Unusual case of endotracheal tube obstruction by caseous necrotic material

Sir,
Tuberculosis is a social disease with medical implications. In spinal tuberculosis, surgery is performed for either deformities and neurologic deficits and/or drainage of cold abscess.

Endotracheal intubation is the cornerstone in the anesthesia practice; however, the tube itself may become a source of airway obstruction and problems due to the tube should be recognized and rectified immediately. We report an unusual case of endotracheal tube (ETT) blockage with a caseous necrotic material in a patient with spinal tuberculosis with no signs and symptoms of pulmonary tuberculosis. A 12-year-old girl was posted for decompression surgery for Pott’s spine at the level of the dorsal 5th and 6th vertebra. The routine tests including chest X-ray were normal. The patient was on treatment with antitubercular drugs for 6 months. The sputum for acid-fast bacillus was negative. Clinical examination including auscultation of the chest was not significant. The surgery was performed with the patient in the prone position. The peak inspiratory pressure (PIP) was 18-20 cmH$_2$O, oxygen saturation (SpO$_2$) was 100%, and end-tidal carbon dioxide (EtCO$_2$) was maintained between 32 and 35 mmHg. Sixty minutes later, there was a sudden increase in heart rate (HR), PIP, and EtCO$_2$. HR increased up to 150/min, EtCO$_2$ to 45-60 mmHg, and PIP to 40 cmH$_2$O. However, SpO$_2$ remained 100% all through the event. The ETT and circuit were checked and found to be patent and not kinked. There was minimal aspirate on suctioning. The tube position was undisturbed, but the breath sounds were decreased globally and there was a resistance in the bag on manual ventilation. Despite ensuring adequate analgesia and relaxation, the situation worsened. Immediately, the patient was turned to the supine position and ETT was changed to a new tube. The first tube was blocked with solid material. The ventilation was smooth now and the vital parameters set within the pre-event values. The patient was turned prone again. The surgery proceeded uneventfully until toward the closure when again there was an increase in the PIP, EtCO$_2$, and HR. Again, there was a minimal thin aspirate on suctioning.

A fiberoptic examination done before extubation showed granulomatous material close to carina. This was not disturbed for fear of caudal dislodgement. The patient was extubated uneventfully. The first tube was blocked with some solid material. The caseous material probably explains the gradual blockage of the tube at the onset of the event and minimal aspirate on suctioning. Gram staining of the caseous aspirate showed degenerative pus cells, cocci, and bacilli while Ziehl-Neelsen staining was positive for acid-fast bacilli. Histopathology showed only necrotic material which could have been caseous [Figures 1 and 2]. A postoperative computerized tomographic scan of the chest was normal.

Skeletal tuberculosis is a hematogenous infection. Endobronchial tuberculosis is infection of the tracheobronchial tree. It is generally found in younger age group (<35 years) and more in females with a very low yield in sputum smear and normal chest X-ray (20%). Fiberoptic bronchoscopy (FOB) is diagnostic with an accuracy of 90%.

The ETT obstruction can present as high PIP and steadily increasing EtCO$_2$ with or without decrease in SpO$_2$ as in our case. An ETT obstruction by mucus, blood, or a kink is not uncommon, whereas obstruction by a foreign body particularly during general anesthesia is not common. Obstruction

Figure 1: The blocked endotracheal tube

Figure 2: Cut endotracheal tube the cheesy material
with objects such as oral preoperative medication, prefilled epinephrine syringe, plastic wrapping from a filter, a heat and moisture exchanger, mucus, and an inferior turbinate, or herniation of the cuff have occurred but are all rare events.\(^5\) This is an unusual case of ETT obstruction by tubercular granulation tissue, either an endobronchial focus or a tubercular lymph node eroding through the bronchus. However, in either case, this was asymptomatic and could not be picked up during preanesthetic evaluation. Lin et al. reported a case of acute ETT obstruction caused by unexpected hemoptysis in a patient undergoing surgery for Pott’s spine in prone position, which was relieved just by placing the patient supine (as happened in our case as well).\(^6\) Further, FOB not only has a role in diagnosis of an adverse respiratory event in an intubated patient but also is a useful therapeutic tool as well.\(^5\) An algorithm for the management of airway obstruction is to exclude ventilator, circuit, and ETT as causes step by step followed by considering and treating patient sources of resistance.\(^7\)

Our case highlights an unusual case of ETT obstruction by a tubercular necrotic material where meticulous monitoring, exclusion of various cause of airway obstruction step by step, and maintenance of calm averted a major anesthetic mishap from happening.

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