Salmonella: a rare cause of subacute effusive-constrictive pericarditis

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Abstract
A 36 year old woman had emergency pericardectomy because of subacute effusive-constrictive pericarditis. The pericardial fluid and tissue culture showed that this was caused by infection with *Salmonella enteritidis*. Cardiac involvement with salmonella does not usually present in such an aggressive manner and it has not previously been reported to cause this rare type of cardiac constriction.

Case report
A 36 year old woman was admitted with an illness that had been progressive over the previous two months. She was unwell, anuric, icteric, and tachypnoeic at rest, with intense orthopnoea. She was afebrile but had signs of severe cardiac constriction with a sinus tachycardia of 120 beats per minute, a low volume pulse, and pulsus paradoxus was seen over a range of 20 mm Hg. Her jugular venous pressure was 10 cm above the sternal angle and she had sacral oedema, gross hepato- and splenomegaly, and reduced air entry to both lung bases. There was a pericardial friction rub and mild mitral regurgitation. Her electrocardiogram showed low voltage complexes with T wave flattening laterally and inversion in I and aVL. A chest X ray confirmed bilateral pleural effusions and showed considerable globular “cardiomegaly”. Echocardiography showed a pericardial effusion of moderate size with biventricular collapse in diastole. The most striking abnormality was the very thick, echodense pericardium. Doppler echocardiography showed mitral valve prolapse with mild mitral regurgitation. Her biochemical profile was abnormal. Before transfer to the Freeman Hospital, she had mild hepatic dysfunction but on arrival her liver function tests were disturbed. The prothrombin time was twice the control value and pre-renal failure had developed.

Over the previous month she had been treated with various antibiotics for a presumed chest infection and had then been admitted to her local hospital for investigation of continuing breathlessness. She was found to have a pericardial effusion of moderate size containing fronds but had no clinical or echocardiographic evidence of cardiac tamponade. The effusion was presumed to be viral in aetiology and benign in nature. After a period of relative stability, her condition progressively deteriorated over a two week period. A normochromic normocytic anaemia (92 g/l) developed and the erythrocyte sedimentation rate rose to 70 mm in the first hour (Westergren). Recurrent pleural effusions required drainage of a total of four litres of clear fluid. All samples were bacteriologically sterile and showed no evidence of infection with tubercle.

Soon after transfer to this hospital, emergency pericardectomy was performed via a left anterolateral thoracotomy. The pericardium was considerably thickened, inflamed and oedematous, and enclosed a moderate purulent effusion. On the visceral aspect there was a purulent exudate with associated fibrin. Histological examination showed that the pericardium was 4 mm thick and was composed of a fibrous layer showing evidence of non-specific chronic inflammatory changes with a perivascular distribution. *Salmonella enteritidis* was cultured from blood, pericardial fluid, and pericardial samples. The organism was sensitive to ciprofloxacin and this treatment was continued for 17 days. Titres to *Salmonella typhi* and *S. paratyphi* were negative, as were stool cultures. No primary source of salmonella could be confirmed.

The patient’s subsequent course was satisfactory apart from transient hypotension and pyrexia. After hospital discharge, she returned to normal activities. Her serum alkaline phosphatase concentration remained raised but otherwise the biochemical and radiological variables returned to normal. Echocardiography showed persistent mitral regurgitation.

Discussion
Acute pericarditis is commonly associated with an insignificant pericardial effusion. It may progress to chronic pericardial constriction but rarely to subacute effusive-constrictive pericarditis where a tense effusion is contained within a markedly thickened pericardium. With the widespread use of antibiotics and the decline of tuberculosis it is rare now for constrictive pericarditis to result from bacterial infection.1-3 Effusive-constrictive pericarditis was first described by Burchell in 19544 and its haemodynamic impact was later defined.5 Relief of the tamponade by aspiration of the effusion does not improve the clinical condition because of the associated constriction.6 Most cases of effusive-constrictive pericarditis are idiopathic in origin but there are reports of it occurring with tuberculosis,
viral, bacterial, and amoebic infections; in uraemia, rheumatoid arthritis, and carcinoma; and after radiation and thoracic trauma. It has not previously been described as a complication of salmonella infection, although Bird's postmortem report in 1969 has some similar features. The rapid progression to tamponade in our patient may be due to the nature of the causative organism. Effusive-constrictive pericarditis usually progresses to non-ef fusive chronic constriction over the course of a year.

There are more than 1700 different serological types of salmonella but most are primarily animal parasites with little human pathogenicity. Salmonella infections can take one of two forms: firstly, typhoid fever which is due to Salmonella typhi or S paratyphi and can be complicated by endocarditis or myocarditis, and secondly, S enteritidis and some other strains which can give symptoms and signs of food poisoning after transmission by undercooked meat of contaminated animals or contamination of other food stuffs by a human carrier. Metastatic spread from the gastrointestinal tract may result in pyrexia of unknown origin, meningitis, or osteomyelitis. It is uncommon for the heart to be secondarily affected but endocarditis and myocarditis have been described. The pericardium is rarely involved in salmonella infections. Pericarditis was first recorded in association with typhoid fever in 1844 and there are few previous reports of pericarditis in non-typhoidal syndromes in published reports after the original description in 1936. It tends to occur in older patients and is often associated with a purulent effusion from which the organism may be cultured. This is the first report of Salmonella enteritidis as the causative organism.

Subacute effusive-constrictive pericarditis due to infection with salmonella has not previously been reported. This case report highlights the potential for this unusual organism to have a highly aggressive presentation. The purulent pericardial exudate rapidly led to the development of prominent pericardial thickening and constriction requiring urgent surgical intervention to relieve cardiac tamponade. It seems prudent therefore to consider diagnostic aspiration of pericardial effusions that do not resolve promptly. Bacteriological testing would then identify unusual organisms whose malignant course might be prevented by early and appropriate treatment.