CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 38 (2017) 176–179

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Case report of successful partial splenectomy for a splenic abscess in a paediatric patient

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ARTICLE INFO

Article history:
Received 26 June 2017
Received in revised form 23 July 2017
Accepted 23 July 2017
Available online 25 July 2017

Keywords:
Case report
Splenic abscess
Salmonella infection
Salmonellosis
Splenectomy
Partial splenectomy

ABSTRACT

INTRODUCTION: Splenic abscess (SA) is a rare potentially fatal condition in the paediatric population. It is difficult to diagnose given its non-specific presentation. There are no current guidelines for management of SA in this population but splenic preservation is advantageous given the vital role the spleen plays in immunity.
PRESENTATION OF CASE: We present a case of a 15-year-old boy with a large splenic abscess. He underwent successful partial splenectomy with resolution of his symptoms thereafter.
DISCUSSION: Standard surgical treatment for splenic abscess is antibiotics and drainage. Spleen-preserving options include percutaneous drainage, partial splenectomy, subtotal splenectomy and splenic auto-transplantation. Spleen-preserving techniques should be used where possible to achieve best outcome in clearing infection and to ensure the immunologic role of the spleen is not compromised.
CONCLUSION: Splenic abscess is rare conditions seen in paediatric practice with high mortality and partial splenectomy can be a useful spleen-preserving technique in treating this condition.

1. Introduction

Isolated splenic abscess (SA) is rare conditions seen in paediatric surgical practice however they are associated with high mortality despite prevalence of antibiotic usage especially if there is delay in diagnosis and treatment [1]. They are seen in patients with an immunocompromised state, however can also occur in the immunocompetent due to dissemination of an infective focus to a pre-existing splenic cyst. The management options for SA has shifted from total splenectomy to spleen-preserving techniques whenever possible, such as percutaneous drainage, partial splenectomy and subtotal splenectomy, due to greater understanding of the important immunologic role of the spleen [1–5].

We report a rare case of a patient with a SA due to Salmonella infection that was successfully treated with partial splenectomy and complete removal of the infected part of the spleen, at an academic medical center. This case report has been reported in accordance with SCARE criteria[6].

2. Presentation of case

A previously well 15-year-old Chinese boy presented to the hospital Emergency Department with a 3-day history of abdominal pain, fever, vomiting and diarrhoea. He had a positive travel history to Malaysia 5 days prior to his admission. However, there was no significant contact history and no significant past medical history. His vaccinations were current.

On examination, he was noted to be pyrexic at 38.4 °C with mild tachycardia at 100–105 bpm. The abdomen was distended with fullness, tenderness and guarding especially over the left upper quadrant. Examination of the cardiovascular and respiratory system was otherwise unremarkable. Biochemical investigations revealed a leucocytosis of $17.9 \times 10\hat{9}$/L ($3.4–9.6 \times 10\hat{9}$/L), with neutrophilia, with normal haemoglobin and platelet levels. The C-reactive protein was grossly elevated at 322 mg/L (0–10 mg/L). Work-up for immunodeficiency was negative with normal Complement 3, 4 levels, CD4 and CD8 counts. Blood and stool cultures were negative for bacterial growth, ova, cysts or parasites. Abdominal x-rays revealed displacement of prominent small bowel loops towards the right flank (Fig. 1).

Computed tomography (CT) scan of the abdomen (Fig. 2) revealed a 15-cm cystic lesion arising from the lower pole of the mildly enlarged spleen at its widest diameter with rim calcification suggesting that the cyst had been present for a long time.

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http://dx.doi.org/10.1016/j.ijscr.2017.07.050

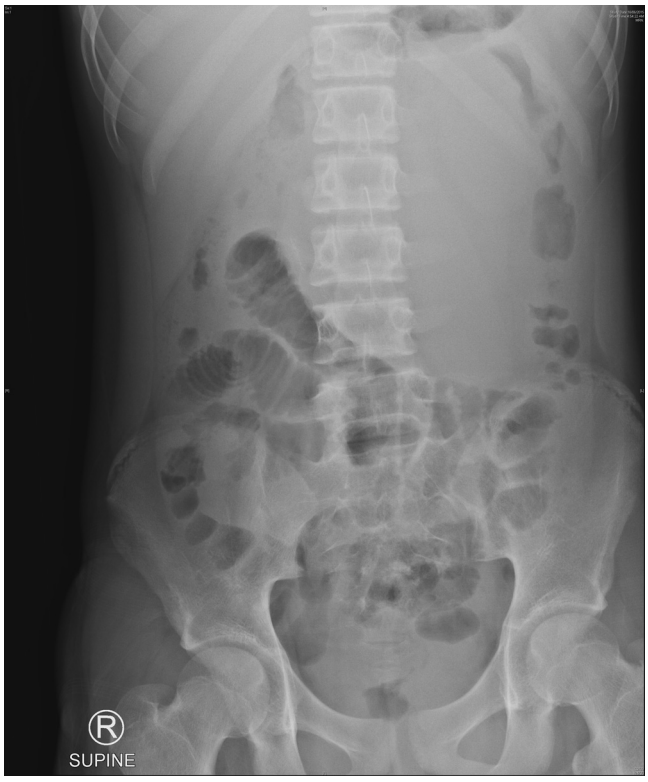

Fig. 1. Abdominal x-ray showing displacement of dilated small bowel loops towards right flank.

