

Focal Salmonellosis in a Diabetic Male Involving the Soft Tissue of Anterior Chest Wall from Pakistan

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Abstract

Typhoid fever remains prevalent in Pakistan, with *Salmonella Typhi*, the causative bacterium, known to occasionally trigger uncommon extra-intestinal ailments. The identification of a focal *Salmonella* infection poses a frequent challenge. This case report details an instance of an extensively drug-resistant *Salmonella* infection affecting the soft tissue in the anterior chest wall, effectively managed with antibiotic treatment. Our emphasis is on recognizing the importance of considering focal *Salmonella* infection as part of the differential diagnosis when confronted with a chronic abscess of unknown origin.

Key words: Abscess, chest wall, extra-intestinal, focal, typhoid fever.

Introduction

Typhoid fever is a common disease in Pakistan and among South Asian countries. Pakistan has been estimated to have the highest rate with 493.5/100,000 typhoid cases in 2018.¹ A recent typhoid outbreak in Hyderabad in 2016 resulted in a drastic surge of typhoid fever cases in Pakistan.² *S. Typhi*, the causative agent, has been associated with infrequent extra-intestinal manifestations, including urinary tract infections, meningitis, and liver abscess.³ Focal *Salmonella* infections are often observed among immunocompromised individuals, and there is a heightened likelihood of such

infections in diabetic patients, possibly due to the hyperglycemic environment promoting infection spread and immune dysfunction.⁴ While few cases of focal *Salmonella* infections have been reported in diabetic patients.^{5,6} We, herein, have a case involving a diabetic male with gastroenteritis and an intermittent high-grade fever for six months. The case features a focal, extensively drug-resistant *Salmonella* infection manifesting as an abscess on the anterior chest wall, despite no documented history of previous typhoid fever.

Case Report

We describe here a case of *Salmonella* infection in a 32 year old diabetic male caused by *Salmonella typhi* involving the soft tissue of the anterior chest wall, 6 cm lower basal to the right nipple (Figure-1A). Six months ago, this suppurative abscess was initiated as a solid nodule which later on developed into pus and blood discharging small abscess measuring 2.1x1.3 cm in size (Figure-1B).

The patient experienced a six-month period of gastroenteritis accompanied by recurring episodes of high-grade fever (102°F) and diarrhea. During this, the patient had undergone two times for abscess drainage for culture and TB GeneXpert and once for a wedge biopsy. Routine laboratory

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Authors Contribution

RMAK, MI & MF conceptualized the project. RMAK, MF, AN, KK & MI did the data collection. All authors did the literature search. RMAK, MI, MF & AN performed the statistical analysis. Drafting, revision & writing of manuscript were done by RMAK, MI, MF, KK & MI.

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investigations revealed haemoglobin 13.1 mg/dl, WBC count 8.9×10^9 /L, C-reactive protein 12.5 mg/dl, lymphocytes 49%, erythrocytes sedimentation rate (ESR) 34mm/hour, and HbA1c 5.61%. Rest of baseline metabolic panels were within the normal range. Biopsy revealed thickened fragmented fibrovascular tissue with severe acute on chronic specific inflammation with foci of suppuration, haemorrhage and granulation tissue formation and was free from tumor. Ultrasound findings showed a soft tissue inflammatory lesion with abscess formation. The CT chest was not available.

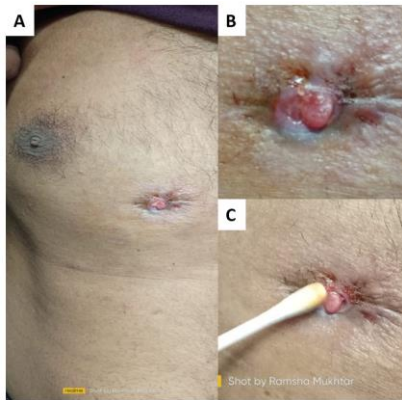


Figure 1: (A) Abscess on anterior chest wall 06 cm lower basal to the right nipple (B) Pus and blood discharging small abscess on anterior chest wall measuring 2.1x1.3 cm in size (C) Pus swab collection from anterior chest wall

Bacterial cultures from blood, urine and stool samples were negative, and mycobacterial and fungal cultures showed no growth. However, pus swabs collected from the chest abscess exhibited slow-growing, pure gram-negative rods on Chocolate agar and MacConkey's agar. The colonies, oxidase-negative and visible only after 48 hours, were identified conventionally through biochemical tests as *Salmonella typhi* (Figure-2C). Confirmation as *Salmonella enterica* serovar *typhi* was achieved through agglutination, further confirmed as *S. typhi* (99.9%) by API 20E (Figure-2D). The strain was confirmed by the amplification of 16srRNA using universal primers followed by Sanger sequencing and blast analysis. The sequence was submitted to the GeneBank under the accession ID OR618327. Antibiotic susceptibility testing (AST) using the Kirby-Bauer disc diffusion method revealed an extensively-drug resistant (XDR) strain of *S. typhi*, sensitive only to azithromycin and meropenem.

