## **Case Report**

# **Disseminated Salmonella Infection Coexisting with Thymoma**

S. Saheer, Subash Immanuel, Balamugesh T and D.J. Christopher

Department of Pulmonary Medicine, Christian Medical College, Vellore (Tamilnadu), India

### Abstract

A 21-year-old boy presented with high grade fever, diffuse chest pain and exertional breathlessness of one month duration. Radiologically he had a large lobulated anterior mediastinal mass with necrotic thick enhancing septaes. Histopathology of the mass was suggestive of thymoma and culture from the necrotic aspirate yielded *Salmonella typhi*. The same pathogen was isolated in subsequent blood and sputum cultures. This current report describes the rare association of salmonella infection with thymoma. [Indian J Chest Dis Allied Sci 2015;57:39-40]

Key words: Salmonella infection, Salmonella typhi, Anterior mediastinal mass, Thymoma.

#### Introduction

Salmonella infection of the thoaracic cavity is a rare and there are limited reports of such an infection complicating an anterior mediastinal mass.<sup>1,2</sup> The rarity of this association prompted us to report this case.

#### **Case Report**

A 21-year-old boy presented to the emergency department with complaints of high grade fever, chest pain and exertional breathlessness of one month duration. On examination, he was afebrile (38.4 °C) with a respiratory rate of 32 per minute, blood pressure of 118/74 mmHg, pulse rate of 126 per minute and oxygen saturation of 94% on room air. Except for pallor, his general examination was unremarkable. Respiratory examination revealed fullness, reduced chest expansion, a stony dull note and reduced breath sounds on the left side. The cardiac, neurological and abdominal examinations were unremarkable.

Laboratory examination showed haemoglobin of 8.3 g/dL (normal 11.5-16.5), platelet count of 18x10<sup>9</sup>/L (normal 150-450), white cell count of 27.4  $x10^{9}/L$ (normal 4.3-10.8); with neutrophillic shift and toxic changes (polymorphs of 86%). He had C-reactive protein of 187 (normal <10 mg/L), procalcitonin of 2.2 (normal <1 mcg/L), lactodehydrogenase of 332 (normal 225-460U/L), beta-HCG of <0.3 (normal 0.1-5mIU/L) and AFP of 1.7 (normal 0.1-5.5 IU/mL). His other biochemical parameters were within normal limits. Human immunodeficiency virus serology was negative and he had normal immunoglobulin and CD4/CD8 levels. As he presented with persistent fever, as part of pyrexia work up, blood-, sputum-, urine-, stool-cultures and widal test were ordered. Widal test was positive and the Salmonella O antigen titres were more than 1:1000. Blood and sputum cultures grew Salmonella *typhi*, but stool cultures were negative. Chest radiograph (Figure 1) revealed a homogeneous opacity in the left upper, mid and lower zone with loss of cardiac borders. Computed tomography (CT) thorax



Figure 1. Chest radiograph (postero-anterior view) showing homogeneous opacity in left upper, mid and lower zones obliterating cardiac borders.

(Figure 2) showed a large lobulated mass in the left anterior mediastinum measuring 16cmx15cmx16cm with hypo-dense necrotic areas having thick enhancing septae. Extra intestinal sites of salmonella infection were ruled out with the help of abdominal ultrasound and computed tomography.

He subsequently underwent ultrasound guided mass biopsy and fluid aspiration from the necrotic areas. Gram stain culture from the necrotic aspirate revealed growth of *S. typhi* and histopathology showed features suggestive of thymoma — World Health Organization (WHO) type B3. Immunohistochemistry revealed tumour cell cytoplasm positive for

[Received: September 27, 2013; accepted: November 11, 2013]

**Correspondence and reprint requests:** Dr D.J. Christopher, Professor and Head, Department of Pulmonary Medicine, Christian Medical College, Vellore-632 004 (Tamilnadu), India; E-mail: djchris@cmcvellore.ac.in

pancytokeratin, CD99 and CD5, and negative for placental alkaline phosphatase (PLAP) and pleuripotent stem cell marker (OCT  $\frac{3}{4}$ ). He was treated with intravenous ceftriaxone. With intravenous antibiotics he became afebrile, and the total leucocyte count dropped to  $9.9x10^9/L$ . Repeat blood and stool cultures were negative. After resolution of fever, the patient was transferred to the oncology department for further management of thymoma.



Figure 2. Computed tomography of thorax showing large lobulated mass in the left anterior mediastinum measuring 16cmx15xcm16cm with hypo dense necrotic areas having thick enhancing septaes (white arrow).

