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Sling Gauze Technique for the Positioning of RAE Tube in Infants Undergoing Head and Neck Surgeries

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ABSTRACT

In order to maintain anaesthesia with minimal complications, one of the vital steps is securing a stable oral endotracheal tube. The endotracheal tube may be displaced and become unstable due to suctioning, change in the position of the head and patient care. Poor fixation of the endotracheal tube is one of the leading causes of accidental extubation. The ideal endotracheal tube stabilisation method must allow changes in position of the infant during care while simultaneously minimising movement of the tube. The relatively short tracheal length in small children and infants is a major reason why placing the endotracheal tube (ETT) in the proper position may be difficult. The endotracheal tube may migrate cephalad with neck extension and caudally with neck flexion due to changes in the position of the head, such as extension or flexion of the neck. Sometimes, a well secured tube may also cause abnormalities in ventilation due to the dynamic positioning during surgeries on the cranium. Here, we present to you a technique where the oral endotracheal tube fixation at the lips, can be manoeuvred to change its depth of insertion by millimetres by a simple easily available device in the operation theatre.

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Background

In order to maintain anaesthesia with minimal complications, one of the vital steps is securing a stable oral endotracheal tube and there are different methods to do so in Neonates [1].

The endotracheal tube may be displaced and become unstable due to suctioning, change in the position of the head and patient care [2-3]. There may be ineffective ventilation of the lungs, in case the endotracheal tube is too short. The endotracheal tube may collapse in case it is too long, resulting in selective ventilation of the lung [4].

The most common cause of accidental extubation has been reported to be due to poor fixation of the endotracheal tube4. Unplanned extubation and re intubation following it can inflict additional pain and trauma to the infant. Pharyngeal trauma and trauma to the mouth from the laryngoscope may occur due to repeated intubation attempts and the vocal cords and trachea from the endotracheal tube. Repeated removal of endotracheal tape adhesive may cause skin loss which may lead to infection and further pain. It is possible to avoid these complications if the tube is secured well after the first successful intubation [5-6].

Sometimes, a well secured tube may also cause abnormalities in ventilation due to the dynamic positioning during surgeries on the cranium. Here, we present to you a technique where the oral endotracheal tube fixation at the lips, can be manouvered to change its depth of insertion by millimetres by a simple easily available device in the operation theatre.

Case Report

A nine month female infant of 7.5kg with unicoronal craniosynostosis was planned for fronto orbital advancement. The patient was induced with inj. Fentanyl 15 mcg, inj. Propofol 15 mg and inj. Cisatracurium 2mg iv. The patient was then intubated with size 4.0 RAE tube and fixed at 12 cm. A gauze was placed around the tube to prevent the pressure of the plastic endotracheal tube on the lips to prevent pressure sores from occurring.

In addition to the gauze, a loose gauze of about 10 cm was folded along its breadth and inserted in the form of sling around the endotracheal tube. This was done to gently apply traction on the tube in case of abutting of the tube on the carina or bronchus, due to inadvertent endo-bronchial insertion of the tube. The inadvertent endo bronchial insertion would occur during the dynamic positioning of the patient's head by the surgeon to obtain adequate access to perform the surgery and would be identified by increase in the peak airway pressure.

Figure 1: The depiction of the Sling Gauze Technique where the gauze is wound around the endotracheal tube and handled by the Anaesthetist.

The patient was placed on volume control mode of ventilation with a tidal volume of 75ml, PEEP of 3 cm of H20, Respiratory rate of 30/min and I:E:: of 1:2. The surgery was completed uneventfully and the patient was extubated once the patient was fully awake, breathing spontaneously, generating adequate tidal volume and moving all four limbs.

Discussion

Movement of the infant should be allowed while minimising movement of the tube which will depend on an ideal endotracheal tube stabilization. It should also decrease the number of times the tube needs re-taping or adjustment as each episode of tube manipulation may increase the risk of tube dislodgement. Depending on whether the infant is nasally or orally intubated the optimal method may change [6].

A number of methods such as clinical signs, respiratory function monitors, exhaled carbon dioxide (CO2) detectors and ultrasound may be utilized to confirm the correct tube placement however the Chest X ray is the gold standard to confirm the position of the endoctracheal tube.

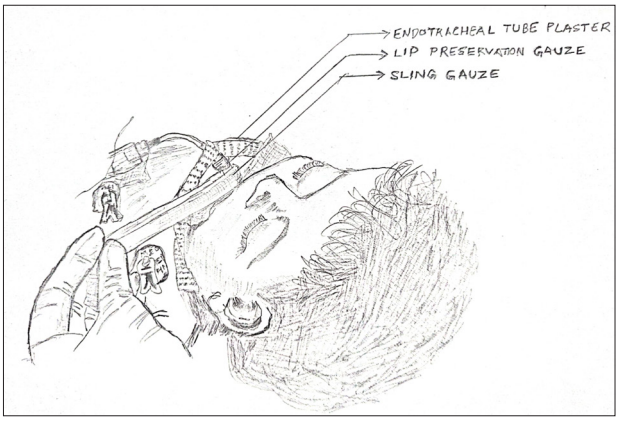

Figure 2: A diagrammatic representation of Figure 1 indicating the application of the Lip Preservation Gauze and the Sling Gauze as methods to prevent airway injury

A visual guide to place the ETT in an optimal position are the presence of depth marks located in the ETT tip for the clinician performing the tracheal intubation. Placing an ETT with the depth mark just below the vocal cords during intubation will position it in the mid-trachea [7-8].

Placing the endotracheal tube (ETT) in the proper position following endotracheal intubation may be difficult due to the relatively short tracheal length in small children and infants. The ETT may migrate cephalad with neck extension and caudally with neck flexion due to changes in head position, such as neck extension or flexion [9].

This technique forms an easily accessible method to gently apply traction and remove the pressure of the endotracheal tube on the carina or the bronchus in case of inadvertent endobronchial intubation due to positioning of the head during surgery. It is a method that avoid manipulation of the airway during crucial steps during surgery and prevents the field from being unsterile while the surgery is being conducted.

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