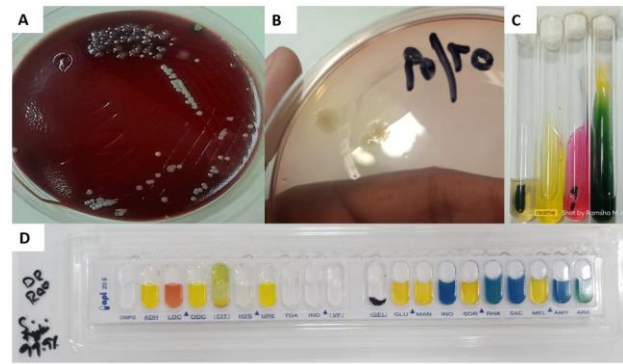


Figure 2: (A) 10-15 colonies of pure gram negative rods on Chocolate agar (B) 4-6 colonies on MacConkey's agar (C) Conventional identification of *Salmonella typhi* by biochemical tests (D) Finally confirmation of *S. typhi* by agglutination, API 20E and 16srRNA

The patient had no prior documented history of typhoid fever but had a family history of tuberculosis in the father and diabetes in the mother. Despite being a non-smoker, the patient experienced persistent myalgia, enteric issues, and fever episodes. The patient used oral hypoglycemic medications, antacids, analgesics, anti-allergens, and had a history of various antibiotics, including erythromycin, lincomycin, co-amoxiclav, and first or third-generation cephalosporins.

The patient received a prescription for oral antibiotics-azithromycin 500mg once a day-for a duration of one month. Additionally, the patient followed a regimen of daily cleansing of the abscess area using povidone solution, followed by covering it with sterile surgical gauze. Subsequently, the patient achieved complete healing of the abscess, and during the two-month follow-up, no recurrence was observed.

The informed consent was obtained from the patient to publish the data concerning this case.

Discussion

Salmonella enterica serovar *typhi* (*S. Typhi*) is the primary cause of typhoid fever in humans, a severe infection marked by prolonged high-grade fever and gastrointestinal disturbances. Annually, an estimated 21.7 million cases and 217,000 deaths are attributed to typhoid.⁷ Transmission mainly occurs through the fecal-oral route. In Pakistan, the heightened incidence is linked to inadequate sanitary conditions and low socioeconomic levels. Following *Salmonella* infections, 1-5% of individuals become chronic carriers.⁶ *Salmonella* infections have been categorized into four types; gastroenteritis, septicemia without localization, focal disease and chronic carrier.⁵ WHO categorizes

multi-drug resistant (MDR) *S. Typhi* as resistant to the first-line antibiotics; whereas, extensively-drug resistant (XDR) *S. Typhi* is resistant to all recommended antibiotics, including fluoroquinolones and third-generation cephalosporins.²

Extra-intestinal *Salmonella* manifestations are infrequent and are mostly observed in immunocompromised individuals, including those with diabetes, HIV infection, or malignancies.⁸ Focal abscesses are the consequence of hematogenous or lymphatic dissemination of primary gastrointestinal infections.⁶ A previous study identified *S. typhi* as the predominant serotype for the extra-intestinal Salmonellosis, accounting for 75% of confirmed cases and uncontrolled diabetes, patient age, gender, and immunosuppression are risk factors for disseminated focal Salmonellosis.⁹ The timely diagnosis and management of focal Salmonellosis pose challenges for both laboratories and physicians. The novelty in our case is that the patient experienced a six-month period of gastroenteritis accompanied by recurring episodes of fever and diarrhea. Later, a solid nodule developed in the suppurative, discharging abscess on the anterior chest wall. Baseline metabolic panels were normal, and a biopsy or ultrasound revealed an indecisive diagnosis. However, culture from the chest abscess exhibited slow growing and limited colonies of *S. typhi* along with inconclusive bacterial cultures from urine, blood and stool. The limitation in this study was that CT chest was not available. In our patient, focal Salmonellosis may be attributed to diminished immunity or diabetes mellitus, or lymphatic spread from the gastrointestinal tract. However, literature reveals few cases of focal Salmonellosis in chest wall abscess but these encompass other serovars of *Salmonella enterica* particularly Dublin¹⁰ and Choleraesuis¹¹ while other reports *S. typhi* in the neck¹² and joints.¹³ To our knowledge, this is the first report of focal Salmonellosis due to XDR serovar *typhi* involving the chest wall abscess in a diabetic male from Pakistan.

This report highlights a focal *Salmonella* infection in a diabetic male, emphasizing the challenges posed by the slow growth and limited colonies of *S. Typhi*, along with the absence of detectable bacteria in blood, urine, and stool. It underscores the potential for misinterpretation due to the misleading characteristics of the few colonies and slow growth of *S. Typhi* in laboratory settings. Moreover, the clinical symptoms of focal *Salmonella* infections often imitate those of other bacterial infections, contributing to potential misdiagnoses by physicians. The importance of including focal *Salmonella* infection in the differential diagnosis of chronic abscesses with unknown etiology is strongly emphasized.

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Conflict of interest: None declared.

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