Learning from errors

Tension pneumoperitoneum complicated with tension pneumothorax in a patient with diaphragmatic eventration

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Summary

Tension pneumothorax complicating a pneumoperitoneum is a rare but known entity. However, all previously published articles report an air leak through defects in the diaphragm connecting the pneumoperitoneum and the pneumothorax. Here, the case of a 36-year-old man in whom the pneumoperitoneum acted like a tension pneumothorax because of a congenital eventration of the left diaphragm without penetration is presented. Emergency needle decompression of the abdomen was performed. A gastric ulcer that had passed through the diaphragm to the right lung was diagnosed intraoperatively. Unfortunately, the patient developed a ventricular fibrillation that remained resistant to all resuscitative efforts, and the patient died shortly afterwards.

BACKGROUND

Tension pneumoperitoneum is a rare but known complication of colonoscopy, endoscopy, blunt trauma and bariatric surgery.¹ The association between pneumothorax or tension pneumothorax and idiopathic pneumoperitoneum has been reported in several case studies of patients who have sustained blunt trauma.^{2–8} In these cases, thoracic air was introduced through a rupture of the lungs and dissected retroperitoneally or leaked directly through defects in the diaphragm.¹ The diagnosis of pneumoperitoneum in this group of patients does not invariably mean gastrointestinal perforation and, therefore, does not always require surgery. Pneumoperitoneum associated with tension pneumothorax has also been described, but it is almost always associated with blunt or (rarely) penetrating trauma.⁹ Idiopathic bowel or gastric perforation rarely leads to tension pneumoperitoneum and tension pneumothorax.¹⁰ We present a case of pneumoperitoneum acting like a tension pneumothorax because of an eventration of the left diaphragm.

CASE PRESENTATION

A 36-year-old man with a known eventration of the left diaphragm (an abnormally high or elevated position of half of the intact diaphragm as a result of paralysis, aplasia, or atrophy of varying degree of muscle fibres) presented to our emergency department with an acute onset of abdominal pain. He claimed that his pain started suddenly 3 h earlier and his abdomen had been distended since then. He was agitated but cooperative. His medical history was unremarkable. His vital signs upon arrival were as follows: temperature 36.8°C, heart rate 92 bpm, respiratory rate 30 breaths/min, blood pressure 110/70 mm Hg and SO_2 99%. On physical examination, no breath sounds were heard on the left but an abdominal gurgling sound was present. However, hyper-resonance was felt on the same side. His abdomen was distended, tender with guarding and rebound pain was present on palpation resembling an abdomen requiring surgical intervention.

INVESTIGATIONS

Since the patient's vital signs were stable, an upright abdominal and a posteroanterior (PA) chest x-ray were performed (figure 1). Free air was diagnosed in the abdomen and left hemithorax. Since he had an eventration of the left diaphragm, a CT scan of the chest and abdomen was ordered by the surgical team in order to determine the surgical approach (figure 2); massive pneumoperitoneum of the abdomen was prominent on CT. However, free air in the subdiaphragmatic area of the left hemithorax was acting like a tension pneumothorax, shifting the mediastinal structures to the right.

TREATMENT

An emergency needle decompression of the abdomen was performed; the patient was taken immediately to the

Figure 1 Upright posteroanterior chest x-ray.

Figure 2 A chest CT scan slice passing just inferior to the carina.

operating room and two subdiaphragmatic drainage tubes were inserted. The abdomen was accessed by a midline incision, free air was decompressed and a gastric ulcer that had penetrated through the diaphragm to the right lung was diagnosed visually and was considered to be the source of the abdominal air.

OUTCOME AND FOLLOW-UP

Unfortunately, the patient developed a ventricular fibrillation that remained resistant to all resuscitative efforts, and he died.

DISCUSSION

Tension pneumothorax complicating a pneumoperitoneum is a rare but known complication. However, in all previously published reports and series, the pneumoperitoneum and pneumothorax were connected by defects in the diaphragm through which the air leaks. To the best

of our knowledge, this is the first published case report of a pneumoperitoneum whose free air has extended into the left thorax because of the eventration of the left diaphragm, causing the same haemodynamic changes as tension pneumothorax.

Learning points

- ▶ Intraabdominal free air may also trigger the same haemodynamic changes as tension physiology.
- ▶ Eventration of the diaphragm should be considered as a risk factor for tension pneumothorax.
- ▶ Needle thoracostomy or drainage tubes may not be enough to decompress free air.

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REFERENCES

1. **Ferrera PC**, Chan L. Tension pneumoperitoneum caused by blunt trauma. *Am J Emerg Med* 1999;**17**:351–3.
2. **Egan M**, Boutros A. Pneumoperitoneum following tension pneumothorax. Report of two cases. *Crit Care Med* 1975;**3**:170–2.
3. **Glauser FL**, Bartlett RH. Pneumoperitoneum in association with pneumothorax. *Chest* 1974;**66**:536–40.
4. **Andrew TA**, Milne DD. Pneumoperitoneum associated with pneumothorax or pneumopericardium: a surgical dilemma in the injured patient. *Injury* 1979;**11**:65–70.
5. **Hashmi S**, Rogers SO. Tension pneumothorax with pneumopericardium. *J Trauma* 2003;**54**:1254.
6. **Gardner-Thorpe D**, Maddox PR. Idiopathic pneumoperitoneum following blunt chest trauma: a case report. *Injury* 1999;**30**:511–3.
7. **Hamilton P**, Rizoli S, McLellan B, et al. Significance of intra-abdominal extraluminal air detected by CT scan in blunt abdominal trauma. *J Trauma* 1995;**39**:331–3.
8. **Krausz M**, Manny J. Pneumoperitoneum associated with pneumothorax: a surgical dilemma in the post-traumatic patient. *J Trauma* 1977;**17**:238–40.
9. **Di Saverio S**, Filicori F, Kawamukai K, et al. Combined pneumothorax and pneumoperitoneum following blunt trauma: an insidious diagnostic and therapeutic dilemma. *Postgrad Med J* 2011;**87**:75–8.
10. **Morse JL**, Safdar B. Acute tension pneumothorax and tension pneumoperitoneum in a patient with anorexia nervosa. *J Emerg Med* 2010;**38**:e13–6.

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