Reviewer's report

Title: Surgical factors affecting oculocardiac reflex during strabismus surgery

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Reviewer: Robert Arnold

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Major Comments:
Muscle traction amount and time are VERY IMPORTANT in this study.

The main conclusion of this study was that first muscle EOM tension caused more >20% bradycardia than the subsequent surgery.
Hidden within the data are also important physiologic data regarding the continuous variable heart rate response to extraocular muscle manipulation. By separating all the numbers into arbitrarily separated groups demarcated by the "magic" 20%.

Routine strabismus surgery requires 100-200 grams tension on rectus muscles. Deliberately gentle surgery may take 50 grams tension. (Machida Reference)

Line 60-61, should include "Braun et al showed that sustained traction of 600 grams of the EOM induced a counter-regulatory effect…"

In Methods, you must describe what the surgeon felt was uniformity of amount and duration of tension, but that these were not actually quantified.
To get to an oblique muscle, often adjacent recti are tensioned first, so the actual tension on the oblique is usually not pure- instead a secondary impact following 1 or 2 adjacent recti. Did your surgeon feel that there was almost no other ocular manipulation before the inferior obliques, or were these associated with adjacent rectus tension by surgeon or assistant first?
The Tables are somewhat confusing: in Table 3, you report the occurrence of oculocardiac reflex with numbers and percentages in the column labeled "without OCR" you need to show why and OCR can be reported in the arbitrary group "without OCR."

Table 5 would be particularly interesting if percentages given, and separated by atropine versus no atropine.

VERY IMPORTANT → Lines 96-101 describes that heart rates were recorded for each of these phases (every 5 seconds): 1) HR before EOM tension, 2) Maximum decreased HR after tension, 3) HR at maximum recovery that was close to baseline 4) HR with maintained traction (how long) defined as the adrenergicHR), and 5) HR at cutting of the muscle. It is OK to do all your comparisons with a 20% definition of OCR, but much more important to the physiology of the vagal response is the calculated percent changes from baseline for each of 2), 3), 4), and 5). Report as means, standard deviations, medians and ranges. Estimate how long from initial tension the recovery (3) and (4) took. Please separate data by those who got atropine and those who got no atropine. These this would be easily done in a table with 4 sets of values separated by two separate pharmacologic interventions. Give numbers of muscle tips for each (ie. 37 LR, 5 MR, 10 IO). You seem to have generated part of this data as a result not mentioned until discussion line 204-205. This could be very related to Table 4.

Lines 145 through 151 note that the defined OCR patients (greater than 20% drop) compared to the non-OCR (less than 20% drop) had greater heart rate changes with p-values. This may seem obvious but does not describe a physiologic difference other than that fitting an arbitrary definition of OCR at 20%.

Lines 132-134: you initially say recess 41%, resect 7% and oblique 3%, but then there was a "significant occurrence of resection surgeries)- is this significantly LESS as your percentages would indicate- your last sentence line 133-134 would seem to imply more with resection contradicting the preceding sentence.

Line 142- do you mean bilateral LATERAL rectus muscle surgery?
Line 153 and line 175- the resection being more- how do you conclude resection is more despite line 131-132 saying recession had 7% compared to recession having 41%?

Line 152- It is doubtful you have large enough sample size to power many conclusions about multivariate analysis (line 152-158) especially when there are actually two groups- those children with atropine and the adults without. Comment is discussion about power to conclude.

Some carefully describe a recovery of heart rate once all traction is released from the EOM (Machida reference). Braun looked at ongoing tension. I believe your study is also describing heart rate with sustained EOM tension- perhaps over several minutes? This is important to separate from your Conclusion comment: line 220. As a treatment for profound OCR, many anesthesiologist comment to surgeon to "release tension." Resuming with more gentle tension after recovery- with non-tension is common however some patients persist with profound OCR (3-10 second asystole) and are often treated with a bolus of IV anticholinergic sufficient to give baseline heart rate more tachycardia.

Thank you for mentioning the unmeasured tension at the very end of the Discussion. All the discussion from lines 175-193 could be explained by careful monitoring of extraocular tension- or there could be other factors which your study uniquely address, such as the sutting of the EOM tendon which you say caused a mean 10% drop (line 204-205)

The Machida reference is missing.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.
No

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?
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