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Tracheocutaneous Adhesion with Cartilage Preservation Technique: A Safe Procedure with Less Complications

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ABSTRACT

Tracheostomy is known to be one of the most common surgeries in otolaryngology since decades. The Indications for pediatric tracheostomy have been observed to be shifted from acute infectious airway compromise to the need for prolonged ventilator support in the chronically ill patient. Tracheostomy can keep the airway safe and secure but the accidental decanulation or tube blockage can happen at any time. Such complications can result in devastating events due to the opportunity of false tract during reinsertion especially in patient with anterior neck mass. In our article, we aim to publish our technique which is Tracheocutaneous adhesion by suturing the stoma to the skin directly during the surgery to make the stoma open directly in the airway to eliminate the risk of false tract during reinsertion and the consequences following that.

INTRODUCTION

Tracheostomy was first observed in Egyptian drawings in 3600 BC and performed frequently during the 1800's diphtheria epidemic [1]. However, the primary indication for pediatric tracheostomy has shifted from acute infectious airway compromise to the need for prolonged ventilatory support in neurologically compromised children [2] which can be explained by the development and spread of vaccines and the improvement in the intensive care and anesthesia increased the use of intubation [3]. One of the most common complications was blockage or displacement of tubes [4]. Such complications can result in devastating events due to the opportunity of false tract during reinsertion especially in patient with anterior neck mass. In addition, the traditional way of tracheostomy used to incise or remove part of the tracheal cartilage which might lead to complications at the time of decanulation. An invented technique has been discussed in this article to avoid the false tract during reinsertion beside the consequences of loss of tracheal cartilage.

SURGICAL TECHNIQUE

Tracheostomy was performed in Theatre for all patients under general anaesthesia with endotracheal intubation; patients were positioned in the usual manner with shoulder roll and hyperextended neck. A transfer cutaneous incision was given midway between the sternal notch and the cricoid cartilage, dissection was done plane by plane medially by vertical separation of the fascia and the strap muscles till we reached the trachea, at that level the cricoid identified to locate the second and third tracheal ring, after that a horizontal incision using 11 blade was given between the second and third tracheal ring without humiliating any cartilage followed by dilatation

with spreader (Figure 1). In order to keep the incised stoma patent and avoid the risk of false tract during reinserting the tracheostomy tube the edge of the stoma was sutured to the skin using Vicryl 4.0 suture (absorbable suture) the size of the stoma were planned to be compatible with the appropriate size tracheostomy tube for the patient's age (Figure 2).

Figure 1: After exposing the trachea, a transfer incision is given between 2nd and 3rd tracheal ring followed by dilatation with a tracheal dilator.

Figure 2: The trachea sutured to the skin, by placing 6 sutures at 12, 2, 4, 6, 8 and 10 O'clock and held by artery forceps without ties.

In the beginning 6 sutures were applied at 12, 2, 4, 6, 8 and 10 O'clock and held by artery forceps without ties, once all sutures placed and insured in good place we preceded with tying all the sutures so the tracheocutaneous adhesion achieved at this level (Figure 3).

Figure 3: Tracheocutaneous adhesion achieved after tying all sutures followed by closing the edges of the wound, at this level stoma is secured and patent.

Finally one to two sutures were given at the edge of the cutaneous incision to close the wound, during the sutures patients were ventilated well on mechanical ventilator with some degree of leak. The stoma became patent and placing the tube is easier (Figure 4).

First change was carried on after 7 days which was easier comparable with the traditional way as there is no risk of false tract insertion and there is no stay suture. The patients were followed until 6 months later with no documented single complication and accidental decantation at home managed by the family by reinserting the tube without any adverse events.

We believed that such technique is ideal for high risk patients of incidental decantation and loss of the airway (patients with anterior neck masses) with full respect for the tracheal cartilage which will decrease the adverse events of airway loss and the late complications of suprastomal collapse and tracheal stenosis. Such procedure can ensure safe airway and decrease the number of mortality rate related to the loss of airway during

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accidental decanulation during hospital stay and after being discharged home, the only drawback which might need longer follow up is the need for the surgical closure at the time of decanulation.

Figure 4: Tube can be inserted smoothly by any one as there is no chance of false tract during the insertion.

DISCUSSIONS

The unique part of such technique is the full cartilaginous respect in which no single tracheal ring were incised or humiliated. Moreover the tracheocutanous adhesion technique ensures the safe reinsertion in case of accidental decantation and decrease the chances of false tract insertion especially in patient with anterior neck masses. Many techniques were mentioned in the literature which ensures safe reinsertion of the tube. Inferiorly based tracheal flap through second, third and forth tracheal ring which was later fixed to the skin to secure the lumen of a tracheotomy tube was designated by Bjork [5]. A vertical tracheal incision through two or three tracheal ring was mentioned in the literature followed by application of the stay sutures on the sides to secure the stoma during the first tracheal change [6]. A window resection technique can be performed by 11 blade or tracheotomy punch device in the anterior tracheal cartilage [6]. Starplasty is another technique in which a plus shape incision is made through the anterior tracheal wall then to be sutured to the skin [7]. However, all these techniques includes disruption to at least one tracheal ring and some may extent the damage to two or three tracheal rings in which such damage can affect the tracheal structure and limits the management options later in case of late complications.

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