Severe Tracheal Stenosis with Stridor: An Uncommon Complication of Prolonged Ventilation

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ABSTRACT

Post intubation (PI) and post tracheostomy (PT) tracheal stenosis are common among patients requiring prolonged ventilation. However, patients presented with symptomatic severe tracheal stenosis are rare. We report a middle aged man presented to us with a left basal ganglia bleeding secondary to hypertensive emergency with an initial Glasgow Coma Scale (GCS) of E2V5M5 (11/15). He was intubated for surgical aspiration of hematoma in the operating theatre and was sent to the Intensive Care Unit (ICU) for weaning. His stay was complicated with restlessness and aspiration pneumonia. A percutaneous tracheostomy was done in the ICU at day seven of hospitalization. After one week, the tracheostomy tube dislodged and generated noisy breathing; however patient was not tachypneic nor distress. An urgent Computed Tomography (CT) Thorax showed narrowing of the trachea at level of thoracic inlet – sternoclavicular junction. An emergency tracheostomy and examination under anaesthesia was planned by the Otolarhinolaryngology (ORL) team. Direct laryngoscopy showed one centimeter stenotic lesion with matured scar and granulations above the new tracheostomy site. The entire procedure was uneventful. We highlight (1) the importance of ETT cuff pressure monitoring, (2) urgent definitive management of impending total airway obstruction and (3) uncommon presentation of symptomatic severe tracheal stenosis.

Key Words: Tracheal stenosis, cuff pressure

INTRODUCTION

Tracheal and subglottic stenosis is a common post intubation complication and may develop due to different reasons. One important reason is the endotracheal tube cuff pressure. The optimal cuff pressure is determined to be about 20-30cm H2O so that aspiration pneumonia due to low cuff pressure and tracheal stenosis due to high cuff pressure can be avoided as much as possible.¹,² As the cuff pressure can be estimated approximately using palpation and minimal occlusive volume techniques, the accuracy of these techniques should be studied. It is recommended that the best way to measure endotracheal tube cuff is use a cuff manometer, and when there is no access to it, the minimal occlusive volume would be a better alternative as compared to palpation method, so the the cuff pressure is kept within a proper and ideal range to avoid tracheal stenosis.

CASE REPORT

A 44 year-old obese gentlemen who had hypertension for 5 years was admitted to our center for a diagnosis of left basal ganglia bleed secondary to hypertensive emergency. Aspiration of hematoma was successfully performed by the neurosurgical team and managed in the ICU postoperatively. Due to poor GCS recovery, a percutaneous tracheostomy was done. However, the tracheostomy tube was accidentally decannulated one week later and the patient developed noisy breathing for a few days. On examination patient had on and off stridor on deep inspiration; however he was not tachypneic and was able to maintain oxygen saturation under room air between 95 – 98%. His vital signs were normal and blood investigations were within normal limits except for platelet levels of just 41,000/ml.
DISCUSSION

PI and PT stenosis remains an important cause of acquired tracheal obstruction. When the cuff pressure exceeds the mucosal capillary pressure (30 mm Hg) of the trachea, the mucosa that lies between the cuff of the balloon and the underlying cartilages develops ischemia. Long standing ischemia can lead to ulceration and chondritis of tracheal cartilages, followed by fibrotic healing, leading to progressive tracheal stenosis. It has been suggested that using standardized instrumentation to measure cuff pressure would help to decrease the possibility of injury resulting from endotracheal intubation. The inability of clinicians to determine endotracheal tube cuff pressure by the traditional standard method of palpation of the pilot balloon warrant the usage of a cuff manometer.

Usual factors responsible for stenosis are: cuff pressure, size of the tube relative to the tracheal lumen, duration of intubation, cardiovascular status during intubation, movement of tube during the period of intubation, sex and age of the patient, material from which cuff is manufactured and the possible adverse effects of steroids. However, tracheal stenosis can also be developed by intubation lasting as short as 24 hours only. These patients may remain asymptomatic for a variable period and then develop difficulty in expectoration and dyspnea on exertion and can progress to airway obstruction with the development of a stridor.

The acute airway management for a patient with a stridor following PI stenosis should always be dependent on the skills and knowledge of the anaesthesiologist. An awake fiberoptic intubation should be the best method. This can be done either by inhalational induction or via TCI method as per our patient. The reason why we chose the awake fiberoptic intubation to be done via TCI is that the patient was obese and we were doubtful regarding the anatomical structure of the airway. In addition, the anaesthesiologist in charge of the patient is well trained in performing awake fiberoptic intubation via TCI method.

CONCLUSION

It is common for ICU patients to develop PI and PT stenosis. However, it is uncommon for a stenotic patient to develop acute stridor. A constant and regular monitoring of the tracheal cuff pressures are highly recommended to prevent stenosis. It is crucial for a trained anaesthesiologist to have the experiences and ability to manage a patient with airway emergencies.

Conflict of interest
No conflict of interest was declared by the authors.

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