Purulent pericarditis complicating meningococcal septicaemia

Clinical History:

24 hour history of irritability, poor appetite and pyrexia. One, non-blanching petechial spot found on physical examination. Diagnosed as having a possible septicaemia, and commenced on antibiotic therapy.

Imaging Findings:

A previously well infant was brought to the Accident and Emergency Department with a 24 hour history of irritability, poor appetite and pyrexia. He had one, non-blanching petechial spot found on physical examination. He was diagnosed as having a possible septicaemia, and commenced on antibiotic therapy. The following day, his clinical condition deteriorated, as he developed tachypnoea and tachycardia, requiring transfer to the paediatric intensive care unit for ventilation. Following intubation it was noted that his extremities were poorly perfused and that his peripheral pulses were impalpable. An urgent portable CXR and echocardiogram were performed. The CXR showed cardiomegaly, pulmonary oedema and bilateral pleural effusions. Ultrasound demonstrated a large pericardial effusion with a friable, irregular, echogenic mass in the pericardial sac. There was cardiac tamponade. Emergency pericardiocentesis was performed and a pericardial drain was inserted. The patient's condition improved over the next few days. PCR analysis of blood and pericardial fluid samples isolated N. meningitidis.

A CT scan of thorax was performed to further evaluate a possible pericardial mass lesion. The scan demonstrated thickening of the pericardium, which enhanced brightly with IV contrast administration. Lung windows on this patient's CT revealed interstitial and perihilar oedema, bilateral small pleural effusions, and bibasal dependent atelectasis. The pericardial fluid contained debris, but no mass was seen within it. The apparent mass seen on echocardiography was presumed to represent fibrinous strands within the purulent pericardial effusion.

The patient's condition continued to improve on diuretic and antibiotic therapy. He was eventually discharged after 17 days. A pre-discharge echocardiogram showed good biventricular function and almost complete resolution of the pericardial effusion.

Discussion:

Purulent pericarditis is usually a complication of infection originating elsewhere in the body, either by contiguous spread or haematogenous dissemination. It necessitates rapid diagnosis and adequate therapy, being rapidly fatal if untreated. Staphylococcus aureus is the most common causative agent, with respiratory tract infection the most frequent predisposing factor. N. meningitidis is well recognised to cause purulent pericarditis also. The incidence of severe paediatric infections is increasing with antibiotic resistance, however overall incidence of purulent pericarditis has fallen since the antibiotic era.

Clinical features are relatively non-specific in children, although precordial pain is noted in the older child. Fever and dyspnoea are usually present with bacterial or infectious pericarditis. Purulent pericarditis may also present as an
acute abdomen in children with abdominal pain, distension, and signs of sepsis. Classical physical findings are a friction rub along the left sternal border and diminished heart tones.

It is not possible to distinguish the pericardium from the cardiac silhouette on CXR in most children. An enlarged cardiac silhouette may be due to pericardial fluid or more commonly from cardiac dilatation. A classical pericardial effusion manifests as a globular cardiomiadiastinal silhouette, with a smooth contour which may change from the supine to the erect position. The lower cardiac margin next to the diaphragm may form a more acute angle than normal particularly on the right. Children with purulent pericarditis may have a normal heart size on chest radiographs and show signs of right heart failure on abdominal imaging.

Abdominal CT findings may include periportal oedema, persistent or progressive liver enlargement, gall bladder wall thickening and ascites, secondary to right heart failure from cardiac tamponade.

Chest CT may reveal clinically significant findings in children with complicated pneumonia, which may not be seen on CXR. Such findings would include bronchial obstruction, pleural complications (complex parapneumonic effusions or misplaced pleural drains) and decreased parenchymal enhancement following IV contrast administration. The latter on CT is a predictor of more intense illness and may herald development of cavitary necrosis and cardiac complications. The chest findings in meningococcal septicaemia are mainly pneumonia, pulmonary oedema, and ARDS.

The most important imaging investigation used to diagnose purulent pericarditis alongside a CXR, is 2D-echocardiography. At echo, separation of the pericardial layers by greater than 2mm, suggests a pericardial effusion. The pericardial fluid may contain debris or fibrinous strands.

Standard treatment of this condition includes antibiotics and surgical drainage. In some trials intra-pericardial fibrinolytic drugs have been found to be safe and effective. A recognised complication of purulent pericarditis, is constrictive pericarditis. Early pericardectomy 2-6 months after onset of pericarditis with adiastolic signs and pericardial thickening, permits healing and avoids constriction. Our patient remains under review, and to date his recovery is uncomplicated.

Differential Diagnosis List: Purulent pericarditis. Meningococcal septicaemia.

Final Diagnosis: Purulent pericarditis. Meningococcal septicaemia.

References:

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Cakir O, Gurkan F, et al.<br>
Donnelly LF, Klosterman LA.<br>
Pneumonia in children: Decreased parenchymal contrast enhancement - CT sign of intense illness and impending cavitary necrosis.<br>Radiology 1997; 205(3): 817-20.<br>
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Figure 1

Description: Frontal chest radiograph showing cardiomegaly, interstitial oedema and bilateral pleural effusions. Origin:
**Figure 2**

**Description:** CT image at the level of the ventricles, following IV contrast enhancement. The pericardium is thickened and enhances brightly with the contrast. There is a large pericardial effusion, which contains debris. Air bubbles are seen within the pericardial fluid, as the CT was performed after therapeutic pericardiocentesis. Lung windows revealed interstitial and perihilar alveolar oedema, small pleural effusions, and dependent atelectasis. **Origin:**