Cuff Inflation Technique During Fiberoptic Nasal Intubation in Patients With Limited Mouth Opening

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Airway management is critical, particularly in patients who undergo oral maxillofacial surgery, and often involves use of nasotracheal intubation which can be difficult. We previously described a technique involving use of a flexible fiberoptic scope to provide continuous indirect vision of the endotracheal tube (ETT) tip and the glottis to assist with successful advancement of the ETT during nasotracheal intubation. Nevertheless, we often have experienced difficulties during intubation using this method as spatial manipulation and direction of the nasal ETT into the trachea may occasionally be difficult. In such cases, combining visualization with the flexible fiberoptic scope along with the cuff inflation technique may be useful to aid manipulation of the ETT, unlike the technique previously combined with a video laryngoscope. We describe this clinical technique which may be used during fiberoptic nasal intubations to help increase success securing the airway.

Key Words: Nasal intubation; Cuff inflation; Flexible fiberoptic scope.

A nasal endotracheal tube (ETT) is routinely placed where full access to the oral cavity is required for the planned surgical procedure(s).[1,2] Placement of a nasal ETT is typically performed under direct or video laryngoscopy. However, in patients with significantly limited mouth opening, laryngoscopy is likely to be difficult as the laryngoscope requires sufficient space for the blade to be inserted into the mouth. Therefore, intubation using a flexible fiberoptic scope is a commonly used technique for these types of difficult airway cases involving placement of a nasal ETT.[3,4]

Previously we reported that it was useful to advance the ETT during nasotracheal intubation while under continuous indirect vision using a flexible fiberoptic scope passed through the contralateral side of the nasal cavity.[5] However, we have experienced cases of difficult intubation with the use of this method mainly due to problems advancing the ETT.

The ETT cuff inflation technique has been suggested as an effective alternative to the use of Magill forceps during intubation to assist with alignment of the ETT.[2,6,7] As such, we describe a novel clinical technique that combines use of the cuff inflation technique along with the use of a flexible fiberoptic scope during nasotracheal intubation to assist with navigation and passage of the ETT. This technique may be useful in patients with limited mouth opening in whom use of Magill forceps may not be easily tolerated.

METHOD

In this technique, the ETT and flexible fiberoptic scope are inserted into the pharyngeal space separately through the right and left nasal cavities during nasal intubation while the patient is under general anesthesia. This technique permits continuous observation of the glottis as the ETT is advanced into the trachea. Insertion of the ETT with full view of the larynx is indirectly monitored using the flexible fiberoptic scope (Figure a). However, often the ETT tip does not fall in easy alignment with the glottic opening and requires further manipulation (e.g., with Magill forceps) to facilitate passage into the trachea. In the case of such a difficult intubation, inflating the cuff with air from a 10-mL syringe helps direct the ETT tip anteriorly or upward toward the glottic opening (Figure b). Once alignment is achieved, the ETT is then advanced gently into the glottis, where it is then deflated and advanced further into the trachea (Figure c). During intubation, rotation (clockwise or

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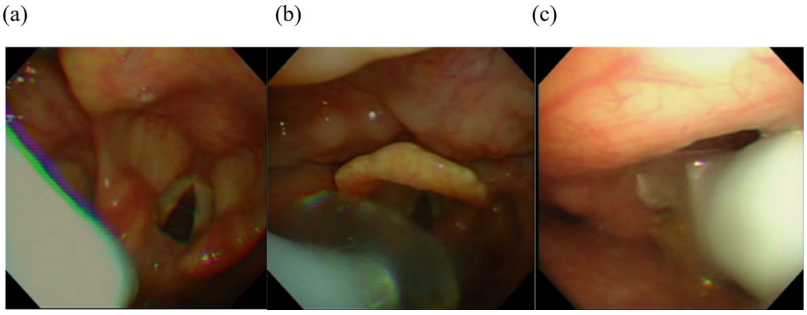
Figure. Cuff Inflation Technique to Improve Endotracheal Tube (ETT) Alignment



Inflation of the ETT cuff can help align the ETT tip with the glottic opening while under continuous indirect vision with a flexible fiberoptic scope. (a) View via the flexible fiberoptic scope showing poor alignment of the ETT and the glottic opening. (b) Following inflation of the cuff with ~10 mL of air, the ETT tip is redirected upward towards the glottis. (c) The ETT is advanced into the glottis where the cuff is deflated, allowing the ETT to be advanced farther into the trachea.

counterclockwise) of the ETT outside the nares can be helpful for adjusting the lateral alignment of the ETT prior to and during ETT advancement. After the ETT is sufficiently advanced into the trachea, the cuff is reinflated and the ETT secured, completing the successful nasotracheal intubation.

DISCUSSION

Various factors and circumstances can increase the difficulty of performing a fiberoptic nasal intubation. Induction of general anesthesia causes relaxation of the airway musculature that can lead to collapse of the airway as the soft palate and tongue approximate the posterior pharyngeal wall.[5,7,8] This leaves very little space remaining in the pharynx to successfully maneuver the flexible fiberoptic scope tip and locate the glottis. Occasionally, the ETT does not align well with the glottic opening and is hard to successfully manipulate and direct into the trachea despite being able to obtain a perfect view for intubation. Sometimes, the ETT may even become stuck on a tracheal ring or the vocal cords during advancement. In addition, repeated attempts further increase the risk of injury to the glottic tissues.

The main advantage of combining the ETT cuff inflation technique with use of the flexible fiberoptic scope is that the tip of the ETT is visualized as the ETT is advanced which helps avoid impingement of the ETT. Following cuff inflation with air from a syringe, the cuff redirects the tip of the ETT anteriorly or upward toward the glottic opening. The ETT can then be advanced into the glottis where it is deflated and introduced further into the trachea, all under continuous indirect vision. After the ETT is sufficiently advanced into the trachea, the cuff can be reinflated to properly secure the airway.[2,7] Inflation of the ETT cuff in the pharynx helps to center the ETT tip and to direct it anteriorly toward the larynx. There is no set volume of air that is needed to accomplish this movement, instead the volume should be adjusted to accomplish the needed ETT movements. Cuff inflation works by lifting the tip of the ETT off the posterior pharyngeal wall.[7] The operator can ensure under continuous indirect vision that the cuff is inflated when the ETT tip is in the laryngopharynx, cephalad or superior to the caudal border of the laryngeal inlet, and can also direct the ETT (mediolaterally) into the laryngeal inlet as it is being lifted off the posterior pharyngeal wall.

This technique does not require any additional equipment or manipulation of the head or neck and may be useful in cases of limited mouth opening, although such cases may carry undue risk of a difficult airway which may necessitate alternative approaches. In addition, this method allows intubation with full view of the larynx via the flexible fiberoptic scope and is not a blind technique, allowing safe intubation and manipulation of the ETT under continuous indirect vision.

CONCLUSION

The ETT cuff inflation technique has been suggested as an effective alternative technique when combined with the use of a flexible fiberoptic scope during nasotracheal intubation to assist with alignment, navigation, and passage of the ETT.

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