Radiological features of tension pneumoperitoneum

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DESCRIPTION

An unconscious 35-year-old man with a history of recreational drugs intake presented with extremely distended and tympanic abdomen. Despite resuscitation, the patient was in shock.

A CT scan of the thorax and the abdomen demonstrated extensive pneumoperitoneum that was compressing the viscera into a central mass, which created an abdominal compartment-like syndrome. The inferior vena cava was compressed that decreased the venous return to heart (figure 1). The peritoneal gas extended into the mediastinum superiorly through the oesophageal hiatus and inferiorly into the scrotum through the inguinal canal (figure 2). The large pneumoperitoneum also decreased the thoracic volume by elevating the diaphragm (figure 3). The exact site of perforation could not be ascertained.

An urgent laparotomy restored the blood pressure and showed a large perforation of the lesser curvature of the stomach. Owing to the prolonged generalised ischaemia sustained prior to the laparotomy, the patient died in the intensive care 2 days later from multiorgan failure.

The features described are characteristic of tension pneumoperitoneum (TP).¹ Most cases are iatrogenic.¹ Spontaneous TP is rare and usually

caused by perforation of a hollow viscus. The exact mechanism is uncertain; however, it is believed that a flap valve at the site of perforation may be responsible.¹ Just as in tension pneumothorax, a large bore needle should be placed into the peritoneal cavity once TP is recognised.² Failure to do so may cause irreversible ischaemia to the vital organs as evident from the index case.

Figure 1 Tension pneumoperitoneum (TP). Intravenous contrast-enhanced CT scan of the abdomen in axial plane demonstrates a large pneumoperitoneum compressing the abdominal viscera into a central mass. Yellow arrow denotes the compressed inferior vena cava. The CT window has been optimised to demonstrate the pneumothorax as well as the soft tissue.

Figure 2 Tension pneumoperitoneum (TP). Intravenous contrast-enhanced CT scan of the abdomen in sagittal plane demonstrates a large pneumoperitoneum that extends superiorly into the mediastinum (yellow arrow) and inferiorly into the scrotum (white arrow). The CT window has been optimised to demonstrate the pneumothorax as well as the soft tissue.

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Figure 3 Tension pneumoperitoneum (TP). CT scan of the abdomen in coronal plane demonstrates a large pneumoperitoneum that has caused marked elevation of the diaphragm (yellow arrows) and severely decreased volume of the thorax. The CT window has been optimised to demonstrate the pneumothorax as well as the soft tissue.

Learning points

- ▶ Characteristic CT appearance of tension pneumoperitoneum (TP) has been illustrated in three different planes of view.
- ▶ TP should be suspected in shocked patients who have severely distended and tympanic abdomen. A large bore needle can be inserted into the abdomen to alleviate the pressure and prevent irreversible end-organ ischaemia.
- ▶ After the patient's blood pressure has been restored, a CT scan of the abdomen may be obtained pending any operative intervention.

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