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Anestezjologia Intensywna Terapia
2019, tom 51, numer 1, 75–79
ISSN 0209–1712
www.ait.viamedica.pl

Complications associated with nasotracheal intubation and proposal of simple countermeasure

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To the Editor,

Nasotracheal intubation is a widely used technique in anaesthesia management for procedures including oropharyngeal, dental, and maxillofacial surgeries [1–3]. It provides uninhibited access to the mouth and plays an important role when dealing with difficult airways [4–6]. It is also used in patients with cervical spine instability owing to injury [7] or in patients with a cervical spine fixation owing to disease or a previous operation [8]. Moreover, it is selected for patients who require prolonged intubation for intensive care [9]. However, nasotracheal intubation may lead to certain complications, with epistaxis being the most common. Epistaxis generally occurs due to damage to Kiesselbach's plexus in the anterior part of the nasal septum [10–12] where branches from several arteries, including branches of the ophthalmic, maxillary, and facial arteries, anastomose to form a vascular plexus. To avoid this complication, the tracheal tube should be inserted into the nasal cavity in such a manner that its bevel tip comes to the lateral side of the naris. However, if the bleeding occurs on insertion of the tube, the nasotracheal intubation should be completed chiefly to protect the airway and also to tamponade the bleeding point. Risk of sinusitis is another disadvantage associated with nasotracheal intubation [13]. Sinusitis can induce oedema around the opening of the maxillary sinus. Mucosal oedema in the nasopharynx can also result in middle-ear problems. Superficial necrosis of the nasal ala is another common complication associated with nasotracheal intubation [3, 9, 14, 15]. Several measures have been suggested to avoid this necrosis problem [15–18]; however, these measures cannot always be applied in paediatric patients as their nares do not provide enough space for them. Nasotracheal intubation has also been reported to cause bacteraemia owing to abrasion of the nasal mucosa [19, 20]. Nasotracheal intubation-related carriage of bacteria into the trachea should be also avoided. It has been reported that prior treatment of the nostrils and anterior nasal septum with mupirocin is effective to avoid this complication [21, 22]. However, the cheapest and easiest countermeasure to avoid such a complication during a nasotracheal intubation for inducing anaesthesia involves the removal of nasal dirt from the tip of the tracheal tube; in short, the tracheal tube should be pulled out with the aid of a Magill forceps through the patient's mouth, while the dirt should be wiped away with a piece of clean cotton (Fig. 1). Additionally, dirt from the pharynx should be completely sucked out with the aid of a direct vision laryngoscope if required, before advancing the tracheal tube into the larynx. Once the tube tip and the pharynx are cleaned, the tube should be placed again into the oral cavity by pulling the proximal side of the tube near the patient's nostril. Subsequently, the tube tip can be

Należy cytować wersję: Yamamoto T, Flenner M, Schindler E. Complications associated with nasotracheal intubation and proposal of simple countermeasure. Anaesthesiol Intensive Ther 2019, vol. 51, no 1, 72–74, doi: 10.5603/AIT.a2019.0002.

advanced into the larynx with the aid of a Magill forceps. This series of treatment does not take longer than 10 seconds to perform once the anaesthesiologist and nurse anaesthetist get accustomed to it, thereby preventing an extreme fall in the peripheral capillary oxygen saturation (SpO_2), even in paediatric patients. If the SpO_2 value goes below the permissible range during the procedure, the patient can be easily ventilated by connecting the ventilation hose from the anaesthesia machine to the tracheal tube, thereby completely closing the nose and mouth of patient (Fig. 2), although some anaesthesiologists believe that the tracheal tube should be completely drawn from the patient's nose again in order to ventilate the patient with a mask. On the other hand, some anaesthesiologists advance the tracheal tube further into the trachea in almost a panic condition, even when they have observed nose dirt on its tip (Fig. 3), in order to prevent a fall in SpO_2, especially in paediatric patients. Therefore, knowledge of the ventilation technique via the tracheal tube inserted in the patient's nostril can be of great benefit while performing nasotracheal intubation. It can allow anaesthesiologists to calmly pull out the tip of tracheal tube using a Magill forceps through the patient's mouth, when they observe the nose dirt on it, in order to advance a clean tracheal tube into the trachea, even in paediatric patients.

