

Isolation of *Salmonella* Kentucky from Scrotal Abscess: A Rare Case Report

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ABSTRACT

Infections due to Non Typhoidal *Salmonella* (NTS) are emerging as a major health problem for both humans and animals worldwide including in India. In humans, NTS infections routinely remain restricted to the intestinal tract and may or may not manifest as a clinical illness but in immunocompromised patients systemic involvement may result in frank bacteraemia or focal involvement depending on the site of localisation. A 70-year-old, male presented to the Emergency Department with complaints of pain for about five days, on the right side of the scrotum. A drained pus sample was received at the Department of Microbiology for culture and sensitivity. *Salmonella* kentucky was identified by standard microbiological techniques. Here the authors present a case of scrotal abscess caused by *Salmonella* kentucky in an old immunocompromised patient and this possibly appears to be the first case report of scrotal involvement from India. No single diagnostic approach may be able to identify the NTS up to the species level. To determine the identity of organisms in cases where individual labs may not have the necessary capacity to produce the results, it would be extremely sensible from a scientific standpoint to create a network of cooperating labs with varying diagnostic capacities.

Keywords: Abrrtent abscess, Non typhoid salmonella, Rare clinical case

CASE REPORT

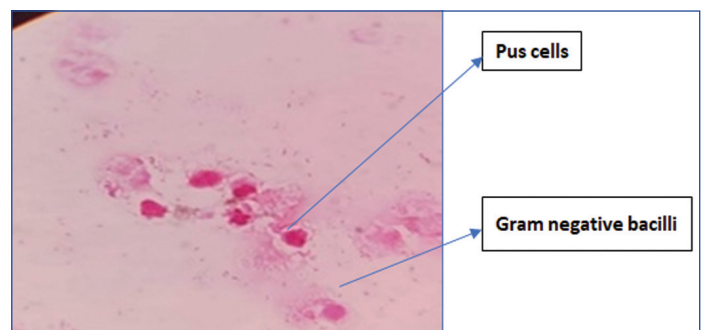
A 70-year-old, male presented to the Emergency Department with complaints of persistent moderate to severe pain and swelling on the right side of the scrotum for about five days [Table/Fig-1].



[Table/Fig-1]: Scrotal abscess.

The patient had discomfort while urinating. He was hypertensive and diabetic but compliance to oral hypoglycaemics and anti-hypertensives was very irregular from past six months. Recently, he was diagnosed as a case of schizophrenia also. He had undergone below knee amputation in the right leg 10 years ago and amputation of the left foot six years ago due to diabetic complications. His personal history revealed that he was a non vegetarian, alcoholic and fond of eating raw eggs. One of the significant events of the past included the history of profuse diarrhoea for one week about four months back and an injury in the groin due to a fall, during that episode of diarrhoeal illness. A treatment from a local doctor had settled that event. Presently, he was having low-grade fever, malaise and some loss of appetite. Patient did not have any urinary complaints and bowel movements were normal.

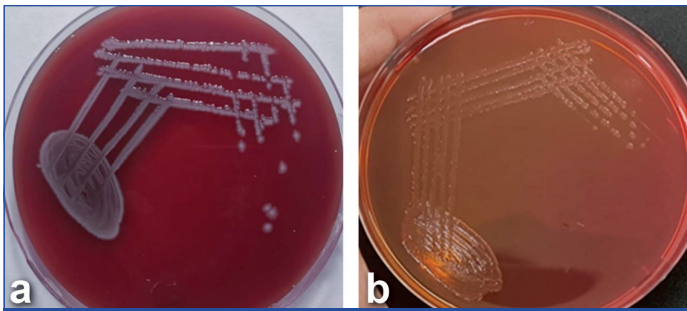
On examination, his vital parameters were within the normal limits. Random blood sugar was 350 mg/dL. Glycated Haemoglobin (HbA1c) was 10.3% reflecting poor retrospective sugar control. On local examination, there was a fluctuant and tender swelling on the right side of the scrotum the overlying skin was red hot. The left testis appeared normal. Paradoxically, regional lymph nodes were not palpable. His routine haematological and biochemical parameters were within the reference range. Blood (paired blood samples), urine and stool culture were sterile. C-reactive Protein (CRP) was raised (6.8 mg/dL). Incision and drainage with minimal debridement was undertaken and a drained pus sample was referred to the Department of Microbiology for culture and sensitivity. After the sample was received in the Microbiology Laboratory, it was inoculated into Brain Heart Infusion (BHI) broth, blood agar and MacConkey agar and incubated at 37°C for 18-24 hours. A direct gram stain of the sample revealed plenty of pus cells with few Gram-negative Bacilli (GNB) [Table/Fig-2].



