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LETTER TO THE EDITOR

An insight to irrigation fluid and increased intraoperative endotracheal tube cuff pressure

Dear Editor,

Intraoperative increase in endotracheal tube (ETT) cuff pressure and associated debilitating effects is a critical area in anesthesia that needs attention. We applaud the work by Choi RH et al.[1] where they have tried finding a causal relationship in shoulder arthroscopy because of the irrigation fluid. Although it looks like the apparent reason, we feel that other circumstances that might have contributed to the phenomena need mention.

Firstly, an intraoperative increased in ETT cuff pressure can result from the higher pressure from inside or outside the cuff. The rise in intracuff pressure can result from the imbibition of anesthesia gas from the luminal side of ETT; in contrast, the pressure from outside the ETT cuff may rise because of swelling tracheal mucosa or by the transmitted pressure because of compression by the surrounding tissue. Extravasation and absorption from the irrigation field are damaging and can even be life-threatening.[2] However, the authors mentioned no complications like neck swelling, chest swelling, and respiratory difficulty in their study to suspect so. More intriguing is the complete lack of any postoperative airway complication, although in some cases, they have reported a maximum cuff pressure of 40 mmHg (52 cmH_2O). It raises a real dilemma whether the increased ETT cuff pressure was due to the extravasation of fluid or not. As ultrasound is currently readily available in most theaters as a point-of-care instrument, the same and the findings would have better insight.

Secondly, intraoperative use of nitrous oxide use has been well reported to diffuse in ETT cuff filled with air.[3] What is felt that the effect of temperature change is frequently left-out while discussing the same. In healthy individuals, the trachea's temperature varies between 31–33 °C and 33–36 °C during inspiration and expiration, respectively, considering the core body temperature remains almost by 36 °C during average surgical procedures.[4] According to Amontons' law (also known as Gay-Lussac's law or Third Gas Law), the pressure of a given mass of gas varies directly with the absolute temperature of the gas provided the volume remains constant. When the ETT cuff of the colder room temperature (22 °C) heats up to match the body temperature, the cold air used to inflate the cuff also heats up, leading to a rise in pressure. Furthermore, the ETT cuff pressure in mechanically ventilated patients is shown directly to change by airway pressure.[5] These may have contributed to rising ETT cuff pressure in this study in high airway pressure cases than the imbibition of irrigation fluids.

Nevertheless, we agree with the authors that monitoring ET cuff pressure periodically is critical. It is valid for patients undergoing surgery under general anesthesia because it would prevent debilitating complications. However, to fully understand the actual pathology, we need to understand the above facts, and further clarification by the authors in these aspects is welcome.

Conflicts of interest

The authors declare no conflicts of interest.

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Mahesh S. Kurwe[a], Habib Md Reazaul Karim[a,*], Pradipta Bhakta[b]

[a] *All India Institute of Medical Sciences, Department of Anaesthesia, Critical Care, and Pain Medicine, Raipur, India*
[b] *University Hospital Kerry, Department of Anaesthesia and Intensive Care, Tralee, Ireland*

* Corresponding author.
E-mail: drhabibkarim@gmail.com (H.M. Karim).

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