

# Primary non-typhoidal *Salmonella* infection presenting as a splenic abscess in a healthy adolescent male

Nabeel Manzar, Mohamed Almuqamam, Kunal Kaushik, Loai Dahabra, Mariana Falcone, Natalia Rimareva, Louisdon Pierre, Adebayo Adeyinka

Pediatric Intensive Care Unit, Department of Pediatrics, The Brooklyn Hospital Center City, Brooklyn, USA

## SUMMARY

Isolated splenic abscess in a previously healthy patient is a rare clinical condition and remains a diagnostic dilemma. Clinical presentation is often non-specific and leads to a delay in diagnosis. Imaging studies help to elucidate the condition. Despite advances in medical diagnostics and therapeutics, splenic abscesses can cause significant morbidity and can be fatal. Although splenectomy was considered the treatment of choice in the past, recent trends have seen a shift towards more conservative management. We present the clinical case of a patient who presented to our emergency room with a chief complaint of left shoulder and left upper

quadrant abdominal pain. Abdominal imaging showed an intrasplenic collection suspicious for a hemorrhage or an abscess. Percutaneous drainage was successfully performed, followed by conservative management with intravenous antibiotics. The culture of the fluid drained from the spleen was positive for *Salmonella Saintpaul*. The patient improved and was discharged. A high degree of clinical suspicion is necessary for early identification of a splenic abscess. Splenectomy can be avoided with the use of interventional radiological drainage.

*Keywords:* salmonella, spleen, abscess, acute abdomen.

## INTRODUCTION

Primary splenic abscess is a rare clinical condition in immunocompetent individuals and can be fatal. Its incidence varies from 0.14% to 0.7% based on reports done on autopsy [1, 2]. The recognized risk factors for developing a splenic abscess are neoplasm, immunodeficiency, trauma, metastatic infection, splenic infarction, and diabetes [3, 4]. The causative microorganism for a splenic abscess can be very diverse and recent advances in diagnostic imaging allow for a faster and more accurate diagnosis [5, 6]. The treatment of choice for splenic abscesses in the past was considered to be splenectomy.

However, current trends have seen a shift towards more conservative management which spares the spleen thereby preserving its immunologic role [7]. A splenic abscess is reported to occur in up to 0.29-2% of patients with typhoid fever and invasive salmonellosis and in cases of non-typhoidal *Salmonella* like in our patient, the presentation of splenic abscess is even rarer [8, 9]. There is no consensus regarding the gold standard management approach to splenic abscess due to *Salmonella* but few case reports have demonstrated a successful conservative approach in cases of invasive salmonellosis or non-typhoidal *Salmonella* [10, 11].

We report a case of a splenic abscess in an immunocompetent patient secondary to *Salmonella Saintpaul* infection in the absence of any history of recent diarrhea, sick contact or travel outside the United States, that was successfully treated with percutaneous drainage and intravenous antibiotics.

*Corresponding author*

Mohamed Almuqamam

E-mail: malmuqamam@tbh.org

## ■ CASE REPORT

A previously healthy 17-year-old African American male presented to our emergency room (ER) with a 4-day history of worsening left upper quadrant (LUQ) abdominal pain and left sided shoulder pain. He did not have any significant past medical or surgical history but reported fever, a non-productive cough and sore throat that occurred 3 weeks prior to presentation. Ten days prior to presentation, the patient started having non-radiating intermittent sharp left sided shoulder pain that later worsened radiated to the LUQ region. He went to his primary care physician where an ultrasound (US) of the abdomen showed an enlargement of the liver and spleen. He was discharged from his doctor's office with a diagnosis of an acute viral infection. However, his pain did not resolve which prompted the visit to our ER.

Abdominal examination revealed tenderness over left upper quadrant without guarding or rigidity. The spleen was palpable and enlarged 3 cm below left the costal margin. Complete Blood Count and Comprehensive Metabolic Panel were normal. The CRP was markedly elevated at 290 mg/L. The abdominal US showed the spleen measuring 14.0 cm and homogeneous with a complex hypoechoic lesion in the spleen measuring 5.5 x 4.0 x 5.1cm (Figure 1). An abdominal magnetic resonance imaging (MRI) with contrast revealed an irregular, complex posterior splenic lesion possibly splenic abscess measuring approximately 5.7 cm (Figures 2 and 3).

