

Ten-year Series of Splenic Abscesses in a General Hospital in Singapore

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Abstract

Introduction: Splenic abscess is an uncommon clinical problem. Traditionally, the “gold standard” treatment has been splenectomy. However, there is increasing use of non-operative treatments worldwide. **Materials and Methods:** A 10-year (1996-2005) retrospective review of case records from a single centre (an 800-bed general hospital) was performed. Information regarding demographics, clinical presentation, aetiological agents and management was gathered and analysed. **Results:** There were 21 cases from 1996 to 2005. Nineteen (90%) had multiple abscesses. Disseminated melioidosis was the most common aetiological agent (15 cases, 71%). Only 3 patients underwent splenectomy. The remainder were treated conservatively with antibiotics. Almost all the patients (19, 90%) also suffered from diabetes mellitus. **Conclusions:** The most common aetiological agent encountered was *Burkholderia pseudomallei*. Diabetes mellitus may be an important co-factor in the pathogenesis of splenic abscesses. The majority of our patients were managed conservatively and splenectomy was only occasionally required.

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Introduction

Splenic abscess is an uncommon clinical problem. Fewer than 800 cases have been reported in the literature. Traditionally, the “gold standard” treatment has been splenectomy. However, there is increasing use of non-operative treatments worldwide. The following is a review of 10 years of experience in the management of splenic abscesses in an 800-bed general hospital in Singapore.

Materials and Methods

A search of hospital records yielded 26 hospital admissions among 21 patients from January 1996 to October 2005 treated at Changi General Hospital, Singapore. All cases had radiological evidence of splenic abscess with clinical presentations consistent with infection. Information was gathered on patient demographics, likely aetiology (route of infection), pre-existing immunodeficiency, presenting symptoms, imaging, treatment and outcome (mortality). For patients who had multiple admissions, the above data were collected for the first admission.

Results

Of the 21 patients with splenic abscesses, 18 (86%) were

male with a mean age of 47 years. Almost all (20, 95%) were febrile on presentation, 8 (35%) patients complained of abdominal pain and only 2 (10%) such patients had pain localised specifically to the left upper quadrant. Splenomegaly was clinically obvious in 6 (29%) cases, and 2 (10%) patients had evidence of left pleural effusion clinically or radiologically. Radiological diagnosis was obtained with computed tomography (CT) in 20 (95%) patients, while 1 underwent abdominal ultrasound. The majority of splenic abscesses were multiple in 19 (90%) cases, while 2 were solitary.

Blood cultures were useful in 11 (52%) patients, yielding the causative organism. Due to the endemic nature of melioidosis in this region, melioidosis serology was frequently performed and was positive in 15 (71%) patients, 7 (33%) of whom had negative blood cultures.

The majority (20, 95%) of cases were due to systemic (or blood borne) infection. As mentioned above, there were 15 (71%) cases of serology-proven melioidosis. There was 1 case that presented as a postoperative complication following Whipple's operation. No organism could be identified in 3 (14%) patients. Other causative organisms

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found were *Salmonella typhi* (2, 10%) and *Klebsiella pneumoniae* (1, 5%).

It was of interest that almost all (14 of 15, 93%) the patients who developed splenic abscesses secondary to melioidosis also suffered from diabetes mellitus. Overall, 18 (86%) of the patients in this series were diabetic. In addition, there was 1 HIV-positive patient. Hence in total, 19 (90%) patients had some measure of immunodeficiency.

Splenectomy was performed in only 4 (18%) patients. The aetiologies of the 4 patients were abscess complicating splenic trauma, ruptured typhoid splenic abscess and 2 of the patients had melioidosis. The remainder were treated solely with intravenous and oral antibiotics. There were 3 patients who had multiple admissions. All 3 suffered from melioidosis, and were treated with antibiotics. One patient was admitted 4 times and 2 patients twice.

The patient who was admitted 4 times was a 29-year-old diabetic man who was admitted on each occasion for disseminated melioidosis with multiple small splenic abscesses evident on a CT scan. Each time he was treated with antibiotics with initial response. However, he had not

been fully compliant with oral antibiotics after discharge. He was offered splenectomy, but had declined.

There was 1 mortality in a 68-year-old diabetic man who died of fulminant sepsis. He presented with change in mentation and lower limb weakness. Abdominal imaging (ultrasound and CT scan) was initially ordered to investigate abnormal liver biochemistry. He was given empiric antibiotic therapy as no organisms were identified on blood culture. However, his clinical course was one of rapid deterioration and there was little opportunity for other investigations or interventions.

Discussion

The spleen is an uncommon site of abscess formation. The intrinsic immunological function of the spleen may give relative protection against suppurative infections. There is a reported incidence of splenic abscesses in autopsy series of 0.03% to 0.7%.^{1,2} There has been increasing recognition of splenic abscesses owing to several factors including the widespread use of CT, the increasing incidence of immunosuppressive states (e.g. HIV) and the adoption of splenic conservation in blunt trauma.

