

# SPLenic ABSCESS IN CANCER PATIENTS: A RETROSPECTIVE REVIEW

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## ABSTRACT

**Objective:** The objective of the study was to review our experience in the management of splenic abscess in cancer patients at a cancer hospital in Pakistan.

**Methodology:** This study was conducted at Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore and data reviewed from January 2007 till December 2012. Demographic, pathologic, radiologic and treatment records of each cancer patient with splenic abscess were retrieved from the electronic database. Patients were followed for a period of six months.

**Results:** Twelve patients were diagnosed with splenic abscess in the last six years. Males were ten compared to two female patients. Mean age was 41.1 years (range 3-64). All except one were adults. Six patients had hematological malignancies while six were diagnosed with solid organ tumors, among the solid organ tumors three had metastatic disease with unknown primary. Six patients had multiple splenic abscesses while six patients had solitary abscesses. Bacterial cultures were positive in four patients, *Pseudomonas* species and *Escherichia coli* in two patients each; one patient with mycobacteria tuberculosis; no fungal growth identified in any patient. Antibiotics were given to all patients except one patient who died before any therapy due to end stage hepatocellular carcinoma. Three patients were treated with antituberculous therapy, two of them recovered while one was lost to follow-up. Percutaneous aspiration/drainage (PCD) was done in five patients; Surgery was performed in three patients. One patient who underwent PCD died due to septicemia while one patient died of cardiac event, two patients were lost to follow up while eight patients recovered completely.

**Conclusion:** Percutaneous aspiration/drainage is an equally good option for treating splenic abscess as compared to surgery along with adequate antibiotics.

**Key words:** Splenic abscess, Cancer, Pakistan.

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## INTRODUCTION

The spleen works as a filter for organisms and as can be guessed from the very low incidence of splenic abscesses, is very resistant to infections, rarely diagnosed in life and on autopsy studies found to have a rate of 0.14% to 0.7%<sup>1</sup>. Splenic abscess generally occurs in immunocompromised patients such as patients with neoplasia, immunodeficiency, major trauma, disseminated infection, splenic infarct or diabetes<sup>2</sup>. The incidence of splenic abscess is thought to be growing due to the increasing number of at risk patients for this disease, and also due to the advancement in the diagnostic imaging modalities such as computed tomography (CT) and ultrasonography (US)<sup>3,4</sup>.

Splenic abscess is a potentially life threatening condition and the best treatment option remains unclear, the options varies due to the availability of resources, comorbidities and the treating physician's choice and expertise. The treatment options for splenic abscesses are; medical therapy with antibiotics and splenectomy or percutaneous drainage (PCD)<sup>5,6</sup>. Splenectomy has been the gold standard treatment for splenic abscess, but the overwhelming burden of the primary disease poses limitation on the use of this modality and other minimally invasive techniques may be better a option. Recent advance in the diagnostic and interventional radiology have a major impact on the diagnosis and management of splenic abscesses<sup>7</sup>.

The purpose of this study was to review our experience in management of splenic abscesses based on different modalities in cancer patients and their final outcome in the last six years.

## METHODOLOGY

A retrospective review of the electronic database of all the cancer patients who were identified with splenic abscesses over a period of six years, from January 2007 till December 2012, at Shaukat Khanum Memorial Cancer Hospital and Research Center (SKMCH & RC) was done. The diagnosis of splenic abscess was made if one of the following criteria was met: (1) microbiologically confirmed abscess from splenic aspirate with compatible splenic imaging studies of computed tomography (CT) or ultrasonography (US) (2) In the presence of typical clinical manifestations and finding of CT or US, the patients' conditions regressed after antibiotic therapy in cases without interventional therapies. The medical, pathologic and radiologic records of each patient were reviewed.

Data extracted include the age, gender, primary tumor, modality on which diagnosis made i.e. ultrasonography vs. computed tomography, number of abscesses, other organs involved, bacteriologic profile, type of treatment and treatment outcome. Patient's records were followed for a minimum of six months. Mean and standard deviation was calculated for numerical variables while frequency and percentage was calculated for categorical variables. Data was analyzed using SPSS 19.

## RESULTS

Twelve patients were diagnosed with splenic abscess in the last six years period, who were admitted to Shaukat Khanum memorial cancer hospital and research center. Males were 10 (83.3%). Age ranged from 3 years to 64 years with a mean age of  $41.18 \pm 17.75$ . Only one patient was in the pediatric age group. Demographics, primary diagnosis, radiologic findings and outcomes of patients is presented in table 1.

Six patients had solid organ tumors while the rest had blood related malignancies. Ultrasound abdomen was done in eight (66.6%) patients, while CT abdomen was done in eleven (91.6%) patients. Both modalities had comparable results. Six patients had multiple splenic abscesses while six patients had solitary abscesses. Associated liver abscesses were present in two patients while two patients had liver metastasis and seven patients had normal liver imaging. Left sided pleural effusion was reported in three (25%) patients. This was also confirmed on chest X-ray. Therapeutic Percutaneous drainage (PCD) was done in five patients (41.6%). Surgery was done in three (25%) patients only while four (33.3%) patients were treated conservatively, one

patient who was also having thalassemia trait ended up in autospplenectomy.

Bacterial cultures were positive in four patients with *Pseudomonas* and *E.coli* in two patients each. No polymicrobial growth was documented; one patient had growth of *Mycobacterium tuberculosis*. Fungal growth was not identified in any patient. Antibiotics were given to all patients except one patient who died before any therapy due to end stage hepatocellular carcinoma, three patients were treated with anti-tuberculous therapy and two recovered completely and one lost to follow up. One patient who underwent PCD died due to septicemia while one patient died of cardiac event, two patients were lost to follow up while eight patients recovered completely.