The surgical team was consulted for drainage of the abscess. The case was referred by surgery to interventional radiology for percutaneous drainage due to the fact that the abscess was superficial and unilocular. The drainage took place on day 2 of admission using computed tomography guidance (Figures 4 and 5). Approximately 50 milliliters of purulent bloody aspirate were obtained from the cavity. A Gram stain and culture were performed on the aspirate and a Jackson Pratt® drain was left *in situ*. The fluid culture grew *Salmonella Saintpaul* sensitive to ampicillin, ceftriaxone, ciprofloxacin and multiple other antibiotics but resistant to various cephalosporins like cephalothin, cefazolin, cefuroxime, cefotetan along with amikacin and tobramycin. However, urine, stool and 3 sets of blood cultures did not

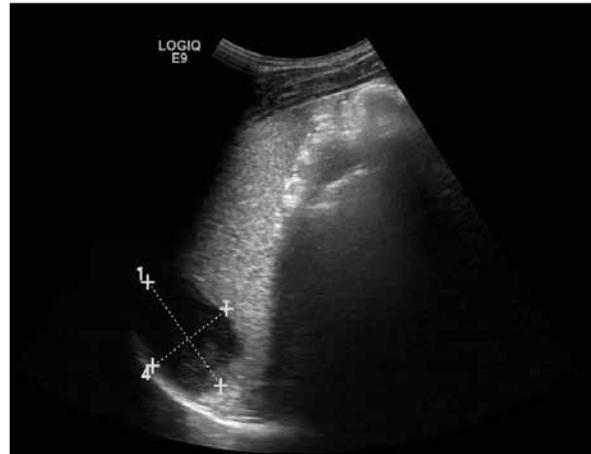


Figure 1 - Ultrasound of the spleen.

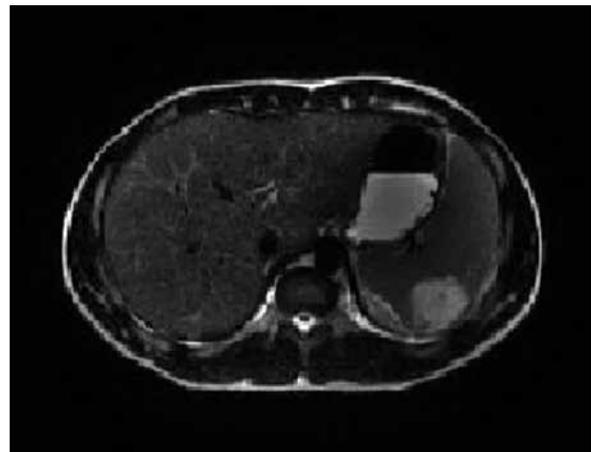


Figure 2 - MRI of the spleen.

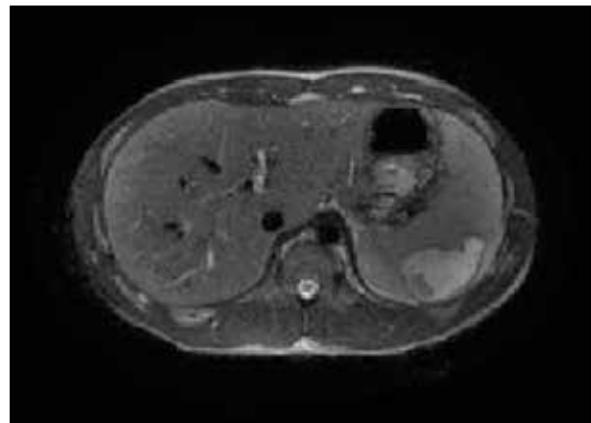


Figure 3 - MRI of the spleen II.



Figure 4 - CAT scan of the spleen before drainage.



Figure 5 - CAT scan of the spleen after drainage.

demonstrate any growth. EBV and HIV testing done were negative. Haemoglobin electrophoresis ruled out sickle cell trait or sickle cell disease. Endocarditis was ruled out with an unremarkable transthoracic echocardiogram.

The patient was started on Zosyn® (piperacillin/tazobactam) 3.375g intravenously every 8 hours and continued to improve despite having febrile spikes initially. The drain was removed on the 10<sup>th</sup> day and on day 11, the patient was discharged home on oral antibiotics with ciprofloxacin 750 mg orally every 12 hours for a total of 14 days. The patient was scheduled to come back to see his primary care doctor in 3-5 days for follow up physical and blood testing.