Despite a trial of intravenous antibiotics with Ceftriaxone and Metronidazole, he remained pyrexial and decision was made for exploratory laparotomy.

The abdomen was entered via a midline incision. Intra-operatively, a large SA displacing the bowel loops was found, containing 1.5 L of frank pus which was aspirated (Fig. 3). There was no intra-peritoneal soilage or free perforation. Decision was made for partial splenectomy and the pus was sent for microbiological studies (Fig. 4). Viable splenic tissue was marked with a 1 cm margin proximal to the infected tissue. A continuous row of horizontal mattress sutures was placed over Gore-Tex® patch to act as pledgets. The infected part of the spleen was then transected with energy device. The surgery lasted a total of 3 h with minimal blood loss.

The splenic pus cultures grew Salmonella group B species that was sensitive to Ampicillin, Ceftriaxone and Ciprofloxacin. His antibiotics were adjusted to high dose Ceftriaxone. He recovered

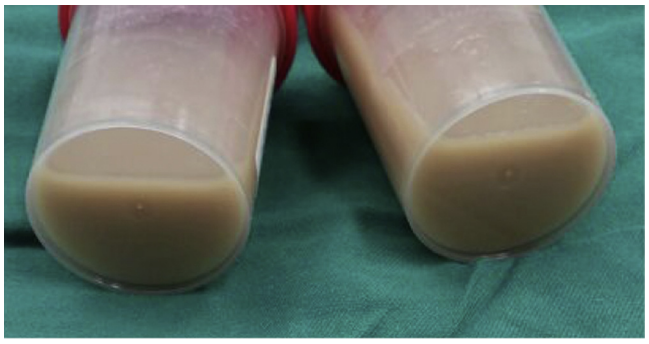

Fig. 3. Frank pus aspirated from the splenic abscess intra-operatively.

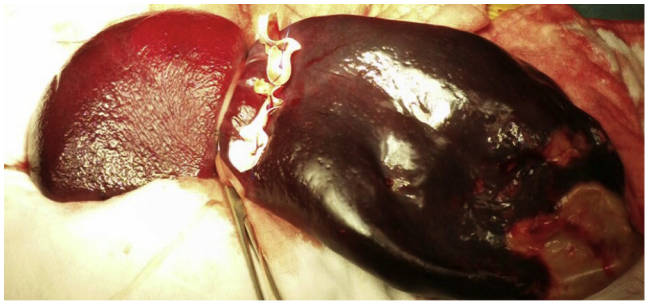

Fig. 4. The spleen prepared for partial splenectomy using Gore-Tex® patch proximal to area of transection.

well post-operatively with defervescence of fever and was discharged well on post-operative day 9 after a total of two weeks of antibiotics. Histology showed a splenic cavity lined by stratified squamous epithelium containing necro-purulent material. The patient was reviewed in the outpatient clinics 6 weeks after discharge and was noted to have recovered fully.

3. Discussion

SA is a rare condition seen in paediatric surgical practice and its incidence is reported to be between 0.14–0.7% in autopsy studies [7]. Spleen has the capacity to fight against infection given the important role it plays in immunity and this likely accounts for the low rates of SA [1]. SA is therefore more common in patients with immunocompromised states such as malignancy, systemic infection, diabetes, trauma and haemoglobinopathies likely sickle cell anemia [1]. In the immunocompetent, seeding of splenic cysts after enteric fever is a common cause of SA especially in regions where enteric fever may be endemic. Although, enteric fever is uncom-

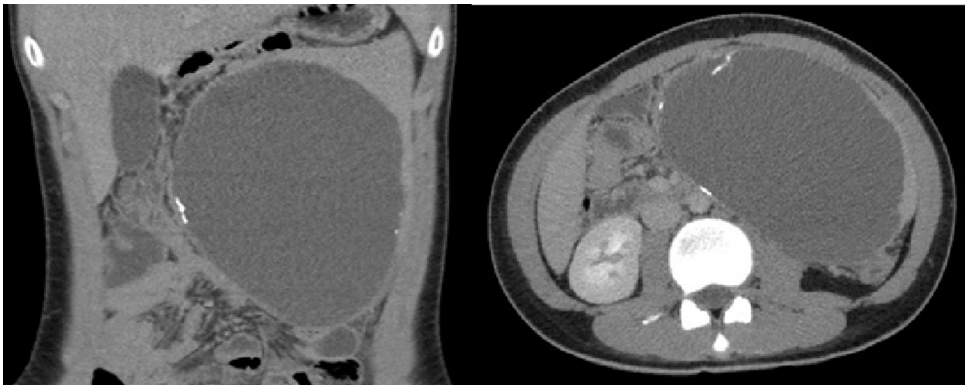

Fig. 2. CT scan images of a large cystic lesion arising from the lower pole of the mildly enlarged spleen with rim calcification.

mon in Singapore, it is still endemic in parts of Malaysia which our patient visited [8].

