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"Dual infection" disseminated salmonella with tuberculosis in an immunocompetent host

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Abstract

Concurrent infection due to Mycobacterium tuberculosis and salmonella infections cause significant morbidity and mortality especially in tropical countries. To our knowledge, co-infection with two of these organisms are rarely reported in individual with preserved immunity. A strong clinical suspicion and diagnostic tools may be required for diagnosis and treatment of the concurrent second infection. We hereby reported a young gentleman with dual infection of disseminated salmonella and mycobacterium tuberculosis psoas abscess and pleural empyema.

Keywords

Mycobacterium tuberculosis; Salmonella; Empyema; Abscess.

Abbreviations

MTB: Mycobacterium tuberculosis; CT: Computed tomography; MTB PCR: Mycobacterium tuberculosis polymerase chain reaction; HIV: Human immunodeficiency virus; IFN-γ: Interferon γ.

Introduction

Mycobacterium tuberculosis (MTB) is one of the public health infectious diseases in most of the developing countries with incidence rate of 92 in 100,000 population in Malaysia [1]. Coinfection with tuberculosis and intracellular bacterial infection has not been widely reported. The simultaneous and clinically significant isolation of *Salmonella spp* and *Mycobacterium tuberculosis* in a single site of infection has not previously been described to our knowledge. A prolonged antibiotic therapy and adequate drainage of abscesses are essential for the treatment of the diseases. Herein, we present a 23 year old male who had a coinfection of disseminated salmonella infection with extrapulmonary tuberculosis.

Case Presentation

This 23-year-old gentleman with no prior medical illness presented with three days history of fever, cough, breathlessness, and pleuritic chest pain. On arrival, he was lethargic and febrile with temperature of 38.2^{o}C, blood pressure of 113/68 mmHg, heart rate of 98/min. His respiratory rate was 18 /min and oxygen saturation of 98% on nasal prong. Systemic examination revealed reduced breath sounds on bilateral lower zone of lungs and hepatomegaly. Cardiovascular examination was unremarkable.

A complete blood count revealed hypochromic microcytic anemia and leucocytosis with hemoglobin of 8 g/dl and white blood cell count of 20,500/mm^3 (predominantly neutrophils) respectively. A raised C-reactive protein of 195 mg/dL. Other laboratory investigations demonstrated normal liver function and renal profiles. Chest radiography showed right lung collapse consolidation with bilateral effusion (Figure 1a). His Human immunodeficiency virus (HIV) serology and hepatitis screening was negative.

He was initially treated as community acquired pneumonia with parapneumonic effusion; empilical antibiotics with intravenous amoxicillin/clavulanic acid 1.2g thrice daily and azithromycin 500mg daily were commenced. However, his condition deteriorated during hospitalisation which he was admitted to intensive care unit (ICU) and required invasive ventilator support.

Thoracic sonography demonstrated multiloculated effusions bilaterally (Figure 1b). Computed tomography (CT) scan of thorax and abdomen revealed bilateral loculated pleural empyema with split pleural sign (Figure 2) and bilateral psoas abscess (measuring 17 cm) with liver microabscess at segment V measuring 1.4 x 1.9 cm. Ultrasound-guided percutaneous pigtail catheter drainage of both psoas collections and bilateral pleura cavities were inserted. Pleural fluid analysis revealed a lymphocyte predominant exudate. Both pleural fluid and psoas pus cultures grew *Salmonella non typhi spp* and acid-fast bacilli staining was positive simultaneously; subsequent noted MTB PCR were positive in both pleural fluid and psoas pus. However, blood and urine cultures were no growth. A diagnosis of disseminated salmonellosis with concurrent extrapulmonary tuberculosis was made, antituberculous medications were commenced. Antibiotics was escalated to intravenous meropenem 2 gram thrive daily and subsequently changed to intravenous ampicillin 2 gram 6 hourly for 6 weeks.

Patient's condition improved with significant radiological resolution whereby a follow-up chest x-ray (Figure 3a) and ultrasonography showed residual pleural effusion (Figure 3b) with pleural thickening and resolved psoas collection. Patient was transferred to another hospital due to logistic issue prior to hospital discharge.

