

Endotracheal Tube Cuff Pressures and Incidence of Postoperative Sore Throat

Endotracheal intubation is the best method of maintaining a patient's airway in operation under general anaesthesia, an unconscious patient with cardiac arrest and who needs elective ventilation in ICU or CCU. Prior to intubation, the tube should have inflatable cuffs. This cuff stops gas leaks out of the ETT during IPPV as well as leaks of stomach contents, blood, mucus, and other foreign bodies into the lungs between the ETT and the trachea. Variable sizes starts from 2.5mm to 10.0mm. Cuffs are usually of two types; high pressure low volume and low pressure high volume. Cuff pressure should not exceed 30 cm H₂O or 22mmHg to prevent ischaemic damage to the tracheal mucosa. ⁽¹⁾ Raised cuff pressure increases the incidence of post extubation sore throat. It also depends on the duration of keeping the tubes in situ, and different inflating agents.

Inflating agents are air, water, N₂O, gas mixture, saline or 2% Lignocaine. ² Coughing and sore throat post operatively are common clinical problems during general anaesthesia. ⁽³⁾ Intra cuff pressure either low volume or high volume, low or high pressure results in irritant or stretch stimuli in the trachea, which in turn results in laryngeal morbidity. Coughing during intubation and extubation can result in hypertension, tachycardia, increase in intraocular and intracranial pressure, and Bronchospasm. ⁴

The recommended methods of preventing cough response and irritation during intubation are topically applied local anaesthetics, intravenous narcotics or tracheal extubation during deep phase of anaesthesia, each of which have their own limitations.

When lateral pressure exerted by an inflated cuff on tracheal mucosa exceeds capillary perfusion pressure, it can result in tracheal morbidity, loss of tracheal mucosal cilia, ulceration, haemorrhage and tracheal stenosis. ⁽⁵⁾ Patients may complain of sore throat, hoarseness and dysphagia during the postoperative period.

In our country, air is usually used for inflating the cuff of the Endotracheal tube (ETT). But air and nitrous oxide

are also used. But for the maintenance of anaesthesia, nitrous oxide with other volatile anaesthetic agents, which can diffuse into the air interface of the cuff faster than nitrogen can escape, resulting in an increase in volume and pressure inside the air filled cuff. ⁶

Different methods have been recommended for controlling intracuff pressure when nitrous oxide is used as a component of general anaesthesia. These include regular measurement and adjustment of cuff pressure.

Filling the ETT cuff with liquid medicine, such as saline, can also be used to prevent increase in cuff pressure due to diffusion of nitrous oxide. Use of local anaesthetics such as Lignocaine could further benefit in addition to the use of normal saline as ETT cuff is permeable to local anaesthetics and diffuses across cell membranes. ⁷

We draw the conclusion that, when utilised for ETT cuff inflation, various media, including air, anaesthetic gas combination, 2% lidocaine, and saline, are comparable in terms of the incidence of postextubation cough and postoperative airway morbidity symptoms, including sore throat, hoarseness, and dysphagia. When liquid media is utilised for ETT cuff inflation during general anaesthesia involving nitrous gas, the average number of cuff deflations is reduced. In scenarios where extended exposure to nitrous oxide is probable and in circumstances where intracuff pressure monitoring becomes challenging, including neurosurgery and ophthalmic procedures, this may be advantageous over gaseous media. ²

(J Bangladesh Coll Phys Surg 2024; 42: 4-5)

DOI: <https://doi.org/10.3329/jbcps.v42i1.70661>

Professor U. H. Shahera Khatun (Retd.)

Professor and Head of the Department of Anaesthesiology, ICU and Pain Medicine, Dhaka Medical College Hospital, Dhaka.

Mobile: 01720238789, E-mail: bela_1610@hotmail.com

References:

1. Lee's synopsis of Anaesthesia, 13th edition, Butterworth-Heinemann, Maintaining Airway. P-209.
2. Effect of air, anesthetic gas mixture, saline, or 2% lignocaine used for tracheal tube cuff inflation on coughing and laryngotracheal morbidity after tracheal extubation) Lokvendra S. Budania, Vamsidhar Chamala, Madhu Rao, Samarth Virmani, Kush A. Goyal, Kanika Nanda¹
3. Jaensson M, Gupta A, Nilsson UG. Risk factors for development of postoperative sore throat and hoarseness after endotracheal intubation in women: A secondary analysis. AANAJ 2012;80:67-73.
4. Beebe DS. Complications of tracheal intubation. Semin Anesth Perioper Med Pain 2001;20:166-72.
5. Loeser EA, Hodges M, Gliedman J, Stanley TH, Johansen RK, Yonetani D. Tracheal pathology following short term intubation with low and high pressure endotracheal tube cuffs. Anesth Analg 1978;57:577-9.
6. Saidman LJ, Eger EI. Effect of Nitrous Oxide and of Narcotic Premedication on the Alveolar Concentration of Halothane Required for Anesthesia. Anesthesiology 1964;5:302-6.
7. Fagan C, Prizelle HP, Laffey J, Hannon V, Carey M. The Effects of Intracuff Lidocaine on Endotracheal-Tube-Induced Emergence Phenomena After General Anesthesia. Anesth Analg 2000;91:201-5.