Primary Anterior Thoracic Wall Abscess with Osteomyelitis by *Salmonella paratyphi A*: Case Report

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Abstract

Salmonella enterica serovar *Typhi* and *Paratyphi* have been imputed in the causation of enteric fever. Cardiovascular and extraintestinal *Salmonella* infections have been documented among immunocompromised individuals. Rarely these pathogens are ascribed in the causation of extraintestinal infections among immunocompetent hosts due to hematogenous seeding. We report a case of anterior chest wall abscess with osteomyelitis in an immunocompetent adult by *Salmonella paratyphi A* without any prior predisposing conditions or gastrointestinal symptoms. The patient underwent incision and drainage of the loculated pus and the involved costochondral junction was curetted. Medical management was guided by automated antibiotic susceptibility testing. Patient responded well to treatment and was discharged with no residual morbidities. Prompt diagnosis complements appurtenant treatment and thereby averts defunct consequential sequelae.

Keywords

- *Salmonella paratyphi A*
- extraintestinal salmonellosis

Introduction

Salmonellae are facultatively anaerobic, Gram-negative, non-sporing bacilli implicated in the causation of a spectrum of salmonellosis including gastroenteritis and other infections by nontyphoidal salmonella. Most *salmonella* serotypes exhibit explicit mammalian host restriction. *Salmonella paratyphi A* are closely knit to *Salmonella Typhi* with sparsely diverse pseudogenes. Salmonellae are taken up by the host cells by the process of bacteria-mediated endocytosis.[1] Further, their ability to survive and replicate within macrophages correlate with their ability to produce nonenteric systemic diseases among human hosts, thus imparting evolutionary survival benefits to the bacteria.

Salmonella paratyphi A infection can manifest as gastroenteritis, paratyphoid fever, sepsis, or abscess. Furthermore, about 1 to 4% of infections with *Salmonella paratyphi A* can result in long-term colonization of the hepatobiliary tract, especially the gallbladder.[2] Literature documents a handful of *Salmonella paratyphi A* breast abscess cases.[3] However, *Salmonella paratyphi A* osteomyelitis is a rare manifestation among immunocompetent adults. We present a rare case of left anterior thoracic wall abscess with osteomyelitis by *Salmonella paratyphi A*.

Case Report

A 56-year-old nondiabetic, immunocompetent patient presented with history of swelling over left hemithorax for 1-week duration. The swelling gradually increased over a period of 1 week to the present size of about 8 × 5 cm. Patient complained of intermittent throbbing pain over the swelling since 1 week. Redness over the swelling was noticed by the

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patient since day 1. No history of fever/discharge from the swelling was noted.

On examination the swelling was about 8 × 4 cm over the left hemithorax below the left nipple extending up to the sternum. Redness, induration, tenderness, and local rise of temperature were noted. The swelling was firm to hard in consistency. The swelling had a smooth surface with irregular borders and was mobile in the longitudinal plane. A dull note was present on percussion over the swelling. Upon admission a provisional diagnosis of left anterior thoracic wall abscess was made and the patient was started on cefoperazone and amikacin. Routine investigations revealed increased inflammatory markers. On magnetic resonance imaging an abscess with involvement of the left 7th costochondral junction was suspected. The loculated pus was drained and the costochondral junction was curetted. The pus was subjected to aerobic culture and sensitivity in the microbiology laboratory.

The direct Gram smear prepared from the sample showed the presence of plenty of inflammatory cells with Gram-negative bacilli (►**Fig. 1**). The sample was inoculated on MacConkey along with 5% sheep blood agar. Aerobic bacterial culture showed oxidase negative, nonlactose fermenting (►**Fig. 2**) colonies on MacConkey agar and nonhemolytic colonies on blood agar. Smear from the culture isolate showed Gram-negative bacilli in concordance to the direct smear findings. VITEK-2 (bioMérieux) identification yielded *Salmonella paratyphi A* with 99% probable confidence of identification. The antibiotic susceptibility by minimal inhibitory concentration testing (bioMérieux) showed resistance to amikacin, gentamicin, and ciprofloxacin. The isolate was susceptible to ampicillin, cotrimoxazole, ceftriaxone, azithromycin, and chloramphenicol. Based on the susceptibility pattern antibiotic therapy was tapered to ceftriaxone. Repeat culture on day 5 after initiating ceftriaxone yielded no growth. The wound healed well with no inexpedient sequelae. The patient recovered and was discharged after complete healing of the operated wound with no residual morbidity.

