

Extra-intestinal salmonellosis in a tertiary care centre in South India

Vithiya Ganesan¹, Shyamala Ravikoti², Raja Sundaramurthy^{2*}, Monica Raghavan³, Rajendran Tiruvanamalai¹

¹Department of Microbiology, Velammal Medical College Hospital and Research Institute (VMCH&RI), Madurai, Tamilnadu, India

²Department of Microbiology, All India Institute of Medical Sciences (AIIMS), Bibinagar, Hyderabad, Telangana, India

³SRM Medical College Hospital and Research Centre, Chengalpattu, Tamilnadu, India

Received: September 2022, Accepted: October 2023

ABSTRACT

Background and Objectives: Extra-intestinal salmonellosis is associated with higher case fatality and is underestimated in the developing countries like India. Here we present a case series of bacteriologically proven extra-intestinal salmonellosis managed at our institute over the past two years.

Materials and Methods: Retrospective analysis of bacteriologically proven extra-intestinal salmonellosis over two years between January 2020 to December 2021 was carried out. Medical records were reviewed for site of infection, evidence of any underlying or predisposing illnesses and antimicrobial susceptibility report.

Results: Eight patients were diagnosed with extra-intestinal salmonellosis. Male to female ratio was 3:1. Mean age was 44 years. Four were typhoidal and four were nontyphoidal *Salmonellae*. The extra-intestinal sites involved were purulent aspirates from scrotum, caecum, perianal region, intraperitoneal collection, synovium, and urine. Predisposing factors include chronic myeloid leukemia, HIV and gastric malignancy. All deep seated abscess required surgical intervention. All typhoidal *Salmonella* (n=4) were sensitive to cotrimoxazole, ampicillin, ceftriaxone. Among nontyphoidal *Salmonella*, one was resistant to cotrimoxazole; two were resistant to ampicillin, ceftriaxone and three resistant to ciprofloxacin.

Conclusion: The diagnosis of extra-intestinal salmonellosis requires a high degree of clinical suspicion and should be included in the differential diagnosis in patients with deep-seated abscesses.

Keywords: Salmonellosis; *Salmonella enteritidis*; Abscess; Pancreatitis

INTRODUCTION

The clinical significance of extra-intestinal manifestations of *Salmonella* is not often appreciated. There are very few documented reports on the actual prevalence of these infections, especially from an endemic region such as India (1, 2). Invasive non-typhoidal salmonella are clinically indistinguishable from other febrile illnesses with higher case fatality (3). Here we present a case series of eight cases of

bacteriologically proven extra-intestinal salmonellosis managed at our institute over the past two years.

MATERIALS AND METHODS

The microbiology laboratory records of the extra-intestinal specimens that were culture-positive for *Salmonella*, between January 2020 and December 2021 were included in this retrospective study. The

*Corresponding author: Raja Sundaramurthy, MD, Department of Microbiology, All India Institute of Medical Sciences (AIIMS), Bibinagar, Hyderabad, Telangana, India. Tel: +91-9791304297 Email: rajacmc87@gmail.com

corresponding medical records of the patients were further reviewed for site of infection and evidence of any underlying or predisposing illnesses. The extra-intestinal specimens were purulent aspirates and urine. They were first processed using standard methods, on 5% sheep blood agar and MacConkey agar. Colonies suspected as *Salmonella* were identified by the Vitek-2 system and serotyping was confirmed by doing the slide agglutination test by using the specific antisera (Denka-Seiken, Tokyo, Japan). Antimicrobial susceptibility testing was performed by Vitek-2. Institutional ethical committee approval (VMCIEC/11/2022) was obtained for the study.

