Author’s response to reviews

Title: A Prospective, Randomized Comparison of Ultrasonographic Visualization of Proximal Intercostal Block vs Paravertebral Block

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Author’s response to reviews:

Dear Dr. Tu,

We thank you and the reviewers for the kind review of our work entitled “A Prospective, Randomized Comparison of Ultrasonographic Visualization of Proximal Intercostal Block vs Paravertebral Block” which we submitted in August to be considered for publication in BMC Anesthesiology. We have addressed reviewers’ comments below point-by-point, and made the suggested changes and additions to our revised manuscript.
To review, this study used a randomized, controlled design to compare the use of ultrasound-guided proximal intercostal nerve blocks (PICB) to the classic ultrasound-guided paravertebral (PVB) in women undergoing total mastectomy. Blinded expert and novice reviewers scored deidentified ultrasound images and videoclips from each block, and rated individual sonoanatomical elements to generate a composite visualization score. We found that novice and experienced reviewers both rated total visualization and pleura identification significantly higher for PICB, while block performance times, postoperative pain, and opioid consumption were similar between groups. We feel that this potential improvement in ultrasound visualization would be of interest to readers with less experience with PVB blocks, as well as for those working in clinical settings with trainees.

All of the listed authors have contributed substantially to this manuscript. In addition, none of the authors have any relevant conflicts of interest to disclose.

If you have any questions, please do not hesitate to contact me. We appreciate your consideration of our work for publication in BMC Anesthesiology.

Sincerely,

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Response to Review:

Reviewer 1:

Comment 1.1: Z Naja (Reviewer 1): The authors compared ultrasound-guided paravertebral block (PVB) versus proximal intercostal block (PICB) in patients undergoing mastectomy in terms of imaging quality, pain and analgesic consumption. We were surprised with the results of this study showing the superiority of PICB over PVB in terms of visualization given that PVB could be used for analgesia as well as anesthesia in patients undergoing breast surgery especially for those with ASA 3-4 or with morbid obesity [Naja MZ, Ziade MF, Lönnqvist PA. Nerve-stimulator guided paravertebral blockade vs. general anaesthesia for breast surgery: a prospective randomized trial. Eur J Anaesthesiol 2003; 20:897-903 and Naja ZM, Ziade FM, El-Rajab MA, Naccash N, Ayoubi JM. Guided paravertebral blocks with versus without clonidine for women undergoing breast surgery: a prospective double-blinded randomized study. Anesth Analg 2013; 117:252-8].

Moreover, increasing the volume of the local anesthetic in the block might not result in more spread due to possible anatomical variation among patients [Naja MZ, Ziade MF, Rajab ME, Tayara KE, Lönnqvist PA. Varying anatomical injection points within the thoracic paravertebral space: effect on spread of solution and nerve blockade. Anaesthesia 2004; 59:459-63].

Response 1.1: We thank the reviewer for this assessment, and for the suggested references, which we include in the revised version.

Comment 1.2: Abstract: Line 22: the description regarding the number of blocks is not clear (n=56). It would be better to specify the number of blocks in each group. Moreover, in the paper it was written that the number of blocks was 58. Please adjust accordingly.

Response 1.2: We thank the reviewer for this suggestion and the attention to detail. We have edited the abstract accordingly, to separately list the number of blocks in each group.

Comment 1.3: The clinicaltrials.gov number is NCT02911168 (the 8 is missing in page 3)
Response 1.3: We apologize for this oversight, which must have accidentally occurred during editing, and again thank you for the attention to detail. We have corrected this.

Comment 1.4: Methods: How was blinding achieved?

Response 1.4: As we had included in the previous methods section, images were de-identified and reviewed by separate reviewers who were not involved in the performance of blocks or patient care:

“After all blocks were performed and images compiled, de-identified saved US images were independently rated by two reviewers, one expert (trained staff regional anesthesiologist with &gt;10 years of US-guided regional anesthesia experience), and one novice (staff anesthesiologist without specialized regional anesthesia training), who had not participated in the care of these patients.”

However, it is likely that the blinding was incomplete, especially for the expert reviewer, as we had listed as a limitation in the discussion:

“Second, the blinding of the expert reviewer may arguably be compromised, as images provide clues to block-specific sonoanatomy.”

Comment 1.5: What was the maximum number of injections per patient?

Response 1.5: We apologize that this was not more clear. As we had previously enumerated in the methods section:

“The number of blocks each patient received was determined by the regional anesthesiologist, according to the procedure and (bi)laterality (1-4 separate block injections per patient). “
We have now added this detail to the results section as well:

“Each patient received between 1-4 blocks of a single type, depending on the laterality and type of procedure, according to the clinical judgement of the attending anesthesiologist.”

Comment 1.6: Page 12, line 191: it was mentioned that one patient received regional anesthesia instead of general anesthesia. What was the type of regional anesthesia given?

Response 1.6: As was perhaps not clearly enumerated in the previous version, there was one patient in the PICB group that had their surgery under regional anesthesia alone (i.e. the PICB blocks were the primary anesthetic). We have amended this accordingly:

“One patient in the PICB group had regional anesthesia (PICBs) as the primary anesthetic, with remaining patients receiving GA for the surgical procedure.”

Comment 1.7: Discussion:The reason for giving regional anesthesia for one patient could be discussed in this section.

Response 1.7: We thank the reviewer for this kind suggestion.

Comment 1.8: The discussion is long.

Response 1.8: Yes, this is true. However, we felt that to address the various implications, citing previous literature, and addressing limitations, this was necessary.

Reviewer 2:

Comment 2.1: Yavuz Gürkan (Reviewer 2): Well designed and conducted study.
Response 2.1: We thank the reviewer for this kind assessment.

Reviewer 3:

Comment 3.1: Vanni Agnoletti. The study deals a very interesting topic.
The manuscript is well-written in an engaging and lively style.
The methodology presented in the manuscript and the analysis provided are both accurate and properly conducted.
Introduction and Background sections provide useful information for the readers
Statistical analysis, even in its complexity, is very well developed.
The objectives of the study are clear and the conclusions supported by the data.
References are adequate as a scientific background for the type of manuscript.
I am not convinced that PICB while providing comparable clinical results to the traditional PVB and I invite the authors to expand, in the future, the study with more cases.

Response 3.1: We thank the reviewer for this thorough assessment.

Reviewer 4:

Comment 4.1: Paul Bigeleisen. The description of the depth the needle was inserted is not useful. The terminology should indicate the depth from skin to target in the perpendicular direction to the skin as well as the length of the shaft that was inside the body. In a sense, a right triangle is defined by the depth from the skin to the target in the perpendicular direction to the skin and the hypotenuse is defined along the path of the needle.
Response 4.1: The reviewer raises an excellent point. Indeed, we had actually only measured and reported the length of the needle that was in the body, i.e. the hypotenuse of the right triangle. As reported in Table 2, the length of shaft in the body, on average, was slightly higher amongst the PICB group of blocks, although this was not statistically different. We did not record the needle angle, or depth from skin to needle tip, during block performance, and this cannot be consistently derived from the ultrasound images that were captured as the visibility of the needle tip is variable.

We have amended the text in the discussion, figures, figure legends, and table 2 to reflect this more accurate verbiage.