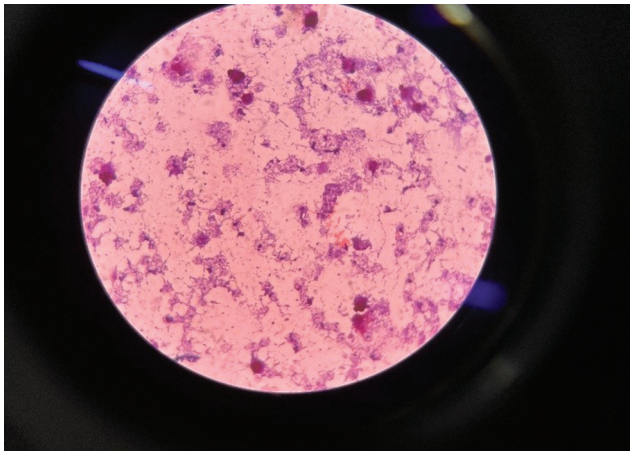

Fig. 1 Direct Gram smear showing pus cells with Gram-negative bacilli.

Fig. 2 Nonlactose fermenting colonies on MacConkey agar.

Discussion

Salmonella enterica encompasses more than 2,500 serovars. *S. enterica* serovar *Typhi* and *Paratyphi* are facultative human intracellular organisms. These organisms commonly cause enteric fever and gastrointestinal manifestations among the residents of developing countries.[4] The emergence of multidrug-resistant salmonella has resulted in the associated mortality and morbidity escalation.

Rarely these bacilli have been attributed to the causation of extraintestinal abscesses, osteomyelitis, and arthritis due to hematogenous seeding of the bacteria secondary to overt/silent bacteremia. Splenic dysfunction, sickle cell anemia, compliment dysfunction, micronutrient deficiency, and necrotic bones[5,6] are factors predisposing to salmonella osteomyelitis. Fertile but slack blood flow to the metaphysis of bones in addition to infective foci proximity predispose them as fertile grounds for salmonella osteomyelitis. Salmonella is essentially a rare etiological agent of osteomyelitis accounting for only 0.45% of osteomyelitis.[7]

The boundless use of prophylactic and metaphylactic antimicrobials in ranching has contributed immensely to the development of drug resistance among foodborne pathogens such as salmonella species. Further, the food web interaction, faulty municipal drainage system, international travel, and use of fecal manure[8,9] have contributed to the pan-species spread of antibiotic resistance. Drug resistance in salmonella is primarily acquired through plasmid/transposon acquisition or via chromosomal mutation.[10]

Drug resistance among disease-causing stains of salmonella remains the foremost obstacle in effective treatment of salmonella infections. Ciprofloxacin has been the drug of choice for treatment of salmonella infections post the emergence of chloramphenicol, ampicillin, and trimethoprim resistance. However, the early 2000s showed an increasing trend of resistance to nalidixic acid and quinolones necessitating alternative antimicrobials.[11] Extended-spectrum cephalosporins and azithromycin came in as alternatives. But soon there followed the emergence of broad-spectrum β-

lactamases in typhoidal salmonellae.[12] A systematic literature review in 2017 by Browne et al indicated the regain of susceptibility to first-line drugs among salmonella isolates.[13] The patient in our case report showed resistance to ciprofloxacin and aminoglycosides, thus stressing the need for appropriate culture identification and antimicrobial susceptibility testing for reducing morbidity and mortality in patients.

Conclusion

This case report brings out the usefulness of strong collaboration between physicians and the laboratory toward deciding the appropriate antibiotic thereby reducing the morbidity in a rare case of extraintestinal salmonella osteomyelitis.

Conflict of Interest
None declared.

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