



ANESTHETIC MANAGEMENT OF A CASE OF SPONTANEOUS RUPTURE OF DIAPHRAGM : A CASE REPORT

Anaesthesiology

Dr (Maj.) Ashok Sehgal

Senior resident, Department of Anaesthesiology, Pt B.D Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana, India.

Dr Abhilasha Dhillon*

Junior resident, Department of Anaesthesiology, Pt B.D Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana, India. *Corresponding Author

Dr Somya Tomar

Junior resident, Department of Anaesthesiology, Pt B.D Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana, India.

ABSTRACT

Background: Anesthetic management of patient with spontaneous diaphragm rupture 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 may need for one lung and post op elective mechanical ventilation.

Case presentation: We present anesthetic management of a 58 year-old male with spontaneous rupture of diaphragm and has planned for emergency laprotomy and proceed under General Anaesthesia.

Conclusion: patient with spontaneous diaphragm rupture can be successfully managed with early diagnosis based on clinical signs, symptoms and proper imaging modalities. Quick restoration of the circulatory hemodynamics followed promptly by surgery under lung protective mechanical ventilatory strategy and invasive monitoring.

KEYWORDS

INTRODUCTION

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 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.

CASE PRESENTATION

A 58-year-old male patient with no known comorbidities presented with a history of sudden onset of the right upper quadrant pain and shortness of breath from 2 days following the morning yoga class. He also had a history of the right 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 right 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 "r" wave inversion in leads V1, V2 and V3. A plain erect chest radiograph showed upward shifting of the right side of hemidiaphragm, air filled shadow of stomach occupying lower half of right hemithorax, compression of the right lung, shifting of the trachea and mediastinal structures to the left side.

Preoperative laboratory evaluation reports are given in Table 1.

Patient's chest X ray showed in (Fig 1).

USG ABDOMEN suggestive of right diaphragmatic rupture with

herniation of dilated large bowel and liver in right hemithorax with dilatation of proximal large and small bowel loops. Mild ascites and right moderate pleural effusion present.

Table 1 showing preoperative blood investigations.

Haemoglobin	14 gm%
Total leukocyte count	5300
Differential leukocyte count	P85,L12,M2,E0,B01
Platelet count	250000
PT/PTTK/INR	10.1/33/0.74
RBS	111 mg/dl
Fasting	90
Post prandial	106
Blood urea	37 mg/dl
Serum creatinine	0.8 mg/dl
S-Na ⁺ /k ⁺	136/3.8 mmol/l
s.bilirubin (Total)	0.4 mg/dl
AST/ALT	21/17 U/L
T.Protein	5.5 g/dl
S.Albumin/Globulins	
Urine routine microscopy	Within normal limits



Fig-1 .chest x ray showing "collar sign"

DISCUSSION

In the operating room, standard anesthesia monitors were attached. A rapid sequence induction (RSI) of anesthesia was done with thiopentone, succinylcholine, and fentanyl. Trachea was intubated with number 8.0 standard endotracheal tube (ETT) that and was fixed

at 21.0 cm. A pressure controlled mode was initiated. Anesthesia was maintained on oxygen, sevoflurane and vecuronium boluses.

Laparotomy via midline approach revealed a tear of approximately 5 cm at the lateral side of right hemidiaphragm. Gut and viscera 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. Chest drain was placed. At the end of surgery, patient was extubated in the operating room with acceptable vital parameters. Post operative period was uneventful. post op analgesia was maintained with mid thoracic epidural catheter.

CONCLUSION

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.

COMPETING INTEREST

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All of the authors were involved in the management of the case and finalizing the article. All of the authors were involved in the process of editing, correcting, and finalizing the manuscript. All authors have read and approved the final manuscript.

CONSENT

The patient and the patient's relatives are pleased to give written consent for publishing this particular case scenario.

ACKNOWLEDGEMENTS

We thank the patient and her relatives for their willingness to publish this study. We also thank the anesthesia support staff involved in the management of this case.

REFERENCES

1. Hillenbrand A, Henne-Bruns D, Wurl P. Cough induced rib fracture, rupture of the diaphragm and abdominal herniation. *World J Emerg Surg.* 2006;1:34.
2. Divisi D, Imbriglio G, De Vico A, Crisci R. Right diaphragm spontaneous rupture: A surgical approach. *ScientificWorldJournal.* 2011;11:1036-40.
3. Rubin S, Sandu S, Durand E, Baehrel B. Diaphragmatic rupture during labour, two years after an intra-oesophageal rupture of a bronchogenic cyst treated by an omental wrapping. *Interact Cardiovasc Thorac Surg.* 2009;9:374-6.
4. Lee HY, Yoo SM, Song IS, Yu H, Kim YS, Lee JB, et al. Spontaneous diaphragmatic rupture after vomiting: Rapid diagnosis on multiplanar reformatted multidetector CT. *J Thorac Imaging.* 2006;21:54-6.
5. Edwin F, Tettey MM, Sereboe L, Frimpong-Boateng K. eComment: Spontaneous or effort diaphragmatic rupture. *Interact Cardiovasc Thorac Surg.* 2009;9:376.
6. Losanoff JE, Edelman DA, Salwen WA, Basson MD. Spontaneous rupture of the diaphragm: Case report and comprehensive review of the world literature. *J Thorac Cardiovasc Surg.* 2010;139:e127-8.