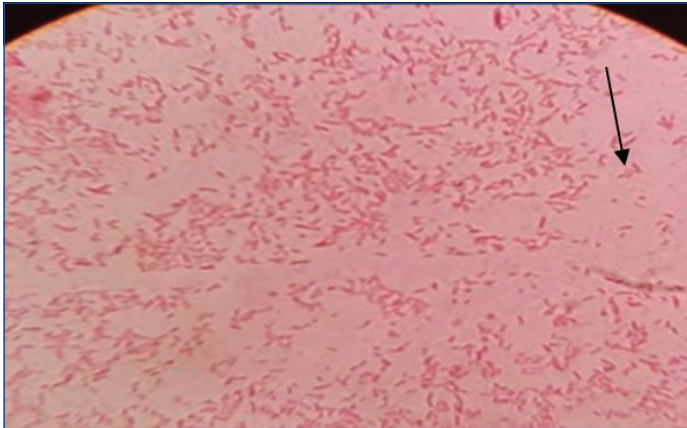
[Table/Fig-2]: Gram stain of pus sample showing GNB and pus cells under 1000x. (Oil immersion lens).

On culture after 24 hours of incubation greyish white, non haemolytic, moist, circular colonies with a smooth convex surface on blood agar [Table/Fig-3a] and 1-3 mm in diameter pale Non lactose Fermenting (NLF) colonies on MacConkey agar [Table/Fig-3b] were observed.

The organism was gram-negative bacilli on grams staining [Table/Fig-4] and BHI showed uniform turbidity and the organism was motile on hanging drop preparation and biochemical reactions appeared

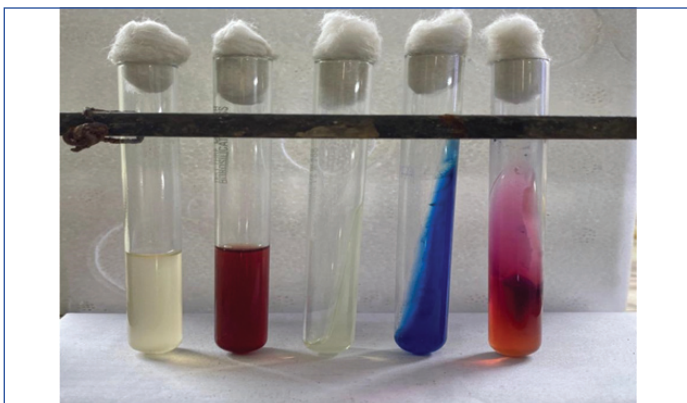


[Table/Fig-3]: a) Blood agar plate showing non haemolytic colonies; b) MacConkey agar plate showing NLF colonies.



[Table/Fig-4]: Gram staining of culture plate growth showing GNB under 1000x. (Oil immersion lens).

to indicate some *Salmonella* species (catalase positive, oxidase test negative). Urease negative, citrate positive, K/A with H₂S on Triple Sugar Iron (TSI) agar medium, methyl red positive [Table/Fig-5].



[Table/Fig-5]: Biochemical reaction. From left to right: BHI broth, Methyl red reaction, urease test, citrate test and Triple Sugar Iron (TSI) test

Vitek 2 ID system reported identification compatible with *Salmonella* species. In the MALDI Biotyper, the isolate was identified as group C of the Kauffman and White scheme of identification of *Salmonella* species. Negative results of agglutination with typhoidal *Salmonella* antisera signalled the possibility of NTS. The isolated species was identified as kentucky after this agglutinated with O:8,20 and H: 1, z6 by using commercial antisera (Statens Serum Institute, Copenhagen, Denmark; and Denka Seiken, Tokyo, Japan) in Lady Hardinge Medical College New Delhi (Referral lab for the typing sera). The antimicrobial susceptibility of the isolates was tested by the Vitek 2 system (bioMérieux) and interpreted by Clinical Laboratory Science Institute (CLSI) guidelines [1]. The isolate was susceptible to ceftriaxone, cotrimoxazole, amoxiclav, piperacillin-tazobactam, imipenem, meropenem, ertapenem and tigecycline but resistant to amikacin and ciprofloxacin by Vitek 2 GNB 405 card that had passed Quality Control (QC) check.

The patient was started on an injection of ceftriaxone 1 g/day in one dose/day for seven days. The patient was discharged

seven days after his fever subsided and there was significant improvement in the symptoms of pain in the scrotal area. During follow-up after two weeks of discharge, it was seen that there was complete resolution of his testicular abscess. He was advised to keep a strict check on his plasma sugar, was suggested another follow-up after two months. The patient's caregiver was advised to help him comply with the antidiabetic drugs and advised not to allow the patient to consume raw eggs.

