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A Fatal Case of Non- typhoidal Salmonella Pyogenic Pericardial Effusion in an Immunocompetent Adolescent

Teh CY¹, Ahmad Kashfi AR²

¹Department of Internal Medicine, Universiti Sultan Zainal Abidin, Kuala Terengganu.

²Infectious Disease Unit, Department of Internal Medicine, Hospital Sultanah Nur Zahirah, Kuala Terengganu.

BACKGROUND

Salmonella infection is common in tropical countries including Malaysia. It is invasive in immunocompromised and those of extreme ages. It typically presents with gastrointestinal symptoms such as diarrhea, abdominal pain or vomiting. Extra-intestinal manifestations are seen in 30% of salmonellosis cases. These atypical manifestation leads to difficulty and delay diagnosis thus poorer outcome. Pericardium involvement is estimated to be less than 2% of all cases and has mortality rate as high as 50%¹. As high as 70% of pericarditis cases were identified to be immunosuppressed²; these include chronic immunosuppressant usage, autoimmune disease, end stage renal failure, malignancy and etc. Herein, we report a fatal case of pyogenic pericardial effusion by Salmonella enteritidis in an immunocompetent adolescent.

CASE PRESENTATION

A 16-years-old Malay boy was referred from GP to our centre in April 2015 with CXR finding suggestive of pericardial effusion. He had prolonged cough for 8 months, associated with breathlessness and failure symptoms. He had on and off fever but denied gastrointestinal symptom. He had multiple visits to private practitioners and was investigated for Tuberculosis, which yielded negative result. His condition continued to deteriorate.

*Correspondence to Author:

Teh CY

Department of Internal Medicine,
Universiti Sultan Zainal Abidin,
Kuala Terengganu.

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Of note, he had no significant medical and surgical illness. There was no history of contact with tuberculosis patients, recent travelling history or high risk behaviour.

Upon admission, he was tachypnea and in shock. His blood pressure was 90/56mmHg with a pulse rate of 102bpm. His JVP was raised and heart sound was muffled. Lung examination revealed reduced breath sound bilaterally with generalized rhonchi. Initial blood investigations revealed leukocytosis with predominant neutrophils ($16 \times 10^9/L$). ABG showed type 1 respiratory failure. ESR was raised, 100mm/hour. Chest X-ray showed a congested lung field consistent with pulmonary oedema. Bedside echocardiogram revealed a large pericardial effusion with diastolic right atrium and ventricle collapsed, indicating tamponade effect. Emergency pericardialcentesis drained 1.3L of frank pus. IV Augmentin (Amoxicillin and clavulanate potassium) was empirically started.

Pericardial fluid culture grew Salmonella Enteritidis which was sensitive to ceftriaxone and ciprofloxacin, thus antibiotic was switch to Ceftriaxone. Despite given targeted therapy, his general condition did not improve; pericardial pus re-accumulates, causing tamponade thus requiring second drainage. Antibiotic was switch to ciprofloxacin and later meropenem in worried of poor pericardium penetration. Average daily drainage was 25 to 35ml. Repeated Echocardiogram showed loculated collection of pus in pericardium. HIV screening and autoimmune screenings were negative. Full blood picture was normal. No screening of malignancy done.

His condition continued to deteriorate, requiring ventilator and inotropic support. He succumbed to death on third week of admission.

DISCUSSION

Salmonella is a group of Gram-negative bacilli bacteria, typically divided into classical Typhoid and Non-typhoidal serotype (NTS). NTS usually infects broad spectrum of animals and

infrequently, may infect human. As it is transmitted via faecal oral route, large outbreak usually occurred in poor hygiene environment and improper food handling¹. Salmonella infection in healthy individual leads to activation of pro-inflammatory mediators and thus secretion of cytokines in local intestinal mucosa. Hence diarrhoea is a defence mechanism in healthy individual^{8, 9, 10}. Salmonella bacteraemia occurred as a result of alteration in local intestinal mucosal immunity, mainly due to reduced lymphocytes and IgA secreting plasma cells⁷.

Not so often, it may manifest with extra-intestinal symptom when it got restricted to respective organs. Salmonella pericarditis typically occurred in immune-suppressed patients. Cardiovascular salmonellosis is extremely rare, which can present as endocarditis, myopericarditis, pericarditis or endovascular infection⁶. Salmonella pericarditis is rare and deadly, with only 30 cases reported so far world wide¹. Most reported cases were prior to antibiotic advancement era. Salmonella pericarditis usually presents with cardiac or pulmonic symptomatology: dyspnea (73%), fever (47%), chest pain or discomfort (31%), cardiac palpitations (21%) and pericardial tamponade (53%)^{2, 3, 4}. Due to its rarity and atypical presentation, diagnosis often delayed.

Our patient was unwell for prolonged period of time (8 months) without gastrointestinal symptoms, thus lead to the suspicion of underlying immune-suppressed state. However, his infection screening, full blood picture and lactate hydrogenase (LDH) yielded negative result. He denied constitutional symptoms and supplement/traditional medication consumption.

Close hemodynamic monitoring and ECG of small QRS complex may suggest presence of pericardial effusion. Echocardiography remained the best tool in confirming the clinical suspicion. Diagnostic and therapeutic pericardialcentesis is vital as organism often detected in either pericardial fluid culture or gram staining of pericardial fluid⁵. Salmonella

Enteritidis (58%) is the commonest organism causing pericarditis, followed by Salmonella Typhimurium (26%)², which consistent with our case report. This may be due to the raised prevalence of Salmonella serogroup D and their unique virulence traits¹¹.

As pyogenic pericardial effusion has high mortality rate, aggressive treatment is crucial. European Society of Cardiology suggested empirical antibiotic combination of anti-staphylococcal and aminoglycoside, followed by targeted antibiotic as per culture result. Antibiotic penetration in pericardium is good. Frequent rinsing with urokinase or streptokinase was suggested in order to liquefy fibrin and purulent exudate. They emphasized open surgical drainage is the preferred method, especially in those with dense adhesions, loculated and thick purulent effusion, recurrence of tamponade, persistent infection, and progression to constriction¹². As for our patient, surgical drainage should be performed in view of persistent infection, loculated purulent effusion and recurrent temponade.

LEARNING POINTS

1. Pyogenic Non-typhoidal Salmonella Pericarditis is a rare but deadly disease.
2. Aggressive treatment is crucial.
3. Surgical drainage is preferred over pericardiocentesis.
4. Search for underlying primary illness.

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