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Splenic Abscess: Outcome and Prognostic Factors

Abdul Rehman Alvi, Shazia Kulsoom and Ghina Shamsi

ABSTRACT

Objective: To determine the spectrum of presentation, treatment outcome and prognostic factors of splenic abscess in a tertiary care hospital.

Study Design: Case-series.

Place and Duration of Study: Department of General Surgery, the Aga Khan University Hospital, Karachi, from July 1988 to July 2007.

Methodology: The records of 27 patients with splenic abscess, diagnosed from 1988 to 2007, were retrieved through ICD-10 coding system. The demographic data, physical and radiological findings, treatment modalities, bacteriology reports, morbidity and mortality were collected on a proforma.

Results: There were 12 males and 15 females with a mean age of 43.52 ± 17.49 years. Common symptoms were fever (92.6%), abdominal pain (55.6%) and malaise (29.6%). Majority of patients (89%) had leukocytosis and 63% patients had associated diseases with which they were admitted. The most common pathogenic organism was *Staphylococcus* species and gram-negative rods. Ultrasound was used as a preliminary diagnostic modality, which was often followed by CT scan. Thirteen patients were treated with intravenous antibiotics, 8 underwent percutaneous drainage and 6 patients required splenectomy with respective survival rates of 84%, 87.5% and 83%. Mortality rate was 14.81% but no statistically significant difference between 3 treatment groups was manifested. There was significant difference between treatment groups regarding the size of the abscess ($p=0.01$) and hospital stay ($p=0.04$). Splenectomy was done when abscess size was >10 cm and hospital stay were increased in the radiological drainage group.

Conclusion: Splenic abscess is an uncommon surgical entity. High index of suspicion and liberal use of radiological studies is essential for timely diagnosis. Most of the patients could be cured with non-operative treatment. Splenectomy is a safe procedure for patients with abscess size more than 10 cm and patients not responding to non-operative treatment.

Key words: Splenic abscess. Splenectomy. Aspiration.

INTRODUCTION

Splenic abscess is an uncommon entity and remains a diagnostic challenge and therapeutic dilemma for the clinicians. The reported incidence in autopsy series varies between 0.3-0.7%.¹⁻³ The reported mortality rate ranged from 47 to 100%.^{1,2} Most of the international literature has case reports and small case series.⁴ The disease may be increasing in frequency because of the growing number of immunologically compromised patients.^{5,6} Current sophistication in imaging and increased awareness have contributed to prompt diagnosis and different therapeutic options for selected groups of patients have resulted in acceptable morbidity and mortality.^{4,7,8} A high degree of clinical awareness and aggressive diagnostic radiological approach are essential for prompt diagnosis. Many surgeons believe that splenectomy is the optimal treatment for splenic abscess, but more recently intravenous antibiotics and

radiological drainage have proven to be efficient methods in the treatment of splenic abscess.

This retrospective study of splenic abscesses was carried out to determine the clinical features, diagnostic modalities used to confirm the diagnosis and the outcome of different treatment groups in 27 consecutive patients over a period of 19 years.

METHODOLOGY

The clinical record of 27 patients with the diagnosis of splenic abscess, admitted to the Department of Surgery, the Aga Khan University Hospital, Karachi, Pakistan, were retrieved through ICD 10 coding system. The study period was from July 1988 to July 2007. The inclusion criteria were age group >14 years and the clinical diagnosis of splenic abscess confirmed by radiological imaging, microbiology and splenic tissue histopathology. The exclusion criteria were splenic cyst, infarction and splenectomy for diagnosis other than splenic abscess. The data was collected on a proforma included age, gender, clinical features, predisposing conditions, bacteriology profile, diagnostic modalities including X-ray chest, ultrasonogram and CT scan. Information about systemic diseases like diabetes mellitus, cirrhosis, chronic renal disease, malignancies, immunosuppre-

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ssion and intra-abdominal sepsis in association with splenic abscess were also recorded.

The diagnosis of splenic abscess was confirmed on ultrasound or CT scan of the abdomen. The number and diameter of abscesses in centimeter was documented. Causative organisms were identified through blood, splenic aspirate and tissue culture.

Treatment of splenic abscess was categorized into 3 groups: (1) medical therapy including intravenous antibiotics; (2) radiologically guided percutaneous drainage of abscess and (3) splenectomy.

Analysis of the data was done on SPSS version 15. Descriptive analysis was done for all variables and the Kruskal-Wallis test was applied for group variables to calculate statistically significant values ($p < 0.05$).

