

Anesthetic management of a case of spontaneous rupture of diaphragm

Sir,

A 58-year-old male patient presented with a history of sudden onset of the left upper quadrant pain and vomiting from 6 days following the lifting of bucket filled with water. He also had a history of the left lower chest pain on inspiration, dyspnea on lying supine, decrease appetite and constipation. Vitals were almost normal at admission. Oxygen saturation was 90%. On auscultation air entry was absent over left lower hemithorax. Routine blood tests were normal. Arterial blood gas showed respiratory alkalosis with mild hypoxemia (pH 7.50, pCO₂ 30 mmHg and pO₂ 64 mmHg). Electrocardiogram showed “t” wave inversion in leads V1, V2 and V3. A plain erect chest radiograph showed upward shifting of the left side of hemidiaphragm, air filled shadow of stomach occupying lower half of left hemithorax, compression of the left lung, shifting of the trachea and mediastinal structures to the right side [Figure 1]. In the operating room, standard anesthesia monitors were attached. A rapid sequence induction (RSI) of anesthesia was done with thiopentone, succinylcholine, and fentanyl. Due to nonavailability of double lumen tube trachea was intubated with number 8.0 standard endotracheal tube (ETT) that was intentionally inserted in the right main bronchus and was fixed at 26.0 cm. A pressure controlled mode was initiated. Anesthesia was maintained on oxygen in the air and isoflurane. Laparotomy via midline approach revealed a tear of approximately 5 cm at the lateral side of left hemidiaphragm. Stomach was pulled down through the rent along with gangrenous part of omentum. Gastropexy was done and diaphragm tear was repaired. Gangrenous part of omentum was resected out. ETT was withdrawn to 22 cm at upper incisor and bilateral air entry was confirmed. Chest drain was placed. At the end of surgery, patient was extubated in the operating room with acceptable vital parameters.

Spontaneous rupture of the diaphragm is extremely rare with limited literature. Spontaneous rupture can be due to violent cough,^[1,2] during vaginal delivery^[3] physical activity,^[2] violent vomiting and defecation.^[4] Sudden and violent Valsalva maneuver with increased intraabdominal pressure is main denominator in these cases.^[5]

Diagnosis is difficult due to nonspecific clinical presentation such as upper quadrant abdominal pain, vomiting, and constipation.^[6] This is mostly associated with dyspnea, tachycardia and hypotension. Chest radiograph may help in diagnosis, but has poor sensitivity and specificity. Radiographic finding includes herniation of abdominal viscera into the thoracic cavity, compression of ipsilateral lung and displacement of mediastinum to the opposite side. “Collar sign” is the presence of a large bulla between the abdomen and the chest, with a constriction at the diaphragmatic level is specific of a diaphragmatic defect.^[5]



Figure 1: X-ray chest posteroanterior view showing left diaphragmatic hernia

Early complications may include strangulation of intestine that can terminate in rupture and gangrene formation. Peritonitis and pleural effusion may be the sequel. Early intervention includes oxygenation, correction of fluid deficit, gastric decompression etc. Emergent surgical intervention is usually required in view of high mortality and morbidity. The causative factor for diaphragm rupture would be the raised intraabdominal pressure during lifting of a heavy object. Other possible etiologies like congenital diaphragmatic hernia or ischemic process was ruled out by intraoperative findings. Anesthetic management of these patients is quite challenging in view of an emergency nature of surgery with inadequate time to patient optimization, unstable hemodynamics, high probability of hypoxemia and rapid desaturation, full stomach, fluid deficit, electrolyte imbalance and need for one lung ventilation. These patients often require the securing of wide bore intravenous access or central venous cannulation, beat to beat blood pressure monitoring if hemodynamically unstable. RSI in these patients may cause rapid desaturation because of already decreased functional residual capacity. During mechanical ventilation, lung protective strategy should be applied with low tidal volume and positive end expiratory pressure. Postoperatively, patient can be extubated in the operating room if vital parameters allow. Grossly ruptured and hemodynamically unstable patient should be allowed to ventilate postoperatively. Adequate analgesia (epidural analgesia) in the postoperative period can help in early recovery. Patient controlled analgesia can be used if epidural was placed.

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