Reviewer’s report

Title: Role of tube size and intranasal compression of the nasotracheal tube in respiratory pressure loss during nasotracheal intubation: a laboratory study

Version: 6 Date: 12 Jun 2017

Reviewer: Alexander Kuo

Reviewer's report:

Consider the follow revisions for organization and readability:

Be more concise and clear in the conclusions, for example consider this revision:

Conclusion:

The most significant factor in pressure loss to flow is decreasing NTT diameter. Slip joint transition and the curvature of the NTT were contributing factors and were worse in smaller tube diameters. External compression of NTT in the intranasal cavity also cause a small but measurable increase in pressure loss, especially in small diameter NTT. This increased flow resistance could significantly increase work of breathing compared to oral tracheal tubes, especially at high peak flows.

Introduction:

Pg 6 Ln 4:

"...various sizes were measured on the physical simulation model and calculated fluid dynamically."

This is grammatically awkward. Consider revising to "...various sizes were measured on the physical simulation model and calculated using established fluid dynamic equations."

Pg 6 Ln 7

The last 2 paragraphs of the introduction provide more detailed information on the theoretical under pinnings of the experiments. These would be better moved to the Discussion section.
Results:

Pg 16 Ln 4: I would re-iterate the important point that these calculations give the pressure drop through a "Straight tube." Le Calculated pressure losses through a non-curved 6.0-, 6.5-, 7.0-, 7.5-, and 8.0-mm ID uncompressed tubular parts were 359.6, 253.3, 184.9, 135.6, and 101.3 Pa, respectively. The pressure losses through the partially compressed parts of each tube were predicted to increase by approximately 10 Pa at a minor axis of more than 5 mm and approximately 20 Pa at a minor axis of 4 mm; the predicted pressure losses through NTTs of 6.0-, 6.5-, 7.0-, 7.5-, and 8.0-mm ID compressed to a minor axis of 3 mm were 82.0, 64.6, 57.5, 51.3, and 45.8 Pa larger than those in the corresponding uncompressed NTTs of each size, respectively.

Pressure losses through a non-curved compressed 6.0-, 6.5-, 7.0-, 7.5-, and 8.0-mm ID NTTs with minor axes of 3.0, 3.5, 3.9, 4.2, and 4.8 mm, respectively, resulting from application of the maximum intranasal compression force of 34.1 N, were calculated as 82.0, 38.0, 23.5, 16.6, and 9.3 Pa, respectively"

I would also re-emphasize the point of the calculation is the pressure loss in a non-curved tube:

Appendix Pg 20 Ln 45:

"Calculation of the pressure losses through a non-curved tubular tube with partial compression"

Again, be more concise and clear in the first paragraph of the discussion:

Pg 17 Ln 1

Discussion:

In this study we demonstrated that pressure loss through NTT was greater than through a standard oral endotracheal tube at sizes of 6.0, 6.5, 7.0, 7.5 and 8.0-mm ID NTT. We found that diameter was the largest factor in NTT pressure loss, with a 6.0 mm NTT having more than 3 times the pressure loss of an 8.0 mm NTT at air flow rates of 30 L/min. The acute curvature of NTT contributed to approximately 10% to 15% of this pressure loss. External compression of the NTT similar to in the nasal cavity further increased the NTT pressure loss by approximately 10% to 15%, with a larger absolute increase for smaller NTT.

**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

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 am able to assess the statistics

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Please indicate the quality of language in the manuscript:

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