

A Rare Case of Primary Anterior Chest Wall Abscess due to *Salmonella* Typhi in an Immunocompetent Male

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Abstract

A case of suspicious anterior chest wall mass due to *Salmonella enterica* serotype Typhi in a middle aged, non-diabetic male is being described. The infection was successfully treated with timely institution of antibiotic treatment. This case highlights the fact that a focal *Salmonella* infection involving the anterior chest wall should be considered as a differential diagnosis and not treated as tuberculosis empirically. Submission of specimens for microbiological analysis should be performed for an accurate diagnosis and management.

Keywords: *Salmonella* Typhi, Chest abscess, Focal infection, Immunocompetent host

Introduction

Salmonella enterica serovar Typhi (*S. Typhi*) primarily causes typhoid fever in humans.¹ Most common route of transmission is the fecal-oral route by ingestion of contaminated water or food.² In developing countries like India, higher incidence of salmonella infection is seen primarily due to the low socio-economic levels and poor sanitary conditions. The only natural reservoirs for *S. Typhi* are humans and they can contribute to transmission even as asymptomatic carriers. *S. Typhi* is a highly versatile pathogen with astounding potential of infecting almost all organs of its host. Apart from causing typhoid fever, *S. Typhi* has been known to cause rare extra intestinal illnesses such as meningitis, endocarditis, liver abscess, myocarditis, empyema, urinary tract infection, etc.^{3,4} Cases although less documented may present with fever and abscess formation at sites like liver,⁵ spleen,⁶ anterior abdominal wall,⁷ and breast.⁸

Most of the skin and soft tissue infections that have been documented have been in immunocompromised individuals such as those with Type 2 diabetes and poor glycemic control, accounting as uncommon causes of focal salmonellosis.

The abscess formation has rarely been reported in immunocompetent cases. Alagar et al. reported a case of unilateral breast abscess in an immunocompetent patient.⁹ We present here a rare case of primary anterior chest wall abscess in an immunocompetent, non-diabetic male with no previous documented history of typhoid fever.

Case Report

A 52-year-old non-diabetic male presented in emergency department in Chandigarh in June 2017 with complaints

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of fever and pain in right upper anterior chest wall near right clavicle for the past 10 days. He had noticed small swelling approximately 2×3 cm over that region 5 days back. The patient had no history of diabetes mellitus, hypertension, cardiovascular disease, or renal disease. There was no history of smoking or alcohol consumption. He was not on any medication for any of the ailments at the time of presentation to the hospital. There was no significant surgical and family history. On admission, the patient was conscious, oriented to time, place and person. His vitals were as follows BP – 120/80 mm Hg, pulse – 82/min, respiratory rate 20/min and temperature 101.7°F. The patient was referred to the pulmonary unit. Physical examination revealed a firm small 2×3 cm swelling near right clavicle. Locally, the skin had inflammation and was tender. No lymph nodes were palpable in the neck and axillary fossa.

Provisional diagnosis of suspected tubercular abscess was made. Laboratory evaluation revealed hemoglobin 11 g/dL, white blood cell count of 6900/mm³ (neutrophils

60%, lymphocytes 28%, monocytes 8%, eosinophils 4%) and serological investigations for HIV and HbsAg were negative. Fine-needle aspiration cytology (FNAC) revealed dense neutrophilic infiltration and occasional macrophages. Cytology revealed no malignancy. Computed tomography (CT) revealed abscess in pre-manubrial region which extended retro manubrium (Fig. 1) with suspicious lytic area of manubrium bone and multiple pulmonary septicemic abscesses. There was suspicion of bony lytic area along right lateral aspect of manubrium with swelling measuring 37×78×61 mm in front of manubrium with extension along right lateral aspect of manubrium with thickening of retro manubrium tissue. USG-guided drainage of pus was performed and the drained pus was sent for culture and sensitivity to the microbiology lab. Patient was put on Linezolid 600 mg bd and Amoxicillin-clavulanic acid 625 mg tds. Gram stain of the exudate showed Gram-negative bacilli with few pus cells. Acid fast staining was negative. In lieu of suspected tuberculosis, the pus sample was also sent for GeneXpert and was found to be negative for tuberculosis complex.