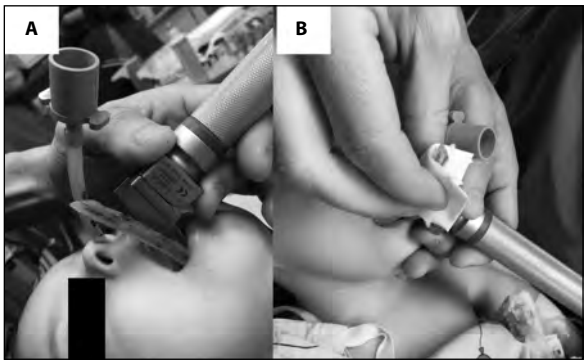

Figure 1. Removal of nose dirt from the tip of the tracheal tube. **A** — tracheal tube pulled out through the mouth; **B** — tip of tracheal tube wiped with a piece of clean cotton

In conclusion, we suggest a simple countermeasure in order to avoid possible complications of nasotracheal intubation. This involves the placement of a clean tracheal tube into the trachea of the patient. Moreover, we suggest a possible ventilation technique in case the SpO_2 value falls beyond the permissible range during a nasotracheal intubation.

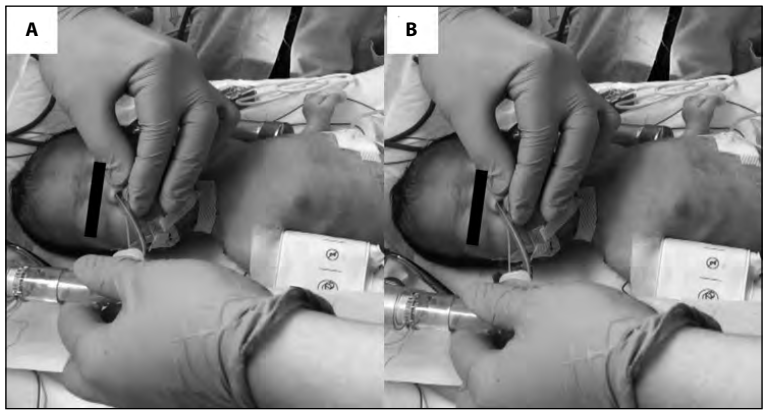

Figure 2. Ventilation technique via the tracheal tube inserted into the nostril completely closing the patient's nose and mouth. **A** — in expiratory phase**; B** — in inspiratory phase

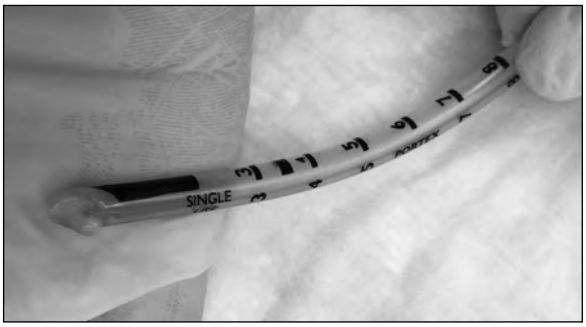

Figure 3. Substantial amount of nose dirt almost completely obstructing the tracheal tube observed in an attempt at performing nasotracheal intubation. Such an amount of nose dirt can be carried into the trachea with the tracheal tube during nasotracheal intubation

ACKNOWLEDGEMENTS

1. Source of funding: none.
2. Conflict of interest: none.

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Anestezjologia Intensywna Terapia
2019, tom 51, numer 1, 77–79
ISSN 0209–1712
www.ait.viamedica.pl

Can we regulate endotracheal tube cuff pressure using an anaesthetic machine?

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To the Editor,

Endotracheal tube obstruction caused by cuff hyperinflation can be a dangerous but preventable complication of airway management [1]. Some authors suggest that a trial focusing on cuff deflation should be considered in algorithms for the management of patients with ventilation difficulty. Although this would be a good strategy, we think that preventive measures, such as the regulation of the endotracheal tube (ETT) cuff pressure, warrant further discussion and should be propagated to a greater degree. It is known that the measurement of ETT cuff pressure has shown to be useful in the prevention of postoperative pain, hoarseness, the aspiration of secretions, subglottic stenosis and tracheal fistulas [2, 3]. However, the routine measurement of cuff pressure is usually difficult given the low availability of the equipment designed for this purpose, the cost of acquisition, the lack of maintenance-calibration and the risk of cross-infection through its use in multiple patients [4].

Recently, we invented a device for the inflation of the ETT cuff, called DUITOM®, which creates a connection between a pilot cuff and the manometer of an anaesthetic machine, in order to inflate the cuff at a precise oxygen pressure provided by the anaesthetic machine pressure

Należy cytować wersję: Tafur LA, Lema-Florez E, Zorrilla-Vaca A. Can we regulate endotracheal tube cuff pressure using an anaesthetic machine? Anaesthesiol Intensive Ther 2019, vol. 51, no 1, 74–76, doi: 10.5603/AIT.a2019.0008.