A malignant pleural effusion infected with *Salmonella enteritidis*

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Abstract

A patient is described with a unilateral pleural effusion persistently infected with *Salmonella enteritidis*. The infection was eventually eradicated with ciprofloxacin. A computed tomographic scan and mediastinal lymph node biopsy demonstrated an underlying small cell bronchogenic carcinoma.

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Keywords: pleural effusion, salmonellosis, malignancy.

Food-borne *Salmonella* intestinal infection is increasing in prevalence in the United Kingdom.1 *Salmonella* infection outside the gastrointestinal tract remains uncommon in western countries and pleural effusions or empyemias infected with *Salmonella* species are extremely rare.13 We report a patient with a small cell lung carcinoma and unilateral pleural effusion which was infected with *Salmonella enteritidis*.


Case report

A 70 year old man was admitted to hospital with increasing dyspnoea and weight loss of 10 kg in three months. He had a history of ischaemic heart disease with atrial fibrillation and congestive heart failure and was receiving treatment with digoxin, furosemide, and captopril. He had smoked 15 cigarettes per day up to six years previously.

Examination revealed an ill and wasted man who was clinically anaemic and had signs of a large left pleural effusion. The pulse rate was 80/min in atrial fibrillation, blood pressure was 140/85, and there were no signs of heart failure. Chest radiography confirmed the unilateral effusion, and the electrocardiogram showed atrial fibrillation with digitalis effect. Haemoglobin was 9·7 g/100 ml with a normochromic normocytic blood film. Serum levels of ferritin, vitamin B12, and folate were normal, and a subsequent bone marrow aspirate was unremarkable. The erythrocyte sedimentation rate was 65 mm in the first hour. Serum urea, creatinine, and electrolyte levels were normal, as were blood glucose and serum calcium levels. Serum tests of liver and thyroid function were unremarkable, and the serum cholesterol concentration was 5·6 mmol/l.

Pleural aspiration was carried out and 1200 ml of cloudy fluid was obtained. The protein level was 45 g/l and glucose concentration 0·3 mmol/l. No malignant cells were seen but *Salmonella enteritidis* was grown on culture. The patient had no fever or clinical
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features of infection, and the blood white cell count was normal. Additionally, there was no history of diarrhoea and cultures of faeces, urine, and blood were repeatedly negative. Ultrasound studies revealed no evidence of biliary disease. A further 650 ml of pleural fluid was aspirated and treatment with ciprofloxacin 750 mg orally twice daily was begun. This second aspirate again grew S enteritidis. Because of continuing pleural fluid collections a chest drain was inserted two weeks after the second aspirate. At the time of insertion S enteritidis was again grown from the aspirate (despite two weeks of ciprofloxacin treatment to which the organism was fully sensitive in vitro). Ciprofloxacin was continued for a total of four weeks and thereafter all subsequent aspirates were sterile.

A computed tomographic (CT) scan of the patient’s thorax (performed two weeks after ciprofloxacin treatment was started) showed enlarged mediastinal lymph nodes. Repeated cytological examinations of the pleural fluid and also pleural biopsy samples were negative. Thoracoscopic biopsy of the mediastinal nodes was performed via an intercostal approach. Histological examination of the specimens obtained revealed small cell lung cancer. The patient was treated with oral etoposide and remains reasonably well 12 months after presentation. He has a moderate residual left pleural effusion but this has not required further therapeutic drainage. Several test aspirate samples have remained sterile on culture.

Discussion
Salmonellosis may occur more frequently and have more diverse clinical manifestations in patients with disseminated malignancy.23 In two series involving a total of 115 patients21 no cases similar to ours were recorded, although Salmonella was occasionally isolated from necropsy lung tissue.

In 1977 Carel et al5 described a patient in Israel with metastatic thyroid cancer and a unilateral pleural effusion. The fluid was brownish red and grew S blockley. Though the source of the infection was not found, the patient did have fever (unlike our case). Prolonged and varied antibiotics were needed, but there was an eventual good recovery. Singh and colleagues5 described a nine year old child in India with a frank empyema due to S typhi and reviewed a small number of similar cases in the literature. Their patient responded to treatment with chloramphenicol and drainage of the pus via an intercostal drain. It seems likely that the empyema arose from an original septicemic typhoid infection. Devi et al6 described a similar case, again in India, but their patient had a small encysted empyema infected with S typhi, and it arose during the course of treatment for pulmonary tuberculosis. Finally, there are two reports of pleural effusions infected with S typhi from the USA7 and UK.8 Both, however, were secondary to subphrenic abscesses below the effusion.

The overall rarity of pleuropulmonary involvement in Salmonella infections in general is demonstrated by a recently published systematic review of 6250 cases of bacteriologically proven salmonellosis from India over a 12 year period.6 Only three patients had chest involvement (0.05%), all with pyopneumothorax, two due to S typhimurium and one to S typhi.

The patient described here is thus dissimilar from other reported cases. The infection was asymptomatic and not associated with systemic salmonellosis, Salmonella gastroenteritis, or adjacent Salmonella abscess. Salmonella enteritidis is common in the UK, and infection is frequently acquired by eating infected eggs. We assume that in our patient the organism spread from the gut, via the bloodstream, to the malignant pleural effusion – the process presumably facilitated by his immunocompromised state.

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