RESULTS

Over the two-year study period, eight patients were diagnosed with extra-intestinal salmonellosis. Clinical spectrum of the cases is presented in Table 1. Male to female ratio was 3:1. Mean age of the patients was 44 years, range 30 and 70 years. Four were typhoidal and four were nontyphoidal *Salmonella* (NTS). There was no history of enteric fever in these patients. Blood and stool cultures were negative and Widal tests were non-reactive in all the cases. The extra-intestinal sites involved were purulent aspirates from scrotum, caecum, perianal region, intraperitoneal collection, synovium, and urine. Fifty four year old retropositive male on antiretroviral therapy for four years presented with right testis swelling for four days, insidious in onset, progressed rapidly to size 4×6 cm associated with throbbing pain. Scrotal exploration with right orchidectomy was performed the next day and around 50ml purulent material was drained which grew *Salmonella* Paratyphi B and sloughed out testis was removed. Forty five year old man operated for gastric malignancy presented with abdominal pain, vomiting and burning micturition for 20 days. CT abdomen showed findings suggestive of prostate abscess (Fig. 1 A). Urine culture grew multidrug resistant non typhoidal *Salmonella*. His condition improved with conservative management with antibiotics. Other unusual focal infections were also reported. Thirty three year old male with perianal abscess was managed with incision and drainage. Pus culture grew *Salmonella* Typhi. Patient had similar episode four years back with unknown etiology. Another thirty year healthy male presented with fever, abdominal pain and loose stools for 10 days. On laparotomy, around 150 ml pus was collected in right iliac fossa walled off by caecum,

with a 6 cm long fish bone lying in the abscess. Abscess was drained, peritoneal lavage, appendectomy and diversion loop ileostomy were performed. Pus culture grew *Salmonella* Paratyphi A. Fifty three year old male without any biliary tract abnormalities presented with acute necrotizing pancreatitis (Fig. 1B). Pigtail drain fluid of intraperitoneal collection grew *Salmonella* Typhi. Unusual pathogen was reported in a 39 year old immunocompetent female who developed lower urinary tract infection with *Salmonella enterica* subspecies arizonae.

Predisposing factors were chronic myeloid leukemia, HIV, gastric malignancy. All deep seated abscess required surgical intervention. Three cases (*Salmonella* in urine due to prostate abscess, UTI, gastroenteritis) were managed with antibiotics. All the patients recovered without any recurrence. All typhoidal *Salmonella* (n=4) were sensitive to cotrimoxazole, ampicillin, ceftriaxone, cefepime and all but one had intermediate susceptibility to ciprofloxacin and levofloxacin. Among nontyphoidal *Salmonella*, one was resistant to cotrimoxazole and cefepime, two were resistant to ampicillin and ceftriaxone and three resistant to ciprofloxacin.

DISCUSSION

Extra-intestinal infections, though less frequent, may affect different sites in the body. Ours is a tertiary care super specialty and referral hospital in South India. As per the microbiological records of the past two years, eight patients had bacteriologically proven extra-intestinal salmonellosis, one case in 2020 and seven cases in 2021. Distinct peak incidence in 2021 cannot be explained. Predominantly, middle aged men were affected. *S. Typhi* was the predominant serotype which may be attributed to the endemicity of the organism in our country.

Salmonella spp. is a rare cause of pyocele. Chung Bin and Hakkim reported neonatal pyocele due to *Salmonella* Enteritidis and *Salmonella* Derby in two cases, the pathogenesis of which is unclear (4). *Salmonella* is an atypical agent for septic arthritis in post antibiotic era. It is particularly reported in acute arthritis patient with sickle cell anemia and systemic lupus erythematosus (5, 6). We had a young male with chronic myeloid leukemia under chemotherapy who developed secondary osteoarthritis with *Salmonella* enteritidis. We emphasize that joint infections can be caused by atypical bacteria like salmonella species in immune compromised individuals.

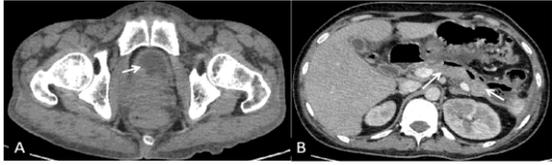


Fig. 1. A: CT whole abdomen showing ill-defined hypodense areas with mild peripheral enhancement in both lobes of mid prostate probably abscess
B: CT Abdomen showing necrotizing pancreatitis with non-enhancing walled off necrosis predominantly in the body and tail region

