Author’s response to reviews

Title: Effect of endotracheal tube lubrication on cuff pressure increase during nitrous oxide exposure: a laboratory and prospective randomized controlled trial

Authors:

Moriyoshi Oji (ycwkf074@gmail.com)
Yukihide Koyama (yukihidekoyama1008@gmail.com)
Hiroyuki Oshika (oshika1108@yahoo.co.jp)
Masashi Kohno (kohno@tomei.or.jp)
Yusuke Nakahashi (yusuke.nakahashi@gmail.com)
Sayano Fukushima (fukusayano@yahoo.co.jp)
Hidemasa Iwakura (hiwakura7@gmail.com)
Tomio Andoh (psdelico06@yahoo.co.jp)

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Effect of endotracheal tube lubrication on cuff pressure increase during nitrous oxide exposure: a laboratory and prospective randomized controlled trial

Dear Dr. Kurt Ruetzler:

Thank you very much for your email of November 27, 2018, regarding our manuscript, “Effect of endotracheal tube lubrication on cuff pressure increase during nitrous oxide exposure: a laboratory and prospective randomized controlled trial”, and the valuable comments of the reviewer, Dr. Kenneth Cummings. I attach here both our revised manuscript, and our point-by-point response to the reviewers’ comments.
We feel that the revised manuscript is a suitable response to the comments and is significantly improved over the initial submission. We trust that it is now suitable for publication in BMC Anesthesiology.

Thank you in advance for your kind consideration of this paper.

Sincerely yours,

Yukihide Koyama, MD, PhD

Department of Anesthesiology, Mizonokuchi Hospital, Teikyo University School of Medicine, 5-1-1 Futako, Takatsu-ku, Kawasaki, Kanagawa Prefecture 213-8507, Japan

Phone: +81-44-844-3333 (business) ; Fax: +81-44-844-3201 (business)

E-mail address: yukihidekoyama1008@gmail.com

Attention

Except for the points that Dr. Kenneth Cummings raised, we found some modifications as below (1-3) would be required in the manuscript.

1. We modified sentences and thus changed the sentences (A) to (B) as below.

(A) P6, L2- L3 (Original manuscript)

Cuff pressure should be maintained lower than the mucosal membrane capillary perfusion pressure [3].

(B) P6, L3 (Revised manuscript)

Cuff pressure should be maintained lower than the capillary perfusion pressure of the tracheal mucosa [3].

2. After re-checking all the data carefully, we found just one of the data was written incorrectly in the original manuscript. In Table 2, Time span in KY jelly (-) group was expressed as
34.1(12.2). However, the correct data was 34.1(13.1). Except for this data, we confirmed that all data are correct. Please refer the revised Table 2 in P 29 in the revised manuscript.

3. We deleted the keywords section written in P2, L6 in the original manuscript, because we found the same section immediately after the abstract in P5. Furthermore, we changed the word, “Tracheal tube cuff” to “Endotracheal tube cuff” in the keywords section in the revised manuscript. Please check the keywords in P5 in the revised manuscript.

Response to the Reviewer

Dear Dr. Kenneth Cummings,

Thank you very much for your valuable review comments for our manuscript. I read your comments carefully and answer your questions as follows. I highlighted changes to the manuscript in RED.

1. In the introduction, the authors state that ETT cuff pressure should be carefully monitored. Do they propose this as a standard of care? If so, practice will need to change across the world. It may be better to suggest, rather than state this.

Thank you very much for your comment. As you point out, we would like to raise this as a standard of care. Therefore, we added some explanations with citations to support this idea in P6, L5-9 in the revised manuscript as below.

P6, L5- L9 (Revised manuscript)

Furthermore, ETT cuff pressure monitoring during general anesthesia using N2O is recommended to ensure that the cuff pressure remains within safe limits to avoid airway morbidity in children [6, 7] and adults [8, 9]. Consequently, monitoring and adjusting the cuff pressure of an ETT during general anesthesia should be performed carefully as standard clinical practice, particularly if N2O is used [10].
2. Table 1: P-values are unnecessary since any differences would be, by definition, due to random chance. If anything, presenting absolute standardized differences (e.g. difference in means/pooled SD or the equivalent) would be more appropriate.

Thank you very much for your comment. As your recommendation, we deleted all P-values from the original Table 1. Please refer the revised Table 1 in the revised manuscript.

3. The authors rightly point out that an 8-minute difference in time to a cuff pressure of 25 mmHg is of limited significance. I'm not sure this supports the statement that there would need to be fewer adjustments of the ETT with the attendant reduction in bucking, etc.

Thank you very much for your comment. In this study, the time span until the cuff pressure reached the clinical safe limit was about 42 min in KY jelly (+) group, which was longer than KY jelly (-) group by about 8 min. From the results, we could raise the possibility that we don’t need to manipulate the lubricated ETT cuff if total anesthesia time is less than about 40 min, and the frequency of the lubricated ETT cuff manipulation may be less compared with non-lubricated ETT cuff during surgery to avoid airway morbidity. We just want to show our contention that may be supported by the data. This idea was also shown in our previous study (BMC Anesthesiol. 2018 Jul 28;18(1):99.). To help the readers to understand our contention easily, we added some explanations for this and modified the sentence in the revised manuscript as below.

(A)P16, L18- P17, L4 (Original manuscript)

However, the results suggest that lubrication of the ETT cuff may decrease the frequency of needing to adjust the cuff pressure during surgery. This effect may reduce the incidence of complications associated with cuff pressure manipulation, such as cough reflex, bucking, and hemodynamic responses.

(B) P17, L5-11 (Revised manuscript)

However, the results suggest that lubrication of the ETT cuff may decrease the frequency of needing to adjust the cuff pressure during surgery. Theoretically, the average number of events to adjust the cuff pressure required during a 3-hr anesthesia period will be 4.2 and 5.3 times with and without the lubricant, respectively. Consequently, this effect may lead to a reduction in the
incidence of complications associated with cuff pressure manipulation, such as cough reflex, bucking, and hemodynamic responses.

4. Why would K-Y jelly even cause this effect? A brief recap would be helpful in the introduction or discussion.

Thank you very much for comment. In our previous study (BMC Anesthesiol. 2018 Jul 28;18(1):99.), we raised the possible underlying mechanism for this inhibitory effect. According to your recommendation, we added a brief recapitulation about this effect in P14, L9-10 in the revised manuscript.

P14, L9- L10 (Revised manuscript)
Additionally, we raised the possibility that the layer of glycerine-based K-Y™ jelly reduced the diffusion of N2O into the ETT cuff [10].

5. Would other lubricants have similar effect (e.g. Surgilube, lidocaine jelly)?

Thank you very much for your comment. Since we did not determine if other lubricants have similar effect, unfortunately, we could not mention about this issue in our manuscript. Therefore, we raised this as a study limitation in P18, L11-15 in the revised manuscript as below.

P18, L12- L16 (Revised manuscript)
Second, we did not test whether other lubricants such as Surgilube™ (E. Fougera & Co., Melville, NY, USA) or Xylocaine™ 2% jelly (AstraZeneca, Osaka, Japan), also have an inhibitory effect on ETT cuff pressure increase during N2O exposure. Thus, it is unclear whether other lubricants have a similar effect.