

CASE REPORT

Salmonella Thompson splenic abscess in a healthy female

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SUMMARY

A 26-year-old woman presented with a 5-day history of fever and 3-day history of left upper quadrant abdominal pain and cough associated with left shoulder tip pain. Initial blood cultures did not display growth. On CT imaging, there was a cyst measuring 7.2×8 cm originally interpreted to be haemorrhagic in nature. Repeat cultures during admission revealed *Salmonella Thompson*. Percutaneous drainage and antibiotic treatment, rather than splenectomy, was successfully pursued with the patient afebrile and in no pain at 6 weeks follow-up.

BACKGROUND

This case report seeks to bring a splenic abscess to the forefront of a clinician's thoughts when faced with a patient with fever and left shoulder tip pain and to have them first consider a spleen-sparing approach as a means of source control of the splenic abscess.

CASE PRESENTATION

Our patient is a 26-year-old white woman who presented to the emergency department of a tertiary care centre with a 5-day history of fever and a 3-day history of left upper quadrant abdominal pain and cough associated with left shoulder tip pain. She was a healthy patient with no history of immunodeficiency or recent travel. She had a motor vehicle accident 2 years prior to presentation. This was complicated by self-limiting abdominal pain, for which she never sought medical help. Two weeks prior to presentation, she and a friend ate at a restaurant, soon after which her friend developed a self-limited diarrhoea. On examination, she was febrile and tachycardic. Her abdomen was diffusely tender without signs of peritonitis. No masses could be palpated. The remainder of her physical examination was otherwise unremarkable.

INVESTIGATIONS

Investigations demonstrated a leucocytosis ($12.3 \times 10^9/L$). β -human chorionic gonadotropin was negative. Initial blood cultures did not show growth. Urine culture demonstrated no growth and stool cultures were not collected since she had normal bowel movements. A chest X-ray was normal. However, a CT scan of her abdomen demonstrated a 7.2×8 cm cyst in the upper pole of the spleen (figure 1), radiologically interpreted as a haemorrhagic cyst.

DIFFERENTIAL DIAGNOSIS

The diagnosis of a haemorrhagic cyst, perhaps a distant complication of her motor vehicle accident, was considered the most probable cause of her symptoms. Supportive care, primarily with intravenous fluids and opioid analgesia, was pursued. On the second day of her admission, her abdominal pain became more unbearable and her fevers and rigours would not relent. She developed a salmon-coloured, macular rash, which first appeared on her left upper extremity in close proximity to the peripheral intravenous line and ultimately appeared on her trunk. This was thought to be a minor hypersensitivity reaction to the contrast that she required for the aforementioned CT scan. In light of her clinical decline, another set of blood cultures were drawn. Though the first set grew nothing, the second set grew Gram-negative bacilli, which were ultimately identified as *Salmonella Thompson*. Her haemorrhagic cyst, though certainly underlying her abdominal pain, diverted attention away from an invasive salmonellosis. Bearing in mind the microbiological diagnosis, her rash was retrospectively diagnosed as 'rose spots.' She was started on ceftriaxone. Despite 5 days of antibacterial therapy, her fever and abdominal pain persisted.

TREATMENT

It was ultimately decided that source control was not achieved. Guided by the hypothesis that her haemorrhagic cyst was rather an abscess, she underwent an ultrasound-guided, percutaneous drainage by interventional radiology. The drained fluid was frank pus. It ultimately grew *Salmonella Thompson*. Within 24 hours of drainage, defervescence was achieved.

