Reviewer’s report

Title: Association of neuromuscular reversal by sugammadex and neostigmine with 90-day mortality after non-cardiac surgery

Version: 0  Date: 08 Dec 2019

Reviewer: Réka Nemes

Reviewer's report:

This retrospective cohort study aimed to investigate the effectiveness of sugammadex and neostigmine at lowering 90-day mortality after non-cardiac surgery.

The authors concluded that reversing rocuronium with sugammadex might be associated with lower 90-day mortality after non-cardiac surgery compared with neostigmine.

There is one major methodological problem with the study that renders the interpretation of the results complicated. This is the lack of neuromuscular monitoring not just in the postoperatively but also in the intraoperative period.

The authors write that anesthesiologist decided on sugammadex or neostigmine reversal. I have several questions with regard to NMB reversal:

1) The authors write that the usual dose of sugammadex was 2-4 mg/kg depending on the level of the block at the end of the case (L151-152). How did the anesthesiologists evaluate the depth of NMB if only 1.5% of the patients were monitored? How could they decide the appropriate dose?

2) Similarly, how was the dose of neostigmine determined?

3) The above doses of sugammadex and neostigmine are not equipotent. 2 mg/kg sugammadex should be used to reverse moderate (TOFC > 1) block, 4mg/kg sugammadex should be used to reverse deep block (TOFC = 0) while 30-50 mcg/kg of neostigmine should be used to reverse shallow block (TOFC > 4).

Similarly, the mean doses of sugammadex and neostigmine (presented on pg 11 L231-233) would suggest different levels of NMB.

However, this is not supported by the fact that the dose of rocuronium, BMI and surgical times were similar in the two groups. This means that the patients receiving neostigmine could receive suboptimal dose of the reversal agent. In addition, how could the anesthesiologists ensure the adequate time for recovery without monitoring? These nuances imply that neostigmine reversal was handicapped from the beginning.
L67: I would add "sugammadex" to keywords

L89: postoperative residual curarization is not a side effect of NMBAs rather a complication. Please consider changing (throughout the manuscript).

L92: There incidence of PORC can be much higher. The results of the RECITE and RECITE-US studies showed much worse situation.

L170: "chronic kidney disease and cancer WERE recorded."

L251-254: The authors write that 1 mg/kg increase in sugammadex dose was associated with 17% lower 90-day mortality, while 1 mcg/kg increase in neostigmine dosage did not. How can these two dosage increases be considered as equivalent? For a 70 kg person, administering 210 mg sugammadex instead of 140 mg looks far more effective than administering 3,57 mg neostigmine instead of 3,5 mg.


L290-293: do not really understand what the authors want to suggest by saying that "quantitative monitoring is sufficient for the determination of sugammadex dosage." Maybe, they want to refer to qualitative monitoring?

L293-294: a better reference for this sentence would be Kotake 2013.

L316-320: why dose "a recent meta-analysis" have two references?

L331-334: please provide more references

**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.

No
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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