CASE REPORT

Unusual Presentation of *Salmonella enterica* Serovar Typhi in Pleural Fluid and Breast Abscess

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ABSTRACT

Salmonella enterica serovar Typhi is usually found to be associated with enteric fever, but extraintestinal findings are not common. Here, we are presenting two cases, one from pleural fluid of an immunocompetent young female and other from breast abscess in a pregnant female. In both the cases, *S. enterica* serovar Typhi was grown on microbiological culture. The first patient was treated with appropriate antibiotic therapy and showed uneventful recovery. The second case could not be followed as she was presented in the outpatient department but is important to treat on time because it would affect the breastfeeding of a newly born child.

KEY WORDS: Breast abscess, culture, pleural fluid, *Salmonella enteric* serovar Typhi

Introduction

Genus *Salmonella* is Gram-negative, non-lactose fermenting (NLF), non-spore forming, aerobic, and facultatively anaerobes belong to *Enterobacteriaceae* family and widely distributed in the environment. There are various species and subtypes (serovars) of this genus that is associated with enteric fever, gastroenteritis, bacteremia, localized infections, chronic carrier state, and other clinical manifestations.[1]

Among all serovars (serotypes), *Salmonella enterica* serovar Typhi is found to be frequently associated with enteric fever, a systemic febrile illness. If it is not treated or failed to the treatment given due to antimicrobial resistance, may lead to seeding of *Salmonella* in various parts of the body and present with various generalized or localized complications in gastrointestinal system, nervous system, bone marrow, kidneys, heart, and other parts.[2,3]

We present here are two rare cases of *S. enterica* serovar Typhi in pleural effusion of an immunocompetent young female and breast abscess of a pregnant female.

Case Report 1

An 18 years unmarried female admitted in November 2017 with high-grade fever, loose motions, and vomiting for past 4–5 days. She had a history of fever off and on for 1 month. A patient was conscious and oriented at the time of admission. No history of tuberculosis or tuberculosis contact. Menstrual history was normal. Blood pressure was 90/60 mm of Hg, pulse 90/min, and temperature 101°C. The chest was clear and no hepatosplenomegaly found on abdominal examination.

Her blood was sent for various investigations. Hemoglobin was 9.9 g/dl, red blood cells - 3.78/mm^3, total leukocyte count - 8.3/mm^3, differential leukocyte count - N65, L25, E7, and M3, platelet 447/mm^3, Erythrocyte sedimentation rate - 35 mm, and random blood sugar 97 mg/dl. Smear examination for malaria parasite, Widal test, Typhidot IgM, Malaria parasitic

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antigen, blood culture, and urine culture was negative. X-ray chest showed right pleural effusion with few patchy fibro opaque lesion in the left upper zone. Ultrasound chest and abdomen showed mild right pleural effusion with an approximate volume of 20–25 cc with minimal ascites seen. Liver showed generalized increased in parenchymal echogenicity with coarse hepatic echotexture - considered likely possibility of tubercular etiology. The next day of admission, pleural tapping was done, and pleural fluid was sent for laboratory evaluation. A patient was put on injectable ceftriaxone, antacids, and analgesics. Antitubercular treatment was not started. Pleural fluid examination showed lactate dehydrogenase - 543 U/L and adenosine deaminase 35 U/L. Ziehl–Neelson (ZN) staining for acid-fast bacilli (AFB) was negative. Gram staining of pleural fluid showed Gram-negative bacteria. A direct culture was put on MacConkey agar (MA), 5% sheep agar blood agar (BA), and chocolate agar (CA). After 24 h of incubation, MA and BA showed growth of NLF colonies and large, opaque, moist, and nonhemolytic colonies, respectively. Colonies were nitrate positive and oxidase negative. Colonies from direct culture were processed for identification and antimicrobial sensitivity in an automated system (Vitek2 compact, Biomerieux). The organism was identified as *S. enterica* serovar Typhi, resistant to fluoroquinolones and ampicillin, but sensitive to ceftriaxone, cotrimoxazole, and tetracycline by the system. The organism was further confirmed by serotyping with polyvalent sera and monovalent sera O9. As per our laboratory protocol, the sample was also put in brain heart infusion (BHI) broth and was subcultured next day on MA and 5% sheep BA. The same process was done with the colonies from the subculture of BHI broth and the result was similar with the direct culture. The patient was continued with ceftriaxone 2 g I/V 24 hourly for 14 days and azithromycin 500 mg 12 hourly for 7 days. The patient was improved and discharged.