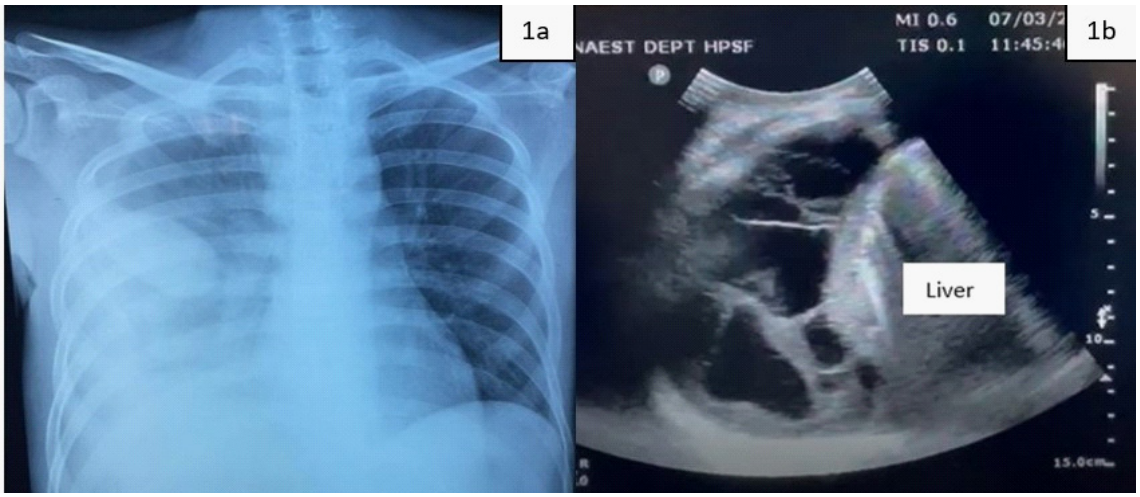

Figure 1: Chest x-ray showed right lung collapse consolidation with bilateral effusion (1a) and thoracic sonography demonstrated right pleural multiloculated effusion (1b).

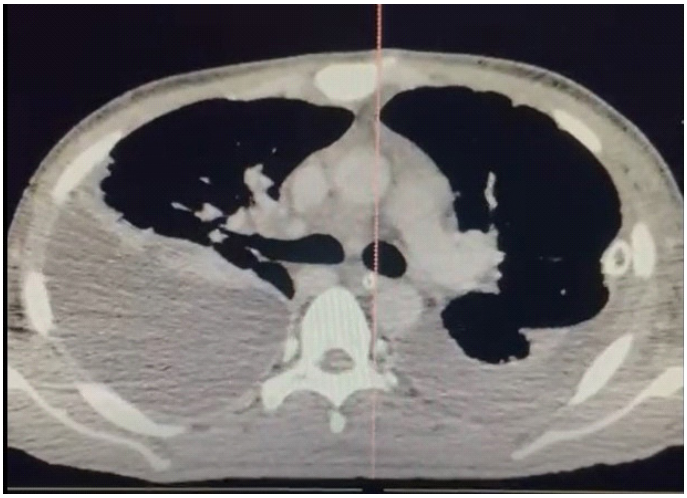

Figure 2: Computed tomography scan of thorax shown bilateral loculated pleural empyema with split pleural sign.

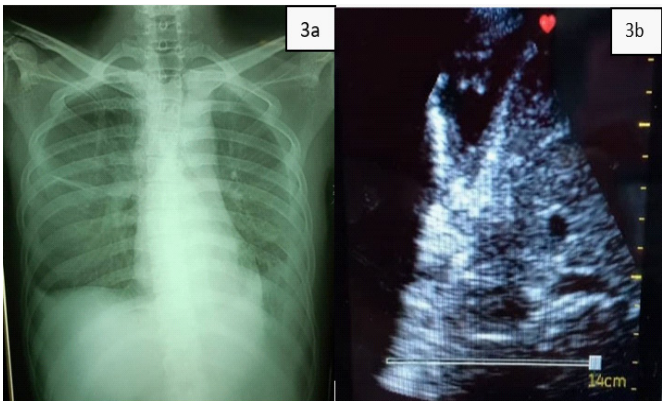

Figure 3: Chest x-ray (3a) and ultrasonography showed residual pleural effusion (3b) with pleural thickening and resolved psoas collection

Discussion

Concurrent tuberculous and bacterial infection are commonly seen in immunocompromised individuals especially those with HIV infection or comorbidities [2,3]. However, there is limited literatures on tuberculous and bacterial coinfection in immunocompetent host [4,5].

Immunological defects on the interleukin-12 and interferon γ (IFN-γ) pathway were identified as the main factor that increased susceptibility of the host with *mycobacterium tuberculosis* (MTB) to concurrent intracellular bacterial infection such as *Salmonella spp* or *Burkholderia pseudomallei* [6,7]. Interestingly, a populational study shown that a higher incidence of *Salmonella* spp. infections was associated with extrapulmonary tuberculosis compared to pulmonary tuberculosis; majority were coinfected with HIV [6]. Unfortunately, our patient was non- HIV infection host and other immunological testing was not available at our centre. Therefore, other predisposing causes could not be identified.

Mycobacterium tuberculosis and *salmonellosis* are endemic in South East Asia countries, it is important to reinforces the need for a high index of clinical suspicion mycobacterium infection in unresolved sepsis and obtaining an adequate specimen culture to allow for early identification of causative pathogen and initiation of treatment accordingly.

Discussion

Coinfection of tuberculosis and bacterial infections in immunocompetent patient is rare. In tropical countries with high prevalence of tuberculous infection, the possibility of dual infection with intracellular bacterial infection and *Mycobacterium tuberculosis* should always be considered. Early diagnosis and initiation of dual therapy may reduce the morbidity and mortality of disease.

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