A rare cause of pulsus paradoxus: acute tension hydrothorax

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DESCRIPTION

A 63-year-old man with advanced lung cancer, suffered from increasing dyspnoea for 1 week. Physical findings included tachypnoea, decreased breath sound in the entire left chest. Chest film revealed complete 'white out' of left hemithorax with rightward shift of mediastinum (figure 1A) while previous study last 2 months showed no effusion. Initial blood pressure was 90/50 mm Hg and exhibiting pulsus paradoxus of 25 mm Hg (figure 1B, from continuous, non-invasive haemodynamic monitoring). Transthoracic echocardiography revealed large left pleural effusion with only minimal pericardial effusion (PE, figure 2). A massive, rapidly-accumulated pleural effusion can compress the left ventricular (LV) free wall (bold arrow, figure 2) and

elevate intrapericardial pressure sufficiently to diminish compensatory LV expansion during inspiratory shift of interventricular septum (IVS) towards the left heart (figure 2, dash arrows point the direction of IVS bowing during inspiration (figure 2A) and during expiration (figure 2B). This allows marked inspiratory reduction in LV stroke volume, hence significant decline in systolic blood pressure resulting in a pulsus paradoxus.

Tension hydrothorax is a rare cause of pulsus paradoxus. It has been reported follow an iatrogenic acute hydrothorax due to central venous catheter misplacement,¹ extensive metastasis of pleura² or in patients with ventriculopleural shunt.³ It is a potentially lethal complication, however, correct diagnosis and timely intervention can be

Figure 1 Chest film reveals complete 'white out' of left hemithorax with rightward shift of the mediastinum (A). Continuous non-invasive haemodynamic monitoring exhibits a pulsus paradoxus of 25 mm Hg (B).

Figure 2 Transthoracic echocardiography demonstrates a massive left pleural effusion compressing the left ventricular (LV) free wall (bold arrows) with only minimal pericardial effusion adjacent to right ventricle (RV). Dash arrows point the direction of interventricular septum bowing which moves toward LV during inspiration (A) and toward RV during expiration (B).

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life-saving. In this patient, the pulsus paradoxus disappeared after drainage of pleural effusion which revealed cytological evidence of metastasis.

Learning points

- ▶ Tension hydrothorax is a rare cause of pulsus paradoxus.
- ▶ A rapidly -accumulated, large left pleural effusion compresses the left ventricular (LV) free wall sufficiently to diminish compensatory LV expansion resulting in exaggerated decrease in systolic blood pressure during inspiration.

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Competing interests None.

Patient consent Obtained.

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