**Reviewer's report**

**Title:** A novel approach to neuraxial anesthesia: application of an automated ultrasound spinal landmark identification

**Version:** 0  **Date:** 04 Dec 2018

**Reviewer:** Adam Jacob

**Reviewer's report:**

In the research article "A Novel Approach using an Automated Ultrasound Spinal Landmark…", the authors describe a single-center, prospective, cohort study of 100 women undergoing spinal anesthesia in which the needle insertion point was determined using an ultrasound-integrated, automated algorithm. Authors had previously developed this new technology, and validated its ability to correctly identify the L3-4 interspace. The present study represents the first clinical application of using the technology to identify the needle insertion site which would result in a successful 1st pass dural puncture. The first pass success of dural puncture was then compared to rates established in the literature. Authors reported a 92% success rate of dural puncture on the first needle pass when using the new technology to locate the needle insertion point, concluding that "… this novel automated ultrasound guided techniques would be useful to clinician to utilize ultrasound-guided neuraxial techniques with confidence to identify the anatomical landmarks on the ultrasound scans."

I applaud the investigators for developing an ultrasound-integrated technology that can further aid clinicians for placement of neuraxial blocks. The technology was developed in the way that even a novel ultrasound user could follow the systematic approach to identify the L3-4 interspace. It's very promising… well done. As the authors correctly point out, there are some limitations of their findings and the generalizability. In general, is the automated algorithm you developed specific only to one type of ultrasound machine/manufacturer, or can it be used on multiple systems? You mention that you plan to investigate its use in complex and obese patients. Is the algorithm similarly accurate in detecting L3-4 in obese patients?

Specific Criticisms/Questions:

1. Though generally well written, there are several grammar and syntax errors that could benefit from editorial review for English language.

2. The Introduction, though complete, is too long. Please condense this section by 50%. You should be able to summarize the background and knowledge gap in one page of text.

3. The title needs some rewording. By leading with "A Novel Approach…" the reader is left wondering what exactly the novel approach is being used for. A novel approach to neuraxial anesthesia: application of an automated ultrasound…. might better describe what the study is about.
4. **Abstract, Background** - Please consider condensing this section, and moving your primary aim up to the Background.

5. **Abstract, Methods** - Please move the primary aim to the Background, and include more detail about what you actually did during the study.

6. **Abstract, Conclusions** - I might suggest that "would" in line 58-59 be changed to "could" to soften your position a little. Not all clinicians may find this useful.

7. **Background**, lines 26-27 - Please be very clear about what you mean by "success," here and throughout the paper. In this case, I think you mean success in achieving dural puncture on the first needle pass. It's important to distinguish this, because there are several other factors that may influence the success of the actual spinal anesthetic (e.g., inadequate block height). You can successfully get a dural puncture on the first needle pass, but fail to get a successful spinal anesthetic because you gave the wrong dose of drug or forgot to lay the patient down after spinal injection and all the medication pooled in the sacral area.

8. **Methods**, page 9, lines 5-6 - Was ultrasound used to guide the needle also, or just identify the needle insertion point? Again, success of first pass dural puncture is dependent on correct needle trajectory as much as it is correct insertion point. What size needle was used?

**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 am able to assess the statistics
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Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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