

# Tracheal stenosis causing weaning and decannulation problem - a case report

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## Abstract

*Approximately 90% of all cases of tracheal stenosis in children and adults result from endotracheal intubation. Intubation causes injury at the level of the glottis due to pressure between the arytenoids cartilages. Intubation causes injury in the subglottis due to complete cartilaginous ring or can cause injury distally in the trachea. Pressure and/or motion of the tube against the cartilaginous framework may cause ischemia and necrosis. Duration of intubation is the most important factor in the development of stenosis. Size of the tube is also important. The most common presentation of the development of stenosis. Size of the tube is also stridor and H/O intubation. Sometime the stridor is only present with agitation or crying. Other S/S include feeding difficulties with poor weight gain, poor phonation and dyspnoea and exertion. A 32 years old lady was admitted into Apollo Hospitals Dhaka with malfunction of VP shunt. She had H/O of several times intubation both in ICU and O.T. Last time we tried for extubation in ICU but failed. So that tracheostomy was done. After 2 weeks full corking of tube was done. But the patient could not tolerate. Prolonged or repeated tracheal intubation may lead to progressive tracheal stenosis presenting week or months later. Tracheal stenosis should be considered in the differential diagnosis of any patient who has recently been in an intensive care unit and who presents with exertional dyspnoea or monophonic wheeze, particular when it is unresponsive to bronchodilators. Such patients require immediate referral to hospital.*

**Key Words:** Tracheal stenosis, endotracheal intubation

## Introduction :

Incidence of Laryngotracheal stenosis is on rise in recent years because of increased incidence of prolonged intubation for extensive & complex neurological conditions, cardiovascular, head & neck surgeries and increased incidence of patients coming out of intensive & critical care units. Approximately 90% of all cases of tracheal stenosis in children and adults result from endotracheal intubation.<sup>1</sup> Intubation causes injury at the level of supraglottis, at the level of the glottis due to pressure between the arytenoid cartilages. Intubation causes injury in the subglottis due to complete cartilaginous ring or can cause injury distally in the trachea. Pressure and/or motion of the tube against the cartilaginous framework may cause ischemia and necrosis.<sup>2</sup>

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Duration of intubation is the most important factor in the development of stenosis. Severe injury has been reported after 17 hours, but it may occur much sooner. A 7-10 days period of ICU intubation is acceptable, but the risk of laryngotracheal injury increases drastically after that.<sup>3</sup>

Size of the tube is also important. Tubes should be no larger than 7-8 mm in internal diameter for adult males. Tubes should be no larger than 6-7mm in internal diameter for adult females. The size of the endotracheal tube needed correlates best with the patient's height.<sup>4</sup>

Tracheal stenosis is a relatively uncommon problem that has a variety of etiologies. It frequently has an insidious onset, and the early signs and symptoms may be disregarded or mistaken for a variety of other disorders. Shortness of breath on exertion, which may progress to dyspnea at rest, a brassy cough, recurrent pneumonitis, wheezing, stridor and cyanosis may all be a part of the clinical presentation. Because many of these symptoms, especially dyspnea on exertion and wheezing, can be easily attributed to other respiratory disorders such as chronic bronchitis and asthma, the patient's past medical history becomes particularly important. A previous history of endotracheal intubation should not be taken lightly during evaluation of a patient with upper airway symptomatology. Only awareness of the possibility that tracheal stenosis might exist will lead to its early recognition.

#### **Case Report:**

A 32 years old lady was admitted into Apollo Hospital Dhaka with respiratory distress and dysfunction of VP Shunt. In Jan 2005, she was operated in Apollo Hospital Chennai for left CP angle meningioma with obstructive hydrochalus. After 2 months she developed VP Shunt dysfunction for which she was admitted into a private hospital in Dhaka. There previous shunt was removed & re-positioning of VP Shunt done. Then she developed shunt infection, ventriculitis & extruded peritoneal end and was transferred to Apollo Hospitals Dhaka. There she underwent following 3 surgical procedures under GA-

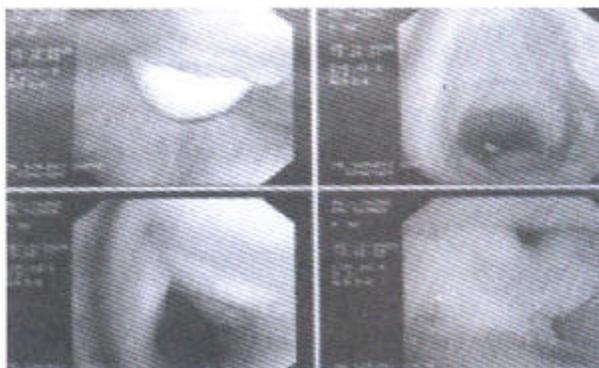
- 1) Removal of exteriorized VP Shunt and external ventricular drainage
- 2) Repositioning of obstructed right sided EVD
- 3) Bilateral VP Shunt

So she had H/O of several times intubation both in ICU and O.T. Last time we tried for extubation in ICU but failed. So that tracheostomy was done. After 2 weeks full corking of tube was done. But the patient could not tolerate. So that planning for decannulation of tracheostomy tube was withheld.