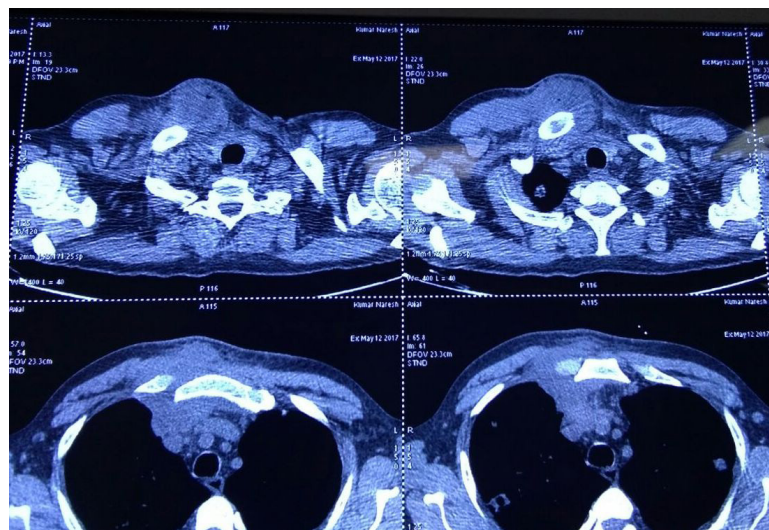


Figure 1. Abscess in Pre-manubrial Region



Figure 2. Anterior Chest Wall Swelling with Sinus Formation

The pus sample was inoculated on 5% sheep blood agar, MacConkey agar and Thioglycollate broth. On overnight incubation at 37°C, non-lactose fermenting (NLF) colonies were obtained on MacConkey agar, which tested oxidase negative. Biochemically, the isolate gave the following key reactions: on TSI alkaline slant and acid butt with the production of slight hydrogen sulfide was seen, citrate-negative, lysine decarboxylase-positive. The organism was conventionally identified as *Salmonella enterica* subsp. *enterica* serovar Typhi.¹⁰ and was confirmed by serotyping according to Kauffmann-White with *Salmonella* polyvalent O antiserum and *Salmonella* O9 and dH antiserum (Denka Seiken Co. Ltd. *Salmonella* antisera group O 2) agglutination. Hereafter, the identification was confirmed based on protein profile of the isolate using Matrix Assisted Laser Desorption Ionization – Time of Flight Mass Spectrometry (MALDI TOF MS, Bruker Daltonics, Germany). Spectra were analyzed using MALDI Biotyper 3 and the isolate was identified as *S. Typhi* with high score (≥ 2 ; 2.2).

Antibiotic susceptibility testing (AST) was performed on Mueller Hinton agar by Kirby-Bauer disc diffusion method. The isolate was sensitive to ampicillin, chloramphenicol, ceftriaxone, cotrimoxazole, ciprofloxacin, and ofloxacin and was resistant to nalidixic acid as per CLSI guidelines.¹¹ Blood culture and Widal test were advised before instituting the antibiotics. A repeat pus sample after one day, before starting antibiotic therapy, from the lesion also revealed the growth of the same organism with same pattern of sensitivity. After the pus culture report was made available, Inj. Ceftriaxone 2 gm IV BD for 14 days was initiated. The results of both blood culture and Widal tests were negative. The patient showed up for follow-up timely and there was complete resolution of abscess on the second follow-up visit on 11th day post discharge.

Discussion

S. Typhi is an endemic pathogen in India, which is responsible for significant morbidity and mortality in the developing countries. *Salmonella* infection in humans can be classified into five clinical groups: enteric fever, septicemia without localization, focal disease (with or without associated bacteremia), gastroenteritis, and the chronic carrier state.¹²

In a recent study on extra intestinal salmonellosis in a tertiary care center in South India, Sudhaharan et al. showed that out of 36 patients diagnosed with extra-intestinal salmonellosis, the predominant serotype isolated was *Salmonella* Typhi in 27 (75%) patients.¹³

The ability of *Salmonella* Typhi to produce unusual and rare clinical manifestations always forces the clinician to keep this pathogen in mind for actual diagnosis of an infection.¹⁴ Anterior chest wall abscess is a rare presentation of *Salmonella* infection.¹⁵

There are several possibilities for pathogenesis of *Salmonella* abscesses: one is the migration of *S. Typhi* to the different organs in an asymptomatic carrier, as suggested in the report of Ciraj et al.⁵ The other mechanism is hematogenous migration from the focus during the intestinal phase of typhoid state.¹⁶ The pathogenesis of extra-intestinal complications of typhoid fever depends on the ingested inoculum size of the bacterium, the virulence of the strain, the host's immune response, previous exposure and local protective factors. The host susceptibility to recurrent salmonella infection is known to be augmented by lowered immunity due to predisposing factor, i.e., uncontrolled diabetes mellitus. However in our case, the presenting patient was a middle-aged, healthy and non-diabetic male with no apparent cause of immunosuppression.

No history of past typhoid fever could be substantiated and no positive blood culture or positive Widal test results were obtained in this patient. But the aspirated pus grew the same isolate as pure growth on two occasions, implicating *Salmonella* Typhi as the causative agent of abscess in this patient. The histological examination was also suggestive of abscess.

The exact cause of the abscess could not be documented in this case. However, a remote explanation is that the patient might have had an uneventful episode of typhoid fever in the past and the organism got seeded in the anterior wall during the bacteremic phase of the disease. Rare presentation of anterior chest wall abscess due to *Salmonella* Typhi is of great significance as it provides awareness to the physician regarding the potential risk of this pathogen to infect almost all vital organs of its host. This differential diagnosis should be borne in mind and any chest wall abscess should not be directly treated as a tubercular one and patient should not be started on anti-tubercular treatment (ATT), which carries significant side effects. Such cases should undergo complete microbiological investigations to identify the pathogens and their sensitivity, which in turn helps in better patient management. Our patient responded to antibiotics due to timely identification of the implicated organism and intervention. No recurrences were seen after 3 months of follow up.

Conclusion

Through this case report, it is intended to highlight the fact that *Salmonella* spp. should be included in the differential diagnosis of anterior chest wall abscess with or without the history of a recent typhoid fever. It also serves as a reminder that abscesses may not always be malignant and microbiological analysis is crucial to establish accurate diagnosis.

Conflict of Interest: None

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