Review of the literature reveals a broad spectrum of aetiological factors, causative organisms and clinical presentations. There is also a marked geographical variation in the above. The most commonly reported organisms implicated in Taiwan^{3,4} were gram negative bacilli, with *Klebsiella pneumoniae* forming the bulk of reported cases. In Thailand,⁵ *Burkholderia pseudomallei* formed the majority. In an earlier series in Singapore,⁶ *Staphylococcus* species were the most common causative organism, as was the case in an American⁷ and Greek⁸ series. Anaerobes are also a common feature in many reported series. There are numerous reports of Tuberculous,⁹⁻¹¹ *Salmonella*¹²⁻¹⁴ (typhoid) and *Brucella*¹⁵⁻¹⁷ splenic abscesses as well. In many cases, Tuberculous abscesses occurred in the setting of immunosuppression (most commonly HIV). Anecdotal reports of abscesses due to *Vibrio cholerae*,¹⁸ *Peptostreptococcus*,¹⁹ *Streptococcus pyogenes*²⁰ and *Chlamydia pneumoniae*²¹ also appear in the literature.

An overwhelming majority of cases in this series were male. This is not seen in most of the published series and probably reflects the epidemiology of melioidosis in Singapore (i.e. male preponderance).²²

The routes of infection of the spleen are classically

Table 1. Patient Demographics and Clinical Data

Age (y)	47 (range, 29 to 78)
Gender (Male:Female)	18:3
Route of infection	
Haematogenous	20 (95%)
Contiguity	0
Inoculation	1 (5%)
Predispositions	
Diabetes mellitus	18 (86%)
HIV	1 (5%)
Clinical features	
Fever	20 (95%)
Abdominal pain/LUQ	8 (38%) / 2 (10%)
Splenomegaly	6 (29%)
Left pleural effusion	2 (10%)
Investigations	
CT scan	20 (95%)
Ultrasound alone	1 (5%)
Multiplicity	
Single	2 (10%)
Multiple	19 (90%)
Treatment	
Antibiotics alone	18 (86%)
Splenectomy	3 (14%)

Table 2. Microbiology of Splenic Abscesses

<i>Burkholderia pseudomallei</i>	15 (71%)
<i>Salmonella typhi</i>	2 (10%)
<i>Klebsiella pneumoniae</i>	1 (5%)

described as haematogenous (systemic infection e.g. infective endocarditis), contiguous infection or direct inoculation (e.g. penetrating injury or laparotomy). There are several classically described predispositions – immunosuppression, pre-existing splenomegaly (usually due to haemoglobinopathies) and splenic trauma (due to haematoma and/or devascularisation). This series is dominated by cases of systemic infection namely melioidosis. In many patients, diabetes mellitus was an obvious predisposing cause. Interestingly, the association of diabetes mellitus and splenic abscesses was also noted in *Klebsiella pneumoniae* abscesses by Lee et al.²³

Although blood cultures are routinely performed, they are useful in only half the cases. However, it would seem that melioidosis serology aids diagnosis significantly in endemic Singapore. It should therefore be routinely performed in our local setting.

Published reviews in the 1980s and 1990s advocate splenectomy as treatment for splenic abscesses. Chun et al²⁴ recommended “prompt surgical intervention” i.e. splenectomy once the diagnosis was made. Nelken et al²⁵ described splenectomy as the “mainstay” of treatment except for those of fungal aetiology (for which systemic anti-fungals alone may suffice). Ooi et al⁶ suggested that percutaneous drainage may be effective for selected cases, but still described splenectomy as “definitive”.

However, there is increasing acceptance and adoption of less invasive and spleen-conserving treatments. Many centres employ percutaneous drainage,^{26,27} with splenectomy being indicated for refractory cases. Percutaneous drainage was not employed in this series.

Melioidosis tends to give rise to multiple small abscesses, rather than a single large abscess that can be easily drained via percutaneous puncture. Thus most patients in this series were not suitable for percutaneous drainage. In such cases, antibiotic therapy alone is frequently successful. The measured sizes of the splenic abscesses were not uniformly recorded (many recorded as “multiple small abscesses”), hence, we are unable to present this. Patients managed conservatively with antibiotics alone should be followed-up closely to ensure complete resolution and compliance with the prolonged course of antibiotics. Otherwise, treatment failures with recurrent or persistent abscesses may be the result. Splenectomy should be strongly considered in such patients regardless of response to antibiotic therapy.

In our local context, most of our patients enjoy easy and convenient access to specialist care; hence, the close follow-up required when a conservative approach is employed is realistic. However, where there are expected difficulties in patient compliance and access to follow-up care, splenectomy should still be regarded as the definitive

treatment. Arguably, non-operative management is more resource intensive (requiring prolonged follow-up), and also bears the burden of repeat admissions for treatment failures. Whilst a detailed cost analysis was not possible in this study, cost considerations should be borne in mind when deciding on treatment.

The data did not lend itself to such statistical analyses on particular risk factors for success or failure of non-operative management. However, one may conclude that the commonest aetiological agent encountered in our setting is *Burkholderia pseudomallei*. Typically, the abscesses are multiple and amenable to treatment with antibiotics alone. Diabetes mellitus appears to be an important co-factor in its pathogenesis. Although non-operative management is frequently successful, splenectomy is still occasionally required for refractory or recurrent cases.

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