## ■ DISCUSSION

A splenic abscess is an infrequent presentation encountered among immunocompetent patients. An extensive literature review was conducted by the authors and revealed that a splenic abscess due to a *Salmonella* species is uncommon. It is reported to occur in up to 0.29-2% of patients with typhoid fever. Moreover, in cases of non-typhoidal *Salmonella*, the presentation of splenic abscess is even rarer [8, 11]. Fever is the most common complaint followed by abdominal pain and tenderness to abdominal palpation [12]. The median duration of symptoms in one case series was around one month (range = one week to six years) [7]. Several other studies from Asia have

reported similar findings [3, 13, 14]. Multiple studies have noted various predisposing conditions that lead to the development of a splenic abscess. Among them, trauma, metastatic haematogenous infection, immunodeficiency, splenic infarction, and contiguous site of infection were usually recognized [3, 4].

Humans come in contact with *Salmonella* by eating foods that have been contaminated by feces like raw meat, poultry, seafood, eggs, fruits and vegetables. Environmental risk factors for acquiring *Salmonella* include activities that may bring you into closer contact with *Salmonella* like international travel or owning a pet bird or reptile. Host factors for acquiring *Salmonella* include gastric or intestinal disorders that alter the natural defenses like inflammatory bowel disease, the use of antacids or broad-spectrum antibiotics. Immunosuppression also increases the risk whether due to a medical condition like AIDS or sickle cell disease or due to medication use like steroids and immunosuppressors. None of these predisposing factors were seen in our patient. The spectrum of causative organisms for a splenic abscess is very large with anaerobes being more common than the aerobes [5]. More recent studies revealed Gram negative organisms were the most common causative organisms [6]. Similarly, our case was secondary to an infection from a Gram negative organism, *Salmonella Saintpaul*. The United States had a *Salmonella Saintpaul* outbreak in 2013 linked to imported cucumbers from Mexico that resulted in 84 cases of

gastroenteritis, 17 hospitalizations and 0 deaths. No cases were documented in New York State or any of the neighboring states [15]. Our patient's illness was in March 2018, which is 5 years after the Center for Disease Control (CDC) announced that the *Salmonella Saintpaul* outbreak was over. The CDC estimates that *Salmonella* causes about 1.2 million illnesses, 23,000 hospitalizations, and 450 deaths in the United States every year. Among these illnesses, about 1.1 million are acquired within the United States. The Bureau of Communicable Disease Control reports that as of May 2017, New York City - which is where our case was seen - had 3063 cases of *Salmonella* over the last 3 years with a crude rate of 12.0 per 100,000 [16].

A negative aspirate culture from a splenic abscess has been reported in up to 30% of cases, which may reflect prior antibiotic use or fastidious organisms [17, 19]. Apart from these, cases of splenic abscesses caused by Mycobacteria, Brucella, *Coxiella burnetii*, Bartonella and other organisms have also been reported [20-22]. In our case, no contiguous or distant sites of infection were detected. This is in contrast to some reports suggesting that blood cultures may be positive in about half of the patients with a splenic abscess [23, 24].

Splenectomy was previously considered the gold standard for treatment of a splenic abscess [25]. Some recent reports have even indicated splenectomy as the best therapeutic choice [26]. However, the need for splenectomy as a primary modality has been challenged by several recent studies that demonstrated conservative management (*i.e.*, antibiotics with or without percutaneous drainage) was possible [3, 7, 10]. In these studies, only about 18% to 22% of patients required therapeutic splenectomy. Approximately 80% of the patients were managed conservatively. Both of these approaches have been described in the literature.

Percutaneous drainage has been a successful approach when the abscess collection is unilocular or bilocular, with a complete and thick wall, no internal septations, and when the content is favorable for drainage. If there are more than two collections, surgical treatment is preferred [27]. Irrespective of surgical or nonsurgical drainage, appropriate antibiotic therapy is vital to the management.

## CONCLUSION

In conclusion, an early diagnosis for a splenic abscess requires a high index of suspicion which lowers the mortality. The best therapeutic approach for treatment of a splenic abscess is still controversial. However, based on our experience and current literature, percutaneous aspiration of a splenic abscess can be safely used in conjunction with antibiotic therapy. These measures can reduce the need for a splenectomy.

## Conflict of interest

None.

## ACKNOWLEDGEMENTS

The authors would like to acknowledge the invaluable contribution of Dr. Keneisha Bailey in reviewing and editing the manuscript.

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