OUTCOME AND FOLLOW-UP

Her admission was complicated by dyspnoea secondary to a large left pleural effusion confirmed by a repeat chest X-ray on day 10 of admission. It required thoracentesis, which drained more than 1 L of fluid. Pleural fluid analysis demonstrated exudate without bacteria observed on Gram stain or grown on cultures. It was thought to be reactive in aetiology; that is, the abscess resulted in diaphragmatic irritation, which itself produced a sympathetic pleural effusion. Of the 12 documented cases of non-typhoid *Salmonella* splenic abscesses in adults, five had associated pleural pathology, one of which was an effusion with no bacterial growth,¹ one of which was an empyema with growth of the



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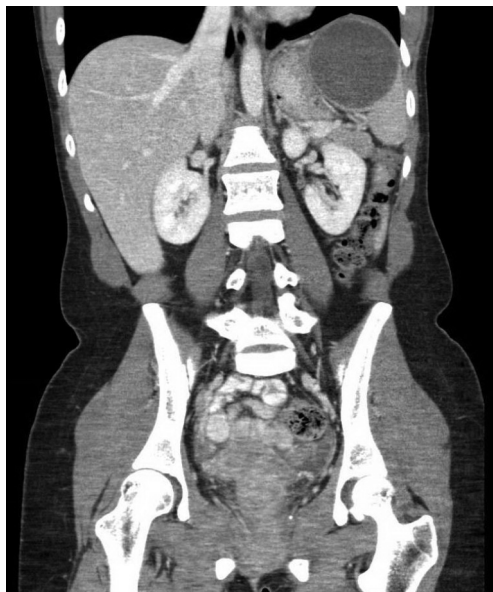


Figure 1 Coronal slice of a CT scan (venous phase) of the abdomen demonstrating a cyst (7.2×8 cm) in the upper pole of the spleen.

same *Salmonella* species as was grown in the splenic abscess² and three of which were called an effusion but were not sampled.^{3–5} Her admission was also complicated by abdominal pain in her lower quadrants secondary to an 8.3×2.0×3.2 cm pelvic abscess diagnosed by a repeat CT scan of her abdomen on day 16 of admission. It was thought to be a consequence of leakage of the splenic abscess during percutaneous drainage. Because of the difficulty with which this abscess would be percutaneously drained, conservative management was pursued. Our patient was discharged on day 21 of admission, transitioned to ciprofloxacin to achieve a total of 6 weeks of antimicrobial therapy and continued on opioid analgesia for a short-term course. At a follow-up appointment 2 weeks after the completion of her course of antibiotic therapy, she was afebrile and in no pain. She remained asymptomatic both 6 months and 1 year after discharge. As a consequence of her lack of symptoms, no repeat imaging was performed.

DISCUSSION

The incidence of splenic abscesses has been estimated to be between 0.07% and 0.2% in the adult population.⁶ Splenic abscesses have a mortality rate as high as 15%⁷ and in a study of 56 such cases, 96% were a consequence of bacteria, of which 1.9% were a consequence of *Salmonella* species.⁸ Most patients who develop a splenic abscess have a predisposition to it, including immunodeficiency, diabetes and sickle cell disease.⁹

This is the first documented case of a splenic abscess secondary to *Salmonella* Thompson.

This case is peculiar in that the patient was immunocompetent. Of the 12 documented cases of non-typhoid *Salmonella* splenic abscesses in adults (see online supplementary table 1^{1–5 10–15}), 7 did not have a medical history,^{1–3 10 13–16} 2 had a medical history of type 2 diabetes mellitus, to which the extraintestinal *Salmonella* infection was attributed,^{5 14} 1 had a medical history of achlorhydria, to which the infection was attributed¹¹ and 2 did not have a medical history reported.¹² Our case, in the context of these cases, suggests that an immunocompromised state is not a prerequisite to a disseminated non-typhoid *Salmonella* infection. Rather, it is hypothesised that her motor vehicle accident

resulted in trauma to the spleen, which resulted in the development of her cyst. It is known that up to 56% of non-parasitic splenic cysts are of traumatic origin.¹⁷ This cyst evaded detection because she never sought medical attention. Ultimately, she developed a bacteraemia with *Salmonella* Thompson, substantiated by the presence of ‘rose spots’, acquired from contaminated food consumed at the restaurant. The splenic cyst served as a point of seeding for *Salmonella* Thompson, culminating to a splenic abscess.