DISCUSSION

Genus *Salmonella* is one of the most important members of the family Enterobacteriaceae. It encompasses more than 2600 serovars which have practically been implicated in infectious pathologies across the complete spectrum of the human and animal kingdom [2,3]. Infections due to NTS are emerging as a major health problem for both humans and animals worldwide including in India. Poultry is considered to be the major reservoir host and source of human infections. *Salmonella* kentucky has been reported to be one of the most prevalent serovar associated with poultry [4]. Generally, poultry and animals infected with NTS serotypes may not show typical clinically significant illness but systemic involvement has been reported in birds, very young or old animals and in instances of large bacterial count exposure [5]. In humans, NTS infections routinely remain restricted to the intestinal tract and may or may not manifest as a clinical illness but have the potential to progress into systemic illness in people with compromised immune function like; very young and elderly, malnourished, diabetics, cancer patients, people living with Human Immunodeficiency Virus (HIV), etc., Systemic involvement may result in frank bacteraemia or focal involvement depending on the site of localisation like; osteomyelitis, arthritis, pulmonary involvement or any possible site where the NTS may migrate and initiate an infectious process. Describe here a case of scrotal abscess caused by *Salmonella* kentucky in an old immunocompromised patient and this possibly appears to be the rare case report of scrotal involvement from our country. Only few comparable case studies have been reported, one of which was from Kuwait, sacral wound containing the species *Salmonella* kentucky was identified; the patient recovered fully after receiving meropenem treatment [6]. Another study, conducted in Canada, found that *Salmonella javiana* was isolated from a scrotal abscess. The patient was treated with ceftazidime and amoxicillin, and made a full recovery [7].

Focal abscesses are usually the result of haematogenous or lymphatic spread rather than a direct extension of some existing pathology. There are descriptions of the association of NTS with localised infections of bones, joints, liver or any possible site where the organisms may migrate and initiate an infectious process [8]. Reports of *Salmonella* isolations from sites like the scrotal area causing epididymal-orchitis are so aberrant that one has to have out-of-the-box thinking to anticipate this species. In this case, it appears plausible that diarrhoeal episodes of the past could have been associated with bacteraemic illness and trauma in the groin area during that period could have created a niche of reduced oxygen tension and provided an opportunity for the organism to establish a latent infection in the epididymal-orchid tissue. The form in which the persistent bacilli exist and the mechanisms that assist persistence are subjects of large scientific investigation but the linkage between persistence and epididymo-orchitis can be conjectured upon.

Based solely on clinical symptoms, it may be quite challenging to suspect *Salmonella* species as the aetiological agent of epididymal-orchitis. Careful microbiological analysis of the clinical sample may be the only reasonable way to determine this organism's causal relationship. The frequency of infections in the United States has significantly increased over time, and

this could be the result of *Salmonella* kentucky becoming more common in hens [9].

There is a reference of fatal septicaemia associated with diarrhoea, due to kentucky in an immunocompetent female from South India else the authors were not able to access cases of invasive kentucky infections from our country [10]. National *Salmonella* and *Escherichia coli* Centre (NSEC) at Central Research Institute (CRI), Kasauli, highlight the need of implementing and improving NTS surveillance in an efficient manner, identifying reservoirs and mechanisms of transmission, detecting the presence of more recent NTS serovars from different clinical samples from human and non-human origin, and developing control programmes with impact evaluation [11].

Not much work is available on the colonisation and virulence mechanisms of kentucky, but it was considered less harmful to humans on account of the assumption that it lacked necessary virulence genes associated with severe human illness. However, the emergence of a multidrug resistant kentucky strain has invoked a pathway for kentucky to cause human infections of concern [12]. In India also the extra-label use of antibiotics, such as cephalosporin, tetracycline and quinolone, in chicken farms is suggested by the high resistance of non typhoidal *Salmonella* isolates to these drugs [13].

CONCLUSION(S)

Isolation of *Salmonella* kentucky from a site as unusual as epididymal-orchitis, underscores the necessity of considering the role of NTS in bacteraemic illnesses and abscesses at aberrant sites. Identification of NTS is a critical diagnostic dilemma since no single diagnostic system may have the competence to identify the NTS up to the species level. Since our nation appears to lack organised data on the scope of the NTS problem and has a sizable population with compromised immune systems, it would be extremely prudent from a scientific standpoint to establish a network of cooperating labs with varying diagnostic capabilities to determine the identity of organisms in cases where individual

laboratory may not have the necessary resources to produce the necessary results.

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