

Abdominal surgery in a patient with bullous emphysema: Anesthetic concerns

Madam,

Emphysema is a pathological condition resulting in destruction of walls of distal airspaces, thus causing their permanent and abnormal enlargement.^[1] The cystic air spaces in the lung parenchyma are known as bullae. They are formed due to loss of lung tissue providing structural support, thus resulting in elastic recoil of surrounding parenchyma.^[1,2]

A 60-year-old male patient presented to our hospital with complaints of recurrent epigastric pain and dyspeptic symptoms for the past 2 years. He was diagnosed to have cholelithiasis with choledocholithiasis and common bile duct (CBD) stricture

and was posted for open cholecystectomy and CBD exploration under general anesthesia. He was a chronic smoker (30 pack years), with presence of bilaterally decreased breath sounds with wheeze on auscultation. His room air saturation was 96%. There was also bilateral wasting of pectorals. High-resolution computed tomography (HRCT) chest revealed bilateral paraseptal emphysematous changes and bullae with a patch of consolidation in the right lower lobe. The patient was started (a week prior to surgery) on a tablet deriphyllin and tiotropium + formetrol metered-dose inhaler (MDI) with spacer twice daily.

In the operating room, standard monitoring was attached and intravenous (i/v) access secured. Lower thoracic epidural catheter was placed in T10–T11 interspace under full aseptic precautions and epidural infusion with 0.25% bupivacaine (5 ml/h) was started. Standard induction technique was followed. However, during mask ventilation, care was taken to maintain a peak airway pressure of <15 cm H₂O at all times. Following intubation, intraoperatively, lung protective ventilation strategy (tidal volume

5 ml/kg, respiratory rate 16–18 breaths/min, titrated to an end-tidal CO₂ of 35–40 mm Hg) was used. Peak airway pressure limit was set at 30 cm H₂O. Nitrous oxide was avoided and anesthesia was maintained with isoflurane, O₂, and air. Post-surgery, prior to extubation, i/v lignocaine 1.5 mg/kg was administered to prevent excessive bucking and to increase tube tolerance. Post-extubation, patient was pain free, hemodynamically stable, with a respiratory rate of 18 breaths/min.

Emphysema is known to be commonly present in patients with moderate or severe airflow obstruction. However, it can also exist in asymptomatic individuals with no signs of airflow obstruction. Both current as well as former smokers without spirometric evidence of airflow obstruction can have a substantial respiratory symptom and radiographic burden of this disease.^[3]

Emphysematous bullae do not participate in broncho-alveolar oxygenation. They may be associated with hypoxia, dyspnea, symptomatic chest pain, or pressure. Further, they can be complicated by infection or pneumothorax.^[4]

Extrathoracic surgery in patients with bullae can be conducted using various anesthetic techniques such as general anesthesia with double-lumen tube, inhalational anesthesia with spontaneous ventilation, or sedation using i/v dexmedetomidine infusion.^[5] Spontaneous ventilation, whenever possible, is considered the safest approach for anesthetizing these patients.^[1,5] As the bullae are more compliant than the normal lung, they tend to fill preferentially during spontaneous ventilation. However, as the tidal volume increases beyond the normal range, the bullae tend to become much less compliant, resulting in increased airway pressures, thus causing acute rise in pressures within the bulla.^[1] So when positive pressure ventilation is used, the risk of hyperinflation and rupture increases. Sudden bullae rupture intraoperatively could pose serious danger to one's life. This could be due to inadequate ventilation, tension pneumothorax, hemodynamic instability, or bronchopleural fistula.^[5]

Thus, patients with radiological evidence of emphysema with bullae, even though asymptomatic, should have a proper perioperative management plan, using lung protective ventilation strategies, while at the same time being aware of the associated complications.

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Conflicts of interest

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