The common organisms cultured from splenic abscess include *Staphylococci, Streptococci, Salmonella* and *Escherichia coli* although most of the microbiological data are from adult studies [9]. Salmonella has been isolated in 11–15% of splenic abscesses and has also been implicated as the causative organism in the immunocompetent child [2,3,10]. Salmonella is the most commonly identified cause of foodborne illness in U.S and most cases involve ingestion of contaminated food item [11]. The most common clinical manifestation of Salmonella is gastroenteritis producing symptoms like diarrhea, nausea, vomiting, fever and abdominal cramps 6–48 h after ingestion of the contaminated food product. It is likely that in our patient the Salmonella gastroenteritis had caused a transient bacteremia with seeding to the pre-existing splenic cyst to cause secondary infection.

Pyogenic infection of the spleen has CT imaging characteristics such as rim-enhancement, gas formation and contents of the abscess showing non-uniform densities owing to the layering of proteinaceous material within [12]. However, CT and Ultrasound are not sensitive in differentiating between infected, nonparasitic, true splenic cyst or pseudocyst [3]. The lack of characteristic imaging findings on the CT scan of our patient influenced the managing team to initially attribute the patient's fever and abdominal symptoms to the gastroenteritis.

There are various treatment modalities for the management of SA including antibiotics, percutaneous drainage, partial, subtotal or total splenectomy. While total splenectomy was the standard surgical treatment for splenic abscesses [13,14], the choice of treatment now is influenced by factors including patient factors, available local expertise, aetiology of SA, anatomical location, extent of infection, and intra-operative evaluation of the viability of the. Spleen-preserving techniques such as partial splenectomy, percutaneous drainage are preferred options where possible with total splenectomy being reserved for patients for whom the extent of the infection renders spleen-preservation technically impossible. This shift in paradigm to spleen-preserving methods especially in a paediatric setting is brought about by increased awareness of the important immunologic role of the spleen in its defence against encapsulated organisms [4,15]. Total splenectomy puts patients at risk of rare but life threatening overwhelming post-splenectomy sepsis. Percutaneous drainage is mostly a temporizing measure before interval surgery and is often complicated by recurrence of collections or incompletely emptied cavities, although some authors have reported good outcomes [1–3,16]. Choudhury et al. reported a case series of 18 patients with isolated SA who were successfully managed with antibiotics and image-guided percutaneous drainage with all patients having complete resolution [16]. Spleen auto-transplantation is a relatively newer technique employed with the aim of splenic preservation in trauma patients when the spleen cannot be saved any other way but its role in patients with SA has not been yet been defined. Despite the apparent disadvantages of total splenectomy, it might be the procedure of choice in select group of patients – those with multifocal focal abscess and permanent immunocompromised state – such as those with haemoglobinopathies.

Fortunately, in our patient despite the large size of the abscess, partial splenectomy was still possible as the abscess cavity appeared to originate from the lower pole of the spleen and the remaining spleen appeared healthy. Therefore, where possible, partial splenectomy is our recommended choice of procedure.

4. Conclusion

SA are rare conditions seen in paediatric surgical practice which are difficult to diagnose and spleen-preserving techniques should be used where possible to achieve best outcome in clearing infection and to ensure the immunologic role of the spleen is not compromised.

Conflicts of interest

No conflicts of interest to declare.

Funding

No sponsors for this research.

Ethical approval

No ethics approval sought as this was a case report with no direct impact on patient outcome.

Consent

Written informed consent was obtained from the patient's legal guardian(s) for publication of this case report and any accompanying images.

Author contribution

Saleem Ahmed – Literature search, writing the paper, Peri-operative care of the patient, Follow-up of patient.

Han Boon Oh – Literature search, writing the paper, Peri-operative care of the patient, Follow-up of patient.

Dale Lincoln Loh Ser Kheng – Critical revision of the content of the paper and approval of final draft, Peri-operative care of the patient, Follow-up of patient.

Prabhakaran Krishnan – Proposal of surgical procedure, Critical revision of the content of the paper and approval of final draft, Peri-operative care of patient.

Registration of research studies

UIN: researchregistry2629.

Guarantor

Saleem Ahmed.

Acknowledgement

NIL.

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