Reviewer’s report

Title: Effects of bupivacaine or levobupivacaine on cerebral oxygenation during spinal anesthesia in elderly patients undergoing orthopedic surgery for hip fracture. A randomized controlled trial

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Reviewer: Wolfgang Buhre

Reviewer’s report:

In their interesting study the authors compared the effects of bupivacaine and levobupivacaine administered in geriatric patients undergoing spinal anaesthesia for hip fracture surgery. The study is of interest, as patients undergoing hip fracture surgery represent a 'frailty' population with both a high risk of mortality as well as some risk to develop cognitive dysfunction after surgery.

This study has an interesting approach as the authors combined a haemodynamic study with measurements of cerebral perfusion and some testing for neurocognitive function.

In general, the manuscript is well written and the study methodology as well as the statistical analysis is well done. Moreover, it is interesting that two different local anaesthetics are compared which are both widely used in clinical practice. The authors has to be congratulated with the performance of this, quite complex study in a difficult scientific field in particular in patients undergoing emergency surgery.

Despite this there are some questions with respect to study protocol and conduct of the trial

1. The authors used the SPMSQ, a. can you explain why patients with low scores were excluded (Methods section, first measurement was done before surgery, did the patients received any pain therapy which can interact with the SPMSQ on beforehand. I think the problems of the SPMSQ in this setting as nicely given by the authors in the discussion chapter should be presented more pronounced.

2. One important factor may be the time delay between trauma and surgery, can you describe this

3. The prehydratation was 300 ml ringer’s lactate. Can the authors describe why they used this amount of fluids and moreover give some informations about the relation to body weight or mass

4. Interestingly, there are some reports describing a relation between the use of phenylephrine and a decrease in NIRS-saturation (Immink et al., BJA) so please explain why PE instead of early ephedrine or even noradrenaline was preferred.

5. The authors describe that they use a fixed dose of midazolam and propofol in case of insufficient analgesia. Despite the fact that these drugs are not known for having analgesic
properties, I wonder if the authors can discuss the additive value of sedation in this patient population.

6. Is there any knowledge on the validity of the SPMSQ in this setting?

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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