#### Discussion

Salmonella typhi usually enters the human body through the mouth and the disease is usually limited to the gastrointestinal tract, especially the colon. The resorvoir of *S. typhi* infection is man, and the usual route of transmission is faeco-oral. Once it reaches the gut, it penetrates the lymphoid tissues. From there, it reaches liver, spleen, bone marrow, reticuloendothelial cells and other organs through haematological dissemination.

Biliary tract especially the liver or gall bladder is the most common extra intestinal sites of salmonella infection, though the same is very unusual. Such patients are usually immunocompromised, or have underlying connective tissue disease<sup>2</sup> or are known to have sickle cell disease<sup>3</sup>.

Among patients with thymoma, 6% to 11% have hypogammaglobulinemia, and this combination is named as Good's syndrome.<sup>4.5</sup> It was first reported by Good in 1954, and the clinical manifestations are hypogammaglobulinaemia with reduced or absent B cells, impaired T cell mitogenic response, CD4 T-cell lympopenias, abnormal CD4/CD8 T-cell ratio and increased susceptibility to bacterial and opportunistic infections.<sup>6</sup>

Patients of Good's syndrome develop recurrent sinopulmonary infections with encapsulated organisms (such as, *Haemophilus influenza, Streptococcus pneumoniae*), bacterial diarrhoeas (*Giardia lamblia, Campylobacter jejuni, Salmonella* species), skin and urinary tract infections. *Pneumocystis carinii* and cytomegalovirus are the most common opportunistic infections seen.

Even though in our case stool cultures were negative, the most possible cause of salmonella infection in the thymoma mass was the haematogenous route. The source of primary infection and the cause for salmonella bacteraemia was not established despite extensive investigations.

Mediastinal infection secondary to salmonella is very rare. To the best of our knowledge, there are limited reports on this rare association.<sup>2,7,8</sup> In early eighties Marsh et al<sup>7</sup> reported probabably the first case of salmonella mediastinitis in a patient who presented with fever and chest pain. Radiology revealed mediastinal mass, and mediastinotomy and culturing aspirate from the mass showed growth of salmonella. The patient subsequently responded to antibiotics. Following year *Tilly et al*<sup>8</sup> reported salmonella infection in a hairy cell leukaemia patient who presented with fever and mediastinal mass. CT assisted aspiration and appropriate antibiotic was initiated. In the last report Snider et al<sup>2</sup> reported a 14-year-old natural history of mediastinal mass with subsequent abcess formation. Fluoroscopic-guided aspiration and subsequent cultures grew group B salmonella enteritidis. Surgical drainage via the left anterior mediastinotomy was done and the patient remained asymptomatic for many years. In our case, the patient clinically responded to antibiotics alone. Serious complications were avoided by timely diagnosis of salmonellosis and administration of appropriate antibiotics.

The notable feature in our patient was that disseminated salmonella infection occurred with normal immunoglobulin and CD4/CD8 levels, and salmonellosis without typical gastrointestinal symptoms like diarrhoea and abdominal pain.

In conclusion, we describe a rare association of thymoma with salmonella bactaeremia without underlying immunosuppression.

#### References

- 1. Carter YM, Shagrun L, Klein H, Katz J, Jablons DM. Salmonella infection in an anterior mediastinal mass. *J Thorac Cardiovasc Surg* 2005;129:228–30.
- Snider JM, Hannah H, McNabney WK, Pemberton LB. Salmonella mediastinal abscess. Ann Thorac Surg 1993;56:556–8.
- Black P, Kunz L, Swartz M. Salmonellosis: a review of some unusual aspects. N Engl J Med 1960:262:921-6.
- 4. Good RA. Agammaglobulenemia: a provocative experiment of nature. Bull Univ Minn Hosp Med Found 1954;26:1–19.
- 5. Rosenow III EC, Hurley BT. Disorders of the thymus: a review. *Arch Intern Med* 1984;144:763–70.
- Kelleher P, Misbah SA. What is Good's syndrome? Immunological abnormalities in patients with thymoma. *J Clin Pathol* 2003;56:12–6.
- Marsh MD, Amorosa JK, Abassi M, Nasher JL, Gross SC, Alcid DV. Salmonella mediastinitis —a rare disease. *Comput Radiol* 1984;8:375–7.
- Tilly H, Gardenibas M, Barry M, Gray G, Monconduit M, Piquet H. Salmonella infection in hairy cell leukemia: report of a case. *Am J Hematol* 1985;19:423–5.