Reviewer’s report

Title: Hemodynamic effects of lateral tilt before and after spinal anesthesia during cesarean delivery: an observational study.

Version: 1 Date: 31 Oct 2017

Reviewer: Ramon Abola

Reviewer's report:

Positive Feedback:

This is a well designed study that looks at a very pertinent clinical question: Does left lateral tilt improve maternal hemodynamics after spinal anesthesia for c/section?

- The preoperative data is useful in that maternal hemodynamics do not appear to be different with supine versus left tilt position. This is somewhat expected as only a small percentage of pregnant patients with have supine hypotension syndrome.

- The value of this study is that it looks at maternal hemodynamics within the context of spinal anesthesia - which is what previous MRI studies looking at caval compression did not include.

- The message from this study to me is that LLT does appear to improve maternal hemodynamics after spinal anesthesia, within the methods of this study. This suggests that we should continue to practice LLT during our c/sections.

- Also the benefit of tilting appears to occur at 15 degrees with no further improvement at 30 degrees. 15 degrees is probably routine for most L&D suites as 30 degrees would interfere with surgery.

- Abstract is written well, clear and concise.

Negative Feedback:

1. My biggest concern is that the methodology of this study does not use phenylephrine for the management spinal hypotension. There has been a change in practice over the past decade where spinal hypotension essentially can be eliminated with the use of prophylactic phenylephrine in fusion and co-loading of fluid. Therefore the findings of this study will only apply to anesthesiologists who do not routinely use phenylephrine in their practice, and primarily still use ephedrine for hypotension. What I don't know - is whether LLT is beneficial in my c/section patients who I use phenylephrine infusions for the prevention of
spinal hypotension. The authors write "we did not use prophylactic vasopressors to confound our measurements" but some acknowledgement of not using phenylephrine should be addressed in the discussion.

From a review article by Hasanin - "The use of vasopressors is more widely accepted as an effective method for decreasing PSH than fluid loading [3]. Phenylephrine (PE) is preferred vasopressor in prevention and treatment of PSH because of: faster onset [7], less incidence of fetal acidosis [28], less placental passage [29], less maternal nausea and vomiting despite the similar incidence of PSH [30,31]." https://doi.org/10.1016/j.egja.2017.03.003-

2. - Methods: it is unclear from the methods - what was the time frame for the supine, 15 degree and 30 degree measurements - AFTER spinal anesthesia. What was the time between spinal administration and the first supine measurement. A spinal anesthetic will develop over 5-10 minutes and changes in sympathetic blockade and the body's response to spinal hypotension may be the reason you are seeing differences in MAP and HR. Not because of LLT. This is addressed in the discussion - but knowing the exact time frame would allow readers to better understand when these measurements were taken.

3. Degree of hypotension after spinal - a MAP of 50 would correspond with a BP of 80/35. This seems unacceptably low today with the routine use of prophylactic phenylephrine for c/section and spinal hypotension. If it was collected, information about APGAR scores and fetal pH values would provide information that the anesthetic conditions provided acceptable uterine-placental perfusion.

4. Discussion - Paragraph 2 - I would recommend restructuring this paragraph - with suggestions that it be divided into 2 or 3 paragraphs. It is difficult to follow the message from these various studies. A paragraph could focus on studies that support LLT, the second - studies that favor against LLT, and a third that reviews CO monitors and how different modalities may be the reason for different results.

5. Discussion - increased HR after LLT - there is no data that shows the amount of phenylephrine that these patients received. Although the authors may be correct that the increased HR with LLT corresponds to "tachycardia induced hypervolemia" - another possible explanation is that this is the effect of ephedrine given for the management of spinal hypotension. Unclear from the methods/results - is whether the increased MAP/CO/HR are solely from LLT or could they be related to ephedrine administration.

Graphs - please label the X-axis as your graph as degree tilt - as it could be mistakenly thought to be time interval which makes it confusion. Consider using a bag graph instead of a line graph for clarity.
Misc - please review the manuscript for acronyms that are not previously defined

Line 115: PSH - I assume is post spinal hypotension but it’s not previously defined.

Line 153 - ACC - I assume aortocaval compression

**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

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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

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