The most common symptoms with which a patient with a splenic abscess may present are left upper quadrant pain and fever and the most common signs are splenomegaly and pleural effusion.^{18 19} Clinical suspicion of a splenic abscess should therefore drive the collection of blood cultures and radiological confirmation. CT with contrast, rather than ultrasound, should be performed in all patients in whom the suspicion of splenic abscess is raised since it has a very high sensitivity (96%) and specificity (90% to 95%).^{20–22}

The diagnosis of a splenic abscess was delayed in the present case because of an initially negative blood culture and radiological findings that were not entirely consistent with an abscess. Therefore, if a splenic abscess is on the differential diagnosis, we recommend repeat blood cultures and a discussion with the radiologist about its possibility. It has been shown that up to 13% of splenic abscesses are blood culture negative.²³ In the nine documented outbreaks of *Salmonella* Thompson (see online Supplementary file 1),^{24–31} eight reported information about the clinical status of the patients that constituted the outbreaks. Though mortality was uncommon (4 out of 112 patients in a smoked-salmon outbreak²⁴), hospitalisation was common, ranging from 9% to 35%.^{24 26–30} Clinical presentation was variable: fever was present in 55% to 89% of the patients, abdominal pain in 53% to 79% of patients and diarrhoea in 71% to 100% of patients. None of the articles reported a splenic abscess or extraintestinal disease. Therefore, though *Salmonella* Thompson is unlikely to result in mortality, it is capable of causing an infection sufficiently severe to warrant hospitalisation.

Early supportive care, including intravenous fluid resuscitation, and empiric antibiotics, generally third or fourth generation cephalosporins, are essential for positive outcomes.³² The spectrum of activity should be narrowed according to culture and sensitivity results. The optimal duration of antibiotics is not well established but can range from 10 to 21 days.^{33 34} However, antibiotic treatment alone is not sufficient to resolve a splenic abscess and source control must be achieved by means of splenectomy or percutaneous drainage. Splenectomy is considered the gold standard of treatment and is indicated in the following clinical contexts: multiple abscesses, multiloculated abscesses, debris-contained abscess, poorly defined abscess on CT or poor route of percutaneous drainage. Recently, percutaneous drainage and antibiotic therapy, without splenectomy, have been shown to be an effective treatment modality.³⁵ Percutaneous drainage is appropriate in the following clinical contexts: small abscesses (<4 cm), solitary abscesses and patients who are too haemodynamically unstable for surgery or are otherwise not surgical candidates.³⁶

Our patient was successfully treated with appropriate intravenous antibiotics and percutaneous splenic abscess drainage. Of the 12 documented cases of non-typhoid *Salmonella* splenic abscesses in adults, four were treated without a splenectomy.^{1 12 16} In the other eight cases, splenectomy was performed after a judged failure of splenic abscess drainage in two cases^{10 15} and splenectomy was the primary intervention in the remaining six cases.^{2 3 5 11 13 14} That this is the fifth documented case of

successful splenic abscess drainage suggests that a spleen-sparing approach should be primarily attempted to preclude the significant risks of surgery and to circumvent the immunodeficient state that asplenia confers.

Learning points

- ▶ *Salmonella* Thompson can cause splenic abscesses.
- ▶ Predisposition to a splenic abscess may not only be conferred by an immunological deficiency but also by an anatomical abnormality.
- ▶ Splenic abscess should be strongly considered in the differential diagnosis with the presentation of fever and left upper quadrant pain. We suggest serial blood cultures and discussion with radiology to confirm diagnoses.
- ▶ Though splenectomy has been considered the gold standard treatment of a splenic abscess, the present case was effectively treated by percutaneous drainage and antibiotics, the choice of which was driven by culture and sensitivity.

Contributors MJB and TY are co-first authors. MJB contributed to study design, data collection, data analysis and writing. TY contributed to study design, data collections, data analysis, writing. YP contributed to study design and writing.

Competing interests None declared.

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