Pneumothorax and surgical emphysema during therapeutic endobronchial suctioning

Sir,

Differentiation of lung collapse and pleural collection in post-cardiac surgery cases are difficult, but essential in our clinical settings, as this recognition helps in charting the proper post-operative treatment course. The problem occurs when both co-exist simultaneously and the patient by and large remains clinically not so much symptomatic. In our attempts to expand

collapsed lung during therapeutic endobronchial manoeuvres, we tend to use very high inflation pressures. This in turn can lead to barotrauma, which may have catastrophic consequences in a sick post-cardiac surgery patient. We report a case of iatrogenic pneumothorax during endobronchial suctioning for left lower lobe collapse in a child who had undergone palliative Senning's operation, which resulted in severe respiratory compromise.

A 9-year-old girl with left lower lobe collapse and a large heart underwent a palliative Senning procedure. Post-operatively, in the initial 2 h, she had significant bleeding, which stopped subsequently. The chest X-ray on the next day showed haziness of left hemithorax. The patient was clinically normal with acceptable (partial pressure of oxygen) PO_2 and (partial pressure of carbon dioxide) PCO_2 on weaning from the ventilator and, therefore, was extubated. Higher antibiotic, chest physiotherapy and nebulisation were started due to suspicion of left lower lobe collapse/consolidation. Post-extubation, the child maintained adequate PO_2 with 1 L/min (LPM) O_2 nasal prongs. As PO_2 was decreasing with decreasing air entry on the left side, a chest X-ray was taken that showed opacity of the whole left lung field. A bronchoscopy was planned to clear the airway. As it was not functional, we decided to perform selective endobronchial suctioning with intermittent bilateral ventilation under ketamine and suxamethonium anaesthesia. We required very high airway pressures to expand the left side even as we removed a lot of thick mucoid secretions. After two successful attempts of endobronchial suctioning, we noticed swelling and subcutaneous emphysema in the neck and periorbital areas, which alerted us to the possibility of pneumomediastinum/pneumothorax. Chest X-ray [Figure 1a and b] revealed left pneumothorax requiring intercostal drain (ICD) insertion, which also drained 200 ml blood. The lung expanded completely and swelling and emphysema disappeared after 3 hours of ICD insertion. There was no gross inspired and expired tidal volume difference or persistent air leak suggestive of complications like bronchial rupture or bronchopleural fistula. The child was extubated immediately and ICD was removed the next day.

Atelectasis in post-cardiac surgery patients is common and multifactorial, resulting in morbidity and increased hospital stay. Various methods have been described for opening up the collapsed lung depending on the cause of collapse like manual ventilation,[1] physiotherapy,[2] nebulisation, postural drainage, selective endobronchial suctioning, bronchoscopy, etc. and whether the patient is intubated or not. Persistent atelectasis is best treated by therapeutic bronchoscopy. In situations where bronchoscopy is not available, selective endobronchial suction has been in vogue for a long time. Endobronchial suctioning requires the patient to be kept nil by mouth, anaesthetic for sedation, skill for placement of endotracheal tube and intermittent bilateral ventilation to prevent desaturation. During manual ventilation of collapsed lung, very high peak airway pressures may be reached[3] (≥100 mmHg), which may have a detrimental effect on airways and/or lungs due to barotrauma, as has been well documented by Turki *et al*.[4] Our case clearly demonstrates the need for manometric[5] check on airway pressures while performing manual ventilation. Jong bun kim *et al*. reported a case of barotrauma due to inappropriate manual ventilation in an adult case, highlighting the problem even in adult patients.[6]

Figure 1a: Pre-operative chest X-ray

Figure 1b: Post-operative chest X-ray

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