Images in clinical medicine

Stab wounds to the heart: a useful radiological sign

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It is difficult to differentiate between pneumomediastinum and pneumopericardium on plain radiography,¹ but not impossible. We report a case demonstrating a reliable radiological sign specific for pneumopericardium.

Case report

A 27-year-old man was transferred to our department following a stab wound to the chest at the left sternal edge at the level of the fifth costal cartilage. The blade of the ('Stanley') knife had broken and was embedded in the cartilage (figure 1). There was no cardiovascular or respiratory compromise. Plain chest X-ray revealed not only a visible pericardial line, but also the transverse band of air sign (figure 2) indicating the presence of air in the pericardium.² The blade was removed and the patient made an uneventful recovery.

Discussion

Differentiation between pneumopericardium and pneumomediastinum or medial pneumothorax by plain radiography may be difficult. In pneumomediastinum, air extends above the pericardial reflection on the aortic knuckle (outlining great vessels, thymus and trachea) and is accompanied by surgical emphysema, whilst in pneumopericardium air only extends along the ascending aorta (and not the aortic knuckle). In pneumopericardium, the heart border is easily visualised but this is also the case with a medial pneumothorax which is thus difficult to exclude. Taking a decubitus radiograph will show a rapid shift of air in the pericardial sac, while air in the mediastinum will not move in the short interval between films.^{3,4} Turning a patient to confirm the diagnosis in the context of major trauma is, of course, less than ideal.

The transverse band of air sign indicates the presence of air in the transverse sinus of pericardium, situated behind the root of the great arteries and in front of the atria. This sign is never present in pneumomediastinum or medial pneumothorax and is thus a reliable sign of pneumopericardium visible on an anteroposterior radiograph.

Figure 1 Lateral X-ray. The broken blade is clearly visible

Figure 2 Anteroposterior X-ray. The thin arrows indicate the visible pericardial line while the thick arrow points to the transverse band of air in the transverse sinus

The outcome of pneumopericardium is related to its aetiology. Penetrating injuries are usually associated with a 'simple' pneumopericardium and carry a favourable prognosis as in the case reported here. Blunt trauma⁵ and neonatal ventilation⁶ are associated with tension pneumopericardium and have a worse prognosis.

Keywords: stab wound; pneumopericardium; pneumomediastinum; transverse band of air sign

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