

Pneumopericardium: An unusual manifestation of blunt tracheal trauma

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Abstract

A case of pneumopericardium in a child following blunt injury to his trachea is described. Such a case has not been previously described in the literature. A probable anatomical explanation for this rare event is offered.

Key words: Pneumopericardium; Tracheal, injury

Introduction

Following blunt injury to the trachea, air leak into tissues often results in sub-cutaneous emphysema. Pneumopericardium following minor blunt injury to the trachea, on the other hand, is unexpected. No similar situation has been described before in the literature. This case report presents what must be an extremely rare event, and also raises interesting questions about the underlying anatomy.

Case report

A four-year-old boy fell off his bicycle, striking the front

of his neck against the handle-bar. He cried initially, but then resumed playing. He complained only of a feeling of soreness in the front of his neck, however, his father noticed swelling of his neck and part of his face, with a crackling sensation on touch and some voice change.

On examination, all vital signs were normal. There was no respiratory distress or stridor, though his voice sounded somewhat hoarse. The trachea was central, breath sounds were equal on both sides and the cardiovascular system revealed no abnormality. There was surgical emphysema in the boy's neck, extending to the right cheek and chest. There was a 1.5 cm horizontal linear bruise over the front of his neck, below the level of the cricoid cartilage (Figure 1), and tenderness over his laryngeal skeleton. An X-ray of his neck confirmed surgical emphysema (Figure 2) and chest X-ray revealed a large pneumopericardium (Figure 3).



FIG. 1
Bruise over front of neck.

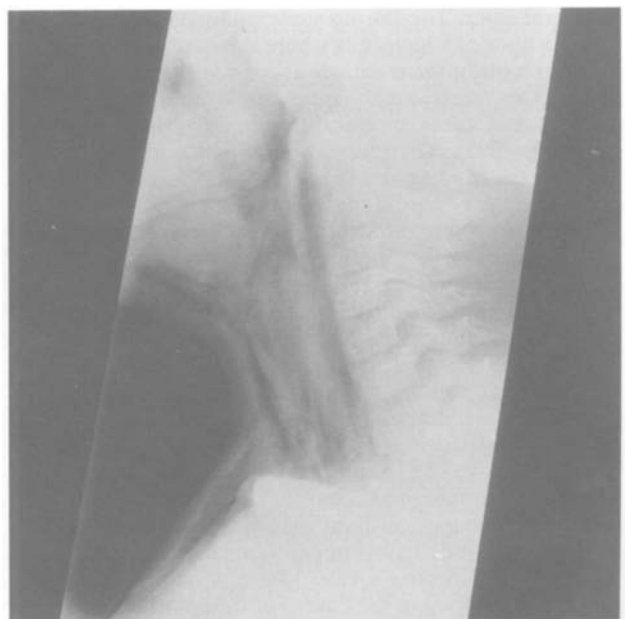


FIG. 2
X-ray of neck showing air in soft tissue planes.

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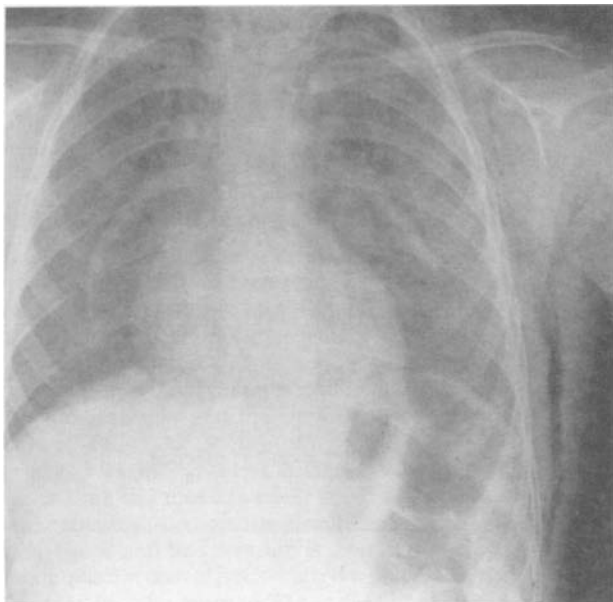


FIG. 3

Chest X-ray revealed a large pneumopericardium.

In view of his stable clinical picture, he was managed conservatively. An X-ray performed 15 hours later showed no significant change in the pneumopericardium, but another one performed after 24 hours showed that the pneumopericardium had begun to resolve. Finally, an X-ray performed eight days after injury confirmed that the pneumopericardium had completely resolved.

Clinical examination performed eight days after the injury confirmed that his voice had returned to normal, and his surgical emphysema had disappeared.

Discussion

The pericardium consists of two distinct structures, the fibrous pericardium, which encloses the serous pericardium. The latter has two components, a parietal layer and a visceral layer. The fibrous pericardium is a cone-shaped bag, the apex of which ends where it is continuous with the external coats of the great vessels, and with the pretracheal fascia. This pretracheal fascia invests the front of the trachea, and fuses superiorly with the cricoid cartilage (Gabella, 1995). Therefore, a leak of air into the plane between the trachea and the pretracheal fascia, may track down into the potential space between the fibrous and the serous pericardium, producing a pneumopericardium.

Traumatic pneumopericardium is a rare condition, whose significance lies in the possibility of developing tension pneumopericardium. The commonest cause of traumatic pneumopericardium is penetrating chest trauma. Spotnitz and Kaufman reported such an injury in 1987, and this was followed by a study of 20 patients with pneumopericardium following penetrating chest trauma in 1990 (Demetriades *et al.*, 1990). Capizzi *et al.* (1995) reported a case of tension pneumopericardium following blunt chest trauma and Vourc'h *et al.* (1985) reported a case of pneumopericardium following endotracheal laser photocoagulation of a left upper lobe lung tumour. Zubair *et al.* (1994) reported a case where a fatal pneumopericardium developed in the course of oesophageal dilatation for a tight stricture. The authors suggested that air may have been pushed into the pericardial sac through a small

tear in the oesophagus, in the presence of a closed glottis. Fitzgerald *et al.* (1992) reported a case of pneumopericardium following colonic perforation during colonoscopy.

Though tension pneumopericardium will manifest itself with signs and symptoms of cardiac tamponade, isolated pneumopericardium may be detected only by a chest X-ray. Though in this case the X-ray was unequivocal, diagnosis of a small pneumopericardium may be confused with pneumomediastinum or a left medial pneumothorax. Van Gelderen (1993) described two signs which only occur in pneumopericardium: (1) the 'transverse band of air' sign, which is seen in the AP view, and represents air in the transverse sinus of the pericardium, and (2) the 'triangle of air' sign, which is seen in the lateral view. The author also recommends a lateral decubitus view with the left side down, in case of doubt.

The presence of a pneumopericardium following penetrating chest injury is suggestive of a cardiac injury, and hence is considered an indication for surgical intervention (Spotnitz and Kaufman, 1987). However, Demetriades *et al.* (1990) concluded that the presence of pneumopericardium is not an absolute indication for surgery as, only one of their 20 cases developed tension pneumopericardium 36 hours after injury, needing surgical intervention. In the case of blunt chest trauma, a conservative approach is reasonable in the absence of tension pneumopericardium, as our case report illustrates.

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