

LETTER

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The value of poly-urethane cuffed endotracheal tubes

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See related Research by Blot et al., <https://ccforum.biomedcentral.com/articles/10.1186/s13054-016-1380-8>

Abbreviations: ET, Endotracheal tube; ID, Internal diameter; PU-ET, Poly-urethane cuffed endotracheal tube; PVC-ET, Poly-vinylchloride cuffed endotracheal tube

I read with special interest the meta-analysis of Blot et al. in a recent issue of *Critical Care* [1]. In a systematic review of the available literature of both laboratory and clinical studies, comparing the sealing efficacy of poly-vinylchloride cuffed endotracheal tubes (PVC-ET) versus poly-urethane cuffed endotracheal tubes (PU-ET), they demonstrated a clear advantage with a demonstrated delay of chance of descent of oropharyngeal secretions when a PU-ET was used. However, prevention of ventilator-associated pneumonia could not be demonstrated in the overall data.

The characteristics of the PU cuff allow better expansion of the cuff within the trachea, in comparison with the thicker material of PVC. In a recent re-analysis of the initial data [2], we demonstrated that a clear benefit of the PU-ET is obvious after 16.6 h if patients are treated in a comparable manner with tidal volume 6 ml/kg, PEEP 7–8 cmH₂O, and positioned in 30–40° inclined position postoperatively [3]. Furthermore, in longer term ventilated ICU patients, intubated with PU-ET, condensation fluid is sometimes present within the cuff (unpublished data), abolishing proper assessment of cuff pressure. The latter could be one of the reasons why no clear advantage is found in mechanical ventilated ICU patients. In addition, we demonstrated that, indeed, micro-aspiration still occurs with PU-ET, but is retarded for several hours [4]. This phenomenon is also suggested in in-vitro studies [5].

Another important issue which has not been discussed is the proper choice of the size of the ET. There is a clear tendency in clinical anesthesia practice to decrease the size of the ET to 8 mm internal diameter (ID) for male and 7 mm ID for female patients. This allows a theoretical improved expansion of the cuff, with a consequent decline of pleas and channels in the PVC cuffs; whether this reduction in size leads to improved sealing has still to be demonstrated.

Several open questions remain unanswered. Though there are some arguments in favor of the use of PU-ET, we still have to wait for the demonstration of a clear delay of onset of ventilator-associated pneumonia.

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Author's contribution

JP wrote and conceived the manuscript/text.

Competing interests

The author declares that he has no competing interests.

Consent for publication

Approved.

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References

1. Blot SI, Rello J, Koulenti D. The value of polyurethane-cuffed endotracheal tubes to reduce microaspiration and intubation-related pneumonia: a systematic review of laboratory and clinical studies. *Crit Care*. 2016;20(1):203.
2. Poelaert J, Depuydt P, De Wolf A, Van de Velde S, Herck I, Blot S. Polyurethane cuffed endotracheal tubes to prevent early postoperative pneumonia after cardiac surgery: a pilot study. *J Thorac Cardiovasc Surg*. 2008;135(4):771–6.

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3. Poelaert J, Haentjens P, Blot S. Association among duration of mechanical ventilation, cuff material of endotracheal tube, and postoperative nosocomial pneumonia in cardiac surgical patients: a prospective study. *J Thorac Cardiovasc Surg.* 2014;148(4):1622–7.
4. D'Haese J, De Keukeleire T, Remory I, Van Rompaey K, Umbrain V, Poelaert J. Assessment of intraoperative microaspiration: does a modified cuff shape improve sealing? *Acta Anaesthesiol Scand.* 2013;57(7):873–80.
5. Zanella A, Scaravilli V, Isgrò S, Milan M, Cressoni M, Patroniti N, Fumagalli R, Pesenti A. Fluid leakage across tracheal tube cuff, effect of different cuff material, shape, and positive expiratory pressure: a bench-top study. *Intensive Care Med.* 2011;37(2):343–7.