RESULTS

In 19 years, a total of 27 patients were diagnosed with splenic abscess. There were 15 females and 12 males with a mean age of 43.52 ± 17.49 years (ranging from 15 to 70 years). The salient clinical features were: fever 25 (96.6%), upper abdominal pain 15 (56%) and malaise in 8 (29.6%) patients. Physical examination showed abdominal tenderness in 14 (51.9%), splenomegaly 9 (33.3%) and left lung rhonchi 8 (29.5%) of patients. The majority of patients (89%) were having leukocytosis with left shift. Fifteen (56%) patients had associated chronic medical conditions including diabetes mellitus 10, malignant disease 4 and liver cirrhosis in one patient.

The majority of patients 15 (56%) were admitted with a provisional diagnosis of other than splenic abscess such as pneumonia, sickle cell disease, malaria intra-abdominal sepsis, typhoid fever and infective endocarditis. The remaining 12 patients were admitted for the workup of fever and upper abdominal pain.

The mean follow-up was 32 months (ranging from: 6 to 62 months).

The crude mortality rate was 14.81% in this study. The poor prognostic factors were diabetes mellitus, underlying disease, multiple abscesses and gram-positive organisms isolated from the abscess (Table I). The other poor prognostic factors were age more than 42 years and size of abscess > 7.5 cm. None of the variables were statistically significant to predict mortality in splenic abscess. No statistical difference in mortality was found between the treatment groups.

The diagnosis of splenic abscess was confirmed on radiological imaging. Thirteen patients had an ultrasound of abdomen, followed by CT scan in 10 patients. In 4 patients, CT scan was the only examination. Sixteen patients showed a single abscess and 11 patients had multiple abscesses. Abscess size

Table I: Prognostic factors of splenic abscess.

Variable	Category	Number	Mortality	p-value
Gender	Male	12	2	0.723
	Female	13	2	
Associated disease	Present	17	3	0.576
	Absent	10	1	
Diabetes mellitus	Present	10	2	0.567
	Absent	17	2	
Size of abscess	> 5 cm	12	2	0.973
	< 5 cm	15	2	
Treatment	Antibiotic	13	2	0.217
	Drainage	8	1	
	Splenectomy	6	1	

ranged from 1-19 cm in maximum diameter, while 55% of the abscesses were < 5 cm and 17% were > 10 cm.

Twenty-one patients in this study had blood or splenic pus sent for microbiological culture. Eleven patients grew aerobes. Seven patients grew gram-positive cocci including *Streptococcus*, *Staphylococcus* and *Enterococcus*; 03 patients grew *E. coli* and 1 patient each grew *E. coli* with *Staphylococcus* and *Morganella morganii*. Nine patients showed no growth. In 6 patients, there was no evidence of microbiological investigation. One patient had tuberculous bacilli on abdominal lymph node culture.

Thirteen patients received medical treatment with intravenous and then oral antibiotics. The patients in the medical group had small abscess size (1 to 6 cm) and an equal number of patients had solitary and multiple abscesses 6 and 7 respectively. All the patients responded well with no evidence of relapse or readmission. The mortality rate in this group was 15% and the causes of death were associated malignant disease (Table II).

Table II: Differences in treatment groups.

Variable	Group	Number	Mean	p-value
Length of stay in days	Antibiotic	13	9.71	0.043
	Radiological drainage	8	18.00	
	Splenectomy	6	11.50	
Size of abscess in centimeter square	Antibiotic	13	9.00	0.011
	Radiological drainage	8	14.86	
	Splenectomy	6	17.60	

Kruskal-Wallis Test

Eight patients had ultrasound or CT guided percutaneous drainage. Most of the abscesses were medium sized (6-10 cm) and 75% were solitary abscesses. Two patients required readmission and were treated with intravenous antibiotics. Mortality rate was 13% with one patient dying of on-going sepsis.

There were 6 patients in the splenectomy group. The indications were large sized abscess (>10 cm) with mean of 17.60 cm and 84% were solitary abscesses. Mortality rate was 17% with one patient dying in the post-operative period because of pneumonia and ARDS.

Significant difference between variable was length of hospital stays in day ($p=0.043$). The mean duration for

medical treatment was 9.71, for radiological drainage was 18.00 and for splenectomy was 11.50 days. The other significant variable was abscess size in cm ($p=0.01$). The mean size for medical treatment was 9.0, 14.86 in radiological and 17.60 cm in the splenectomy group.

