An Unusual Presentation of a Case of Tracheal stenosis

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Iatrogenic airway injury after endotracheal intubation continues to be a serious clinical problem. Despite technological advancements and more skillful patient care in ICUs, tracheal and laryngotracheal stenoses still constitute an important group of iatrogenic sequelae after intubation.

CASE REPORT

A 23 year old female with features of amniotic fluid embolism and shock following lower segment caesarean section (LSCS) was referred to our ICU. She had unremarkable medical/surgical history. She initially received subarachnoid block (SAB) for LSCS but had to be administered general anaesthesia due to incomplete SAB. The surgery was uneventful. However, at the end of surgery, when the patient was extubated, she had an episode of arterial desaturation requiring re-intubation and was shifted to our ICU where she was paralyzed and mechanically ventilated. She was managed on the lines of amniotic fluid embolism with shock and coagulopathy. A tracheostomy was performed with 7.5 mm cuffed tracheostomy tube on 21st day and the delay was due to her coagulopathy. Later in the course, her haemodynamic & metabolic parameters improved and spontaneous breathing trials (SBT) were started. However, she used to develop episodes of breathing difficulty, diaphoresis, tachypnoea, tachycardia with hypertension. At times, she was agitated, restless and had sleep disturbances. In between such episodes, she however remained comfortable with normal breathing pattern. Initial medical consultation revealed no plausible cause. A normal CT scan ruled out any intracranial pathology as the possible cause of her symptoms. Eventually, psychiatry consultation was done and patient was put on oral lorazepam with a possible diagnosis of either postpartum or ICU psychosis. Following this, agitation and restlessness experienced by the patient decreased. However, she still had occasional episodes of breathing difficulty, which were aggravated with the patient's increased efforts at spontaneous respiration. Oral lorazepam was continued for 1 week and once the patient had no episode of respiratory difficulty for 48 hours, she was given a trial of decannulation. However, immediately after decannulation, she had difficulty in breathing with features of respiratory obstruction requiring recannulation. Subsequently, a fibre optic bronchoscopy through the tracheostomy tube revealed tracheal lumen narrowing 5 cm above the carina due to thick granulation tissue approximately 2 cm long and 3 cm broad. This was considered responsible for her intermittent dynamic respiratory obstruction. This condition required insertion of a size 7 mm Moore’s tracheostomy tube bypassing the obstruction by ENT surgeons with a short course of injectable steroids. Repeat bronchoscopy after 1 month revealed that the granulation tissue had subsided. Subsequently the patient was successfully decannulated and discharged from the ICU.

DISCUSSION

The extensive use of endotracheal tubes with a large area of contact (high volume, low pressure cuff) the incidence of post intubation tracheal stenosis in intensive care units has remarkably reduced. However, post intubation stenosis still remains an important cause of acquired tracheal obstruction. When the cuff pressure exceeds the mucosal capillary pressure (30 mm of 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. According to one study, 11% of the critically ill patients developed tracheal stenosis at the cuff site following intubation even with high volume low pressure cuffed tubes. 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 etc. Multiple other factors predisposing to the development of postintubation and post-tracheostomy stenosis have been suggested, including: high tracheostomy site, prolonged intubation period, traumatic intubation, history of previous intubation or previous tracheostomy, excessive corticosteroid steroid usage, radiation therapy for oropharyngeal and laryngeal cancer. However, tracheal stenosis can also be

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developed by intubation lasting as short as 24 hours only.6

The possible causes of stenosis in our patient could be prolonged intubation, movement of the tube during the time patient was intubated, initial hypotension predisposing the patient to mucosal ischemia due to decreased mucosal capillary pressure and coagulopathy making the patient more susceptible to tracheal injury during periods of tube movement. We ruled out stenosis to be post-tracheostomy as the granulation tissue was present below the distal end of tracheostomy tube.

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. They usually remain asymptomatic until the trachea has stenosed to 30% of its original diameter, and it may take as long as three months before the diagnosis.7 Symptoms in our patient however developed with the tracheostomy tube in situ, which is not a very common presentation. Moreover, the patient had atypical symptoms in the form of anxiety, restlessness, sleep disturbances, respiratory difficulty which increased with increase in breathing efforts, diaphoresis, tachycardia and tachypnoea which led us to believe that probably the patient was suffering from either ICU or puerperal psychosis. As the patient's symptoms improved with initiation of oral lorazepam, it further strengthened our belief.

It has been estimated that between 12.5% and 38% of conscious patients admitted to critical care settings experience Intensive Care Unit psychosis.8 As our patient's symptoms improved with oral lorazepam she was given a trial of decanulation. Following this however the patient complained of increased breathing difficulty and was recannulated. Suspecting some other cause of patient's symptoms, bronchoscopic evaluation was done which revealed thick tracheal granulation tissue 2 cm in length, 5 cm above the carina. This was managed by ENT surgeons by inserting a size 7 mm Moore tracheostomy tube bypassing the obstruction along with a short course of injectable steroids. The Moore tracheostomy tube is an extra long cuffless tracheostomy tube which can be trimmed for individual specifications. It is flexible, made of radiopaque silicone and is designed to maintain an adequate airway while providing support in the stenotic cervical or thoracic trachea.9

Tracheal stenosis can be diagnosed by spirometry, the results of which are often complicated by concomitant lung diseases. Chest X-ray rarely detects stenosis but a CT scan will provide precise information regarding exact location, extent of stenosis and the nature of surrounding soft tissues. Bronchoscopy, however, is the mainstay of diagnosis and it also rules out other diseases (i.e. vocal cord palsy, tracheomalacia). A simple bronchoscopic procedure for tracheal stenosis had been developed by Freitag et al,10 for the classification of tracheobronchial stenosis. The type of stenoses includes 2 groups. 1. Structural stenosis (stenosis due to exophytic intraluminal growth, granulation tissue, extrinsic compression, airway distortion, kinking, bending, shrinking or scarring. 2. Dynamic stenosis (stenosis due to triangular- or tent-shaped airway, in which cartilage is damaged or due to inward bulging of the floppy posterior membrane).10

Intermittent nature of breathing difficulty experienced by our patient, which was aggravated by patient's increased respiratory efforts could be because of the dynamic nature of tracheal stenosis.

In conclusion, tracheal stenosis can have varied presentations. Moreover, in rare situations it can also present with the tracheostomy tube in situ, wherein bronchoscopy can be helpful in early diagnosis and timely management.

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