

A Reliable Method of Securing The Endotracheal Tube in Patients Undergoing Neurosurgical Procedure in the Prone Position

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Citation

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Abstract

Background: Unplanned endotracheal tube dislodgement in the prone position can be catastrophic. Even after a perfect intubation, disconnection between the connector and the tube has been known to occur. It is on this background that we sought a reliable method of ensuring that the endotracheal tube remains in the intended position. **Method:** This was a prospective study done over a 4 year period. Following routine oro or nasotracheal intubation, the endotracheal tube connector was secured with an adhesive tape to the tube itself. The integrity of the connection was assessed physically and monitored throughout the course of the anaesthetic. **Results:** Of the 385 patients managed in this way, there was no incident of inadvertent extubation (100%). **Conclusion:** We conclude that securing the tube to the connector successfully prevents inadvertent extubation in the prone position. We advice that this technique be adopted in hospitals without a protocol for securing the endotracheal tube in this position.

INTRODUCTION

Securing the airway is one of the most critical aspects of ventilation and resuscitation.¹ The potential exists for serious morbidity and mortality related to endotracheal-tube migration during patient care especially in the prone position. The combined effect of salivary secretion and the weight of the airway devices under gravity encourage inadvertent extubation. Furthermore, because evidence suggests that the incidence of endotracheal-tube dislodgment after successful tracheal intubation may be greater than previously suspected, properly securing the endotracheal tube has been emphasized. Various methods of endotracheal tube (ETT) fixation have been described, including stitching the ETT, placing a transparent dressing over the face to secure the ETT, and intranasal threading of an infant feeding tube to tie over the ETT.^{2,3,4} All these may not prevent dislodgement of the tube from the endotracheal tube connector hence our device.

METHOD

After obtaining institutional ethical approval and informed consent from the patients, we used the technique among neurosurgical patients. Following routine induction of anaesthesia and oro/naso tracheal intubation, the tube is secured at the angle of the mouth/ bridge of the nose using

Y-shaped adhesive strips and then the endotracheal tube connector was secured to the endotracheal tube using adhesive strips. The patients were then turned to the prone position. The integrity of the connection was assessed physically and monitored throughout the course of the anaesthetic by an independent assessor. This was a prospective study and evaluated 385 patients over a 4-year period. The data collected was analyzed using SPSS 17.

Limitations: We had no control group but assumed the sporadic cases of inadvertent extubation as our control

RESULTS

Of the 385 patients managed in this way, there was no incident of inadvertent extubation (100%).

DISCUSSION

Accidental tube dislodgement may not be common during surgery but is potentially life threatening.¹ This will be more so during neurosurgical procedures particularly in the prone position for many reasons. First of all the patients are draped with sterile clothes. Furthermore, the anaesthetists have to provide the operating team with maximal space and range of movement at the head of the patient while avoiding jeopardizing the patients' airway. Also in the prone position, the anaesthetists may not be able to manage the tube sticking

out from under the table. There is also a need to ensure that techniques used to secure the tube should not interfere with the surgical procedure or provide a source of infection. Unnecessary movement of the tube can cause trauma to both the larynx and trachea.

Many methods have been advocated to secure the endotracheal tube. Adhesive tapes in thin strips or Y shapes have been used.³ Yoshihide et al have described a method of using sutures taken through the nasal septum to secure the nasotracheal tube.² Umbilical tapes or discarded oxygen tubing have been used. A method using the RAE tube and use of the Mayo table to secure the endotracheal tube has also been described.⁵ There are also commercially manufactured endotracheal tube holders which are not available in our environment.⁶ All these techniques have disadvantages, such as injury to the nasal septum as a result of the sutures cutting through it, ischaemic necrosis of the nasal septum, allergy to the strips, availability of commercial gadgets and the need to learn a hitherto unknown technique.

Unfortunately, these methods focus solely on preventing dislodgement of the tube from the trachea but we have focused on the disconnection between the tube and the connector which happens although occasionally but very important. We have also found that the technique using an adhesive tape to hold the connector to the tube to be very secure during surgical manipulation and have not

encountered any problems such as inadvertent extubation, septal damage, or pressure necrosis. In addition, we have found that patients tolerate this technique of fixation well during turning and that in the postoperative period it is easy to remove the tape as the patient is positioned supine.

We conclude that securing the tube to the connector successfully prevents inadvertent extubation in the prone position. We advice that this technique be adopted in hospitals without a protocol for securing the endotracheal tube in this position.

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