DISCUSSION

The first account of splenic abscess comes from the writings of Hippocrates. Grand-Moursel is credited with the first detailed description of the disease with his case series of 57 patients published in 1885. The reported incidence in autopsy series varies between 0.3 to 0.7 percent.^{1,2,4,7,9} The disease is thought to be increasing in frequency because of the growing number of immunologically compromised patients.^{6,10-12} If left untreated, mortality rate is 67-100%.^{5,12,14} There are only few case reports of splenic abscesses from South Asian countries like India and Pakistan.^{12,15-17} This is probably due to underreporting. There are large series from South East Asian countries-Thailand, Taiwan and Hong Kong^{4,8,9,13,14} and the associated conditions include diabetes mellitus and immunosuppression.

Most patients in this study were admitted with abdominal pain and fever. Abdominal tenderness was present in the majority of patients and leukocytosis was a common laboratory finding. The clinical features were similar to those reported in other studies.^{4,7,8} Sixty three percent of the patients in this study had associated chronic medical condition and Diabetes mellitus was the most common condition (37%).

The microbiological pattern in this group was different from the other reported studies^{4,7,8,15} as 60% of blood and 37% of splenic pus cultures were positive for bacterial growth. The commonest organisms were gram positive cocci (63%) followed by gram-negative rods (28%) and in 9 the bacterial cultures were negative. In other studies, the most common isolated organisms were gram-negative rods, the explanation could be greater frequency of Diabetes mellitus in this population and less intra-abdominal visceral infection. Other studies reported more mortality with gram-negative infection and more complex abscesses. In this study, *Staphylococcus* was associated with large solitary abscesses and increased mortality in this group of patients but not statistically significant.

The older surgical literature reports splenectomy as the treatment of choice in the management of splenic abscesses,¹⁻⁴ but recent evidence supports other therapeutic options including antibiotic alone or with combination of radiological percutaneous drainage with reported success rates of 67-100%.^{4,14}

In this study, 78% of patients were treated non-surgically with 86% survival. Thirteen (48%) were treated with antibiotics alone with 2 deaths (15% mortality). Those

mortalities were not directly related with the primary condition but because of associated malignancies. Medical therapy was selected in the group of patients with small sized abscesses (< 6 cm). Antibiotic therapy alone has been reported to have a survival rate of 48%.¹⁴

Eight (30%) patients were treated with CT or ultrasound guided catheter drainage with 87.5% survival and 12.5% mortality because of the on-going sepsis. Radiological drainage was done in patients with abscess size 6 and 10 cm. Two patients in this group required readmission and were successfully treated with intravenous antibiotic therapy. A success rate of 40-60% has been reported.^{4,14} There is an increasing trend of non-surgical treatment of splenic abscess with improved outcome.

Splenectomy was done in patients with large abscesses (>10 cm), which was a significant variable among the treatment groups. Solitary abscesses (84%) and 2 patient required splenectomy when other treatment were not successful. The reported splenectomy rate is 14-38% with mortality rate of 0-7%.^{4,7,14} The mortality rate in this study was 17% and was due to postoperative pneumonia in a 60-year-old male with Diabetes mellitus.

The prognostic factors for splenic abscesses mentioned are: size of abscess, number of abscesses, underlying disease, associated medical conditions, gram-negative infection and delay in diagnosis.^{4,8,13,14} The poor prognostic factors identified in this study were abscess size >7.5 cm, solitary abscess, underlying disease, Diabetes mellitus, *Staphylococcus* infection and age greater than 42 years but none of the variables were statistically significant. Survival among the 3 treatment groups ranged 83-87% and there was no significant differences of mortality.

There is no single risk factor that can predict prognosis accurately. In one of the studies, APACHI II scoring system was used to compare the mortalities with survival and found a statistically significant higher score in the mortality group.⁴ The APACHI II severity scoring system could be a useful tool in future studies to identify high-risk patients and to compare different treatment groups.

As possible in a retrospective study, there was missing data in 6 patients; splenic pus culture reports were not available and the follow-up data was also incomplete. The second weakness of the study was the small number of patients in the 3 different treatment groups; therefore, the power of statistical analysis became weak and sometime invalid.

CONCLUSION

Splenic abscess remains an underreported entity in Pakistan. Splenic abscess must be considered in patients with fever, abdominal pain and leukocytosis and the diagnosis should be established with CT scan

abdomen and ultrasonography as per availability. Most patients with splenic abscess can be cured with intravenous antibiotics alone or with radiological guided percutaneous catheter drainage. Splenectomy is a safe procedure when abscess size is larger than 10 cm and when non-surgical treatment has failed.

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