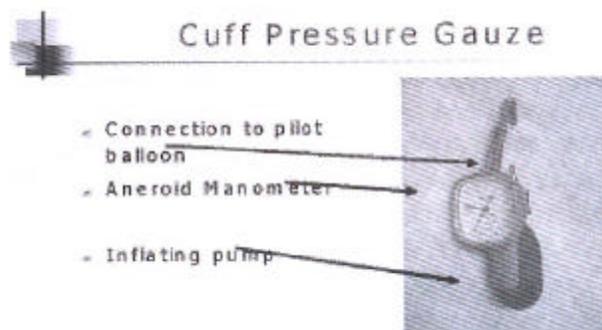
X-ray chest, X-ray soft tissue neck AP and Lateral view show tracheal narrowing. Then flexible endoscopy under GA was done for evaluation of larynx. (flexible endoscopy under topical anaesthesia was avoided since secretions, oedema and bronchoscope itself can precipitate sudden, complete airway obstruction). Endoscopy showed tracheal stenosis as well as supraglottic oedema. After that supraglottic oedema subsided with steroid therapy.



**Fig.1** X-ray shows tracheal stenosis



**Fig.-1** : Endoscopy showed tracheal stenosis above the tracheostoma as well as supraglottic oedema.



**Discussion:**

Several major sequelae of prolonged tracheal intubation were recognized after the introduction of mechanical ventilation for respiratory support during the poliomyelitis epidemics of the 1950s, including laryngeal damage, subglottic stenosis and tracheal stenosis at the site of the tracheal cuff. Studies into stenosis at the cuff site showed that the main cause was the pressure exerted on the tracheal mucosa by the cuff<sup>5</sup>. A cuff pressure greater than about 30 mm Hg exceeds the mucosal capillary perfusion pressure, causing mucosal ischaemia, which may lead to ulceration and chondritis of the tracheal cartilages<sup>6</sup>. These circumferential lesions heal by fibrosis, leading to a progressive tracheal stenosis. The incidence of tracheal damage and tracheal stenosis after intubations can be reduced by the use of tracheal tubes with cuffs that have a high volume and large area of contact with the tracheal mucosa, thus minimizing the pressure exerted.<sup>7,8</sup> The use of such high volume, low pressure cuffs is now standard practice in intensive care units. However, tracheal stenosis may still occur and in one prospective study of critically ill patients, 11% of patients who had been intubated with high volume low pressure cuffed tubes developed tracheal stenosis that were 10-50% of their tracheal diameter at the cuff site<sup>9</sup>.

Tracheal stenosis after intubation usually presents as shortness of breath and either or both inspiratory stridor and expiratory wheeze on exertion. The wheeze heard in acute upper airway obstruction is classically described as monophonic whereas that heard in acute asthma is described as polyphonic. However, this distinction may not be done - as in the case of our patient or may not actually suggest the correct diagnosis. Tracheal stenosis after intubation is therefore often misdiagnosed as asthma and the diagnosis is not suggested at initial presentation in as many as 44% of patients<sup>10-12</sup>. Symptoms do not usually occur at repeat until the trachea has stenosed to 30% of its original size and it may take as long as three months before most stenoses are seen by a doctor<sup>13</sup>.

A history of progressive dyspnoea and wheeze unresponsive to bronchodilators, coupled with a high index of suspicion in patients who have recently undergone a prolonged period of tracheal intubation, are probably the most important indicators of tracheal stenosis. The diagnosis may be confirmed with plain radiography, computed tomography or endoscopy.

Prolonged period of tracheal intubation may lead to progressive tracheal stenosis presenting weeks or months later. Tracheal stenosis should be considered in the differential diagnosis of any patients who has recently been intubated in an intensive care

unit and who presents with exertional dyspnoea or monophagic wheeze particularly when it is unresponsive to bronchodilators. Such patients require immediate referral to hospital.

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