Case Report 2

A 24-year-old, 7-month pregnant female visited the outpatient gynecology department in the month of July 2018, with the history of weakness and pain in right breast off and on for past 15 days. No present or previous history of fever was there. On physical examination, nothing remarkable was found except a small lump in the right breast. No retraction or discharge from the nipple was seen. No local or generalized lymphadenopathy was detected. She was advised for ultrasonography (USG) of the right breast. Ultrasound scan of the breast was done using high - resolution linear probe including all quadrant in radial, anti-radial, vertical, and horizontal direction. A hypoechoic nodule with echogenic hilum was seen in the upper outer quadrant likely mammary lymph node was the finding in the left breast. However, in the right breast, a complex multicystic lesion was found in the lower outer quadrant, measuring 28 mm × 13 mm at the 7 O'clock position and another cystic lesion of 12 mm × 7 mm seen adjacent to this mass. USG-guided FNA was advised and performed after discussion with the concerned clinician. 2cc thick pus was collected and sent for cytological examination, ZN staining for AFB, gram stain, and aerobic bacterial culture. Cytological examination showed degenerated and viable neutrophils, few mononuclear inflammatory cells against a background of necrotic material suggestive of the inflammatory lesion consistent with abscess. No granuloma and duct cells were seen. AFB was not seen in ZN staining. TB expert (GeneXpert, Cepheid) was negative for *Mycobacterium tuberculosis*. Gram stain showed occasional Gram-negative bacilli. The sample was cultured on MA, BA, and BHI broth. After 24 h of incubation, 10–15 NLF colonies were grown on MA and opaque, nonhemolytic colonies on BA. BHI broth was showing turbidity. Subculture was done from BHI broth on MA and BA. The culture was followed in the same way as above from growth after 24 h of incubation of culture plates.

Colonies were nitrate positive and oxidase negative. The direct culture was processed for identification and antimicrobial sensitivity in an automated system (Vitek2 compact, Biomerieux). The organism was identified as *S. enterica* serovar Typhi, resistant to ciprofloxacin, and cotrimoxazole; intermediate to levofloxacin but sensitive to ampicillin, ceftriaxone, and tetracycline by the system. The organism was further confirmed by serotyping with polyvalent sera and monovalent sera O9. Further follow-up of the patient could not be done as the patient came to the hospital on outpatient department basis.

Discussion

Enteric fever is endemic in developing countries caused by *S. enterica* serovar Typhi and Paratyphi A, B, and C probably result from poor sanitation and non-accessibility of the potable water.[4] The severity of the disease usually depends on the initial infective dose and virulence of bacteria as well as the immune response of the host.[5]

Bacteremia caused by these bacteria sometimes associated with extraintestinal manifestations. It

may reach to various parts of the body and present with a localized illness such as in our cases, breast abscess, and pleural effusion. The pathogenesis of both the conditions is not well understood, but hematogenous or lymphatic transfer of these bacteria to different sites could be the probable reason.[6] Both the conditions are rare, and patients did not give any previous history of enteric fever, but the possibility of subclinical infection or short febrile illness with incomplete treatment cannot be ruled out.

The cases of bilateral and unilateral breast abscess caused by typhoidal and nontyphoidal *Salmonellae* have been reported by various authors, but most of the cases were in nonlactating females.[3,7,8] Here, we have isolated *S. enterica* serovar Typhi in breast abscess of a pregnant female for the first time.

Pleural empyema cases have been reported in immunocompetent and immunocompromised patients from various parts of the world including India.[9-11] There are 1–6% cases of pneumonia, empyema, and bronchopleural fistula caused by *S. enterica* serovar Typhi.[12]

In our case, we have reported it in an immunocompetent young female without any comorbidity such as diabetes, malignancy, or respiratory diseases. We did not get any previous history of enteric fever, but the possibility of bacteremia and settlement of *Salmonella* Typhi in pleura can be assumed. Her blood culture was sterile probably due to prior treatment of fever (1 month) with antimicrobials before admission to the hospital.

Therefore, both the presentations of *S. enterica* serovar Typhi should be kept in the differential diagnosis of breast abscess that is associated with infections, or carcinoma and pleural effusion caused by other etiologies such as tuberculosis and malignancy, especially in endemic countries like India and should be treated accordingly. Both the cases strongly signify the importance of aerobic culture of such precious samples.

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