Prostatic abscesses due to *Salmonella* are exceedingly rare and have previously been described in immunocompromised patients (7). In the current series, prostate abscess developed in a patient operated for gastric malignancy. Although it is unclear whether the primary source of infection in this case was gut translocation or ascending urinary tract infection, spread between the sites was most likely hematologic as bacteremia is a known complication of *Salmonella* infections. Focal infections with typhoidal *Salmonella* are known to occur (8). The majority of case reports involving *Salmonella* pancreatitis showed relatively mild–moderate pancreatitis not requiring surgical intervention. A case of severe necrotizing pancreatitis due to *Salmonella* Typhimurium has been reported in the literature (9). In this series, a case of acute necrotizing pancreatitis due to *Salmonella* Typhi was reported. There are several documented reports of human infections by an unusual pathogen, *Salmonella enterica* subspecies *arizonae*, mostly in immunocompromised individuals (10). In this series, immunocompetent female who developed lower urinary tract infection with *Salmonella enterica* subspecies *arizonae* recovered without any complications.

NTS shows higher antimicrobial resistance to antimicrobials posing a serious threat to human population. This occurs mostly due to the widespread use of antimicrobials in food of animals. Among four isolates of nontyphoidal *Salmonella* in this series, one was resistant to cotrimoxazole and cefepime, two were resistant to ampicillin and ceftriaxone and three resistant to ciprofloxacin.

CONCLUSION

Infections with typhoidal *Salmonella* species can involve any organ or system. Abscesses may occur

as a late complication in almost any *Salmonella* infection. The diagnosis of extra-intestinal salmonellosis requires a high degree of clinical suspicion and should be included in the differential diagnosis in patients with deep-seated abscesses. Infections due to NTS are often underestimated in the developing countries like India. The need for a high degree of clinical suspicion in immunocompromised individuals cannot be overemphasized.

REFERENCES

1. Sudhaharan S, Kanne P, Vemu L, Bhaskara A. Extraintestinal infections caused by nontyphoidal *Salmonella* from a tertiary care center in India. *J Lab Physicians* 2018; 10: 401-405.
2. Sudhaharan S, Padmaja K, Solanki R, Lakshmi V, Umabala P, Aparna B. Extra-intestinal salmonellosis in a tertiary care center in South India. *J Infect Dev Ctries* 2014; 8: 831-837.
3. GBD 2017 Non-Typhoidal Salmonella Invasive Disease Collaborators. The global burden of non-typhoidal salmonella invasive disease: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet Infect Dis* 2019; 19: 1312-1324.
4. Munigangaiah S, Khan H, Fleming P, Dolan MA. Septic arthritis of the adult joint secondary to *Salmonella enteridis*: a case report. *J Foot Ankle Surg* 2011; 50: 593-594.
5. Gerona JG, Navarra SV. *Salmonella* infections in patients with systemic lupus erythematosus: a case series. *Int J Rheum Dis* 2009; 12: 319-323.
6. Giessing M, Baumgart E, Lenk S, Loening SA. *Salmonella* Typhimurium prostatic abscess: a rare cause of persisting dysuria in an AIDS patient. *AIDS* 2003; 17: 449-450.
7. Liu C-K, Liu C-P, Leung C-H, Sun F-J. Clinical and microbiological analysis of adult perianal abscess. *J Microbiol Immunol Infect* 2011; 44: 204-208.
8. Blank A, Maybody M, Isom-Batz G, Roslin M, Dillon EH. Necrotizing acute pancreatitis induced by *Salmonella typhimurium*. *Dig Dis Sci* 2003; 48: 1472-1474.
9. Landron C, Le Moal G, Roblot F, Grignon B, Becq-Giraudon B. *Arizonae* subspecies *Salmonella enterica* urinary infection with confusional syndrome. *Presse Med* 2003; 32: 696-697.
10. Lee Y-C, Hung M-C, Hung S-C, Wang H-P, Cho H-L, Lai M-C, et al. *Salmonella enterica* subspecies *arizonae* infection of adult patients in Southern Taiwan: a case series in a non-endemic area and literature review. *BMC Infect Dis* 2016; 16: 746.