found that patients with BPPV had higher amino-terminal propeptide of protocollagen type I levels, and that level of biochemical markers of bone turnover correlated with the presence of BPPV.” These levels were higher compared to what?

Page 7, line 14: “…and that the medications used to treat these conditions may be able to prevent the occurrence and recurrence of BPPV.” Is there any data in these 7 studies that support this statement or is this speculation?

Page 7, line 17: “recurrence rate for BPPV of about 27%”. This number is meaningless, unless you define the time of follow up; e.g. recurrence rate of xy% per year.

Page 7, line 19: osteoporosis is not the cause of BPPV

Table 1: does the age refer to patients with BPPV? How about controls? Was the age similar in patients and controls? Does the ratio female to male refer to patients with BPPV? Concerning Ref 13: was there any association between osteoporosis and BPPV?

References 1, 9 and 10: spelling has to be checked.

Can the authors quantify the association between osteoporosis and BPPV?

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

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

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests