Author's response to reviews

Title: Endotracheal Tube Cuff Pressure Cannot Be Predicted Accurately without a Manometer

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Author's response to reviews: see over
BioMed Central Editorial Team

RE: MS 7379657493942310 “Endotracheal tube cuff pressure”

Dear Editors:

We are pleased to resubmit the above manuscript to BMC Anesthesiology. We appreciate the reviewers’ comments and suggestions and believe that we were able to revise our manuscript to answer their concerns.

A point-by-point response to the reviewers is given below. We hope you will now find our manuscript acceptable for publication.

Yours very truly,

Anupama Wadhwa      Papiya Sengupta       Daniel I. Sessler       Paul Maglinger

Spencer Wells        Alicia Wells          Jaleel Durrani
Response to Dr. Karasawa:
Major Revisions
1. Defined criteria to decide volume of air…

The cuffs were inflated by the anesthesia provider or the circulating nurse. This is routine practice in all 3 hospitals. They determined the adequacy of the cuff volume by either manually palpating the cuff or inflating it just enough to prevent an audible leak. We did not question providers specifically about their method of inflation in each patient since they were blinded to the nature of the study.

2. What is tube size based on?

We now state in the methods on page 6 “Male patients were intubated with an 8 or 8.5 mm internal diameter endotracheal tube, and female patients were intubated with a 7 or 7.5 mm internal diameter endotracheal tube. This is a standard practice at these hospitals. Patients who were intubated with sizes other than these were excluded from the study.”

3. What kind of endotracheal tubes were used?

We used Mallickrodt endotracheal tubes, sizes 7, 7.5, 8, and 8.5.

4. Did the authors measure compliance of the manometer?

The compliance of the manometers was checked monthly or whenever the reader went to a different hospital.

5. Patients paralyzed?

The patients were adequately paralyzed (P 7, Line 9). As now stated in the methods “Pressure was recorded at the end of expiration after ensuring that the patient was paralyzed.”

6. Power analysis

[Gil is doing this.] We didn’t power the study to compare findings among the practitioners; however, the large P value (0.847) suggests that the outcome didn’t vary among practitioners. The initial cuff pressure according to personnel were as follows:

- Attending (n=6): 43±32 cm H₂O
- CRNA (n=72): 34±20 cm H₂O
- Resident (n=15): 38±26 cm H₂O

7. …real purpose for inspecting the difference among three practitioners? Difference among 3 practitioner types?
We thought there might be a correlation between the experience of the practitioner and being able to better judge the cuff pressure, but as stated above we didn’t power the study for this outcome.

Our results clearly indicate however that this was not the case.

Minor Revisions

1. **Title**
   - We changed the title to “Endotracheal Tube Cuff Pressure Cannot Be Predicted Accurately without Manometer.”

2. **Change 50%**
   - It was corrected.

3. **Move 1st paragraph**
   - It was incorporated into the background section

4. **Replace aesthetic**
   - It was corrected

5. **Divide Table 1**
   - Table 1 now has the demographic data and Table 2 the principal results by hospital

6. **Remove figures**
   - Figs 1-3 were removed

**Response to Dr. Dullenkopf**

Major Revisions

1. **Finger palpation**
   - The reviewer is correct in his criticism. We have accordingly changed the abstract, background, and conclusion section to reflect our hypothesis that the tube cuff is inadequately inflated when manometers are not used (pp. 2 and 11)

2. **Evaluation of cuff pressure provided during clinical routine**
   - We corrected the role of the author SP in the author’s contributions section. She wasn’t the anesthesiologist on any case, but did take the majority of the cuff pressure measurements.

   Unfortunately, we didn’t record the names of the anesthesia providers, only their positions. However, we made the measurements over a period of several months, and we made an effort not to use the same person more than once. Most of our measurements were preformed on naïve providers. We can’t say with certainty however that the same provider wasn’t “tested” more than once. The IRB did not require consent from the providers (P.5, L.21-23), thus they were not aware that the patient was participating in the study at the time of they inflated the cuff.

3 & 4. **Volume of air and compliance.**
The endotracheal tubes used were Mallinckrodt. Sizes 7 and 7.5 were used for female patients and 8 and 8.5 were used for male patients. All the patients were paralyzed and mechanically ventilated. The cuff pressures were measured at the end of expiration.

Minor Revisions

1. **Reference lower limit**
   Using 20 cm H₂O as the lower limit is the routine practice in the 3 hospitals where the study was conducted.

2. **Lomholt et al. reference**
   This did refer to the lower limit. We cited this reference to point out the discrepancies in the recommendations by the various authors.

3. **Rephrase sentence**
   Done

4. **Why mention appointments?**
   This information was deleted

5. **Selection of the tube sizes**
   As now stated in the methods “Male patients were intubated with an 8 or 8.5 mm internal diameter endotracheal tube, and female patients were intubated with a 7 or 7.5 mm internal diameter endotracheal tube. This is a standard practice at these hospitals. Patients who were intubated with sizes other than these were excluded from the study.”

6. **Change initial**
   We changed “initial cuff pressure” to “measured cuff pressure.”

7. **How determined emptiness?**
   As we now state in the methods “A syringe attached to the third limb of the stopcock was then used to completely deflate the cuff, and the volume of air removed was recorded. The cuff was considered empty when no more air could be aspirated on aspiration with a syringe.”

8. **Tube and cuff dimensions**
   We used the same ET tubes of tube in all the hospitals. We added this information.

9. **Conclusion should be rephrased**
   We rephrased the conclusion as suggested: “Cuff pressure should be measured with a manometer and, if necessary, corrected.”