## DISCUSSION

The causes of splenic abscess often falls into one or more of the following categories in patients with malignancy; metastatic infections, super infections on splenic infarction, and immunodeficiency. Immunodeficiency is a major predisposing factor in splenic abscess and is gaining more importance with the increased use of corticosteroids, chemotherapy, immunomodulators, organ transplantation, and the greater incidence of AIDS. This group comprises 18-28% of the cases of splenic abscess<sup>8</sup>. The increase in the availability of diagnostic tools are contributing to a recent surge in the number of patients with the diagnosis of splenic abscesses and at the same time the treatment options are also increasing<sup>9</sup>. Our study population is purely a special subset where the hospital stay, number of invasive procedures, use of chemotherapy, mortality and morbidity are higher, and are at greater risk of deep seated infections due to low or minimal immunity.

The mean age of our patients was 41.1 years with only one patient in the pediatric age group, the mean ages of the patients reported in other studies is almost comparable in the range of 35-54 years<sup>3, 10, 11</sup>.

In our study ten patients were males while only two were females (83.3% vs 16.7%), this skewed gender distribution is also noted in other studies like 14 males and 4 females in the study published from Korea by Won-Suk Lee and colleagues<sup>10</sup>, 52 males and 23 females in the Indian study by H. Sareekar and colleagues<sup>11</sup>. The cause of male predominance in all these studies could not be confirmed; rather it's possible that male sex predisposes to this condition but requires larger study to confirm this fact.

Six patients had hematological malignancies while six were diagnosed with solid organ tumors; among the solid organ tumors three were having metastatic disease with unknown primary. We were unable to locate a single study done on cancer patients with splenic ab-

Table 1: Demographics, primary diagnosis, radiologic findings and outcomes of patients with splenic abscess.

S	Age/ Gender	Malignancy	USG	CT scan	Solitary / multiple	Associat- ed liver abscess	Culture	Image guided percu- taneous aspira- tion(PCD)	Surgery done (splene- ctomy)	Antibiotics given	Out come	Associated Left sided pleural effusion
1	59/M	Myeloid metaplasia	+	Not done	multiple	No	Pseudomo- nas	PCD	-	Carbapen- em + van- comycin	Died, had AMI	Yes
2	57/M	Recto-sig- moid adenocar- cinoma	Not done	+	single	No	No growth	-	-	Ceftriax- one+ met- ronidazole	Improved	No
3	50/M	T-cell jejunal lymphoma	+	+	single	yes	E coli	PCD	-	Carbape- nem	died	Yes
4	40/M	Spindle cell neoplasm	Not done	+	single	No	No growth	-	Splenecto- my	Carbape- nem	Improved	No
5	28/M	Metastatic carcinoma	Not done	+	multiple	No	No growth	-	-	Ceftriaxone + ATT	Improved	Yes
6	44/M	Metastatic carcinoma	+	+	multiple	No	MTB	-	Splenecto- my	ATT	Improved	No
7	64/F	Hepato- cellular carcinoma	Not done	+	multiple	No	-	-	-	-	No show	No
8	3/M	Burkitt's lymphoma	+	+	multiple	No	No growth	-	Auto sple- nectomy (thalas- semia trait)	Carbape- nem	Improved	No
9	32/M	T-cell lym- pho-sarco- ma	+	+	single	No	E coli	-	Splene- ctomy	Carbapen- em + van- comycin	Improved	No
10	27/F	Metastatic carcinoma	+	+	multiple	Yes	No growth	PCD	-	ATT	no show	No
11	49/M	Relapse DLBCL	+	+	single	No	Pseudomo- nas	PCD	-	Piptazo- bactam + ciproflo- xacin	Improved	No
12	39/M	CML	+	+	Single	No	No growth	PCD	-	Piptazo- bactam	Improved	No

cess to compare the distribution among various malignancies.

The diagnostic modalities used in our series were ultrasonography and CT scans. Other modalities like PET/CT and leucoscans were also available at our center but none were used to diagnose or confirm splenic abscess because diagnosis was confirmed on CT without any doubt, the diagnostic study of preference is an abdominal CT<sup>12</sup>. Six patients were diagnosed with solitary splenic abscess while six were having multiple splenic abscesses; multiple splenic abscesses were common in patients with solid organ tumors while single abscess was common in patients who had hematologic malignancies. Associated liver abscess was also found in two patients.

PCD was performed in five patients; three patients had percutaneous needle aspirations while two of them were managed with a percutaneous catheter placement. Sequential images of one of our patient with percutaneous catheter drainage are illustrated in figures 1-3. Compared to another study where nine out of twelve patients underwent percutaneous aspiration while three were managed with catheter placement<sup>15</sup>. Two of our patients had multiple abscesses; PCD was done because they were physically not fit for surgical procedure. One of them died of acute myocardial infarction while the other patient never showed up again. He recovered initially and was discharged on ATT. The advantages of PCD over surgical options are spleen preservation, patient's acceptance and compliance, cost, less complications and shorter hospital stay. However for patients with multiple abscesses surgical options are still preferred. Three of our patients were surgically managed; two of them had solitary abscesses. It is recognized that percutaneous drainage may be appropriate for some patients initially but the high failure rate (14.3—75%) reported in the literature demonstrates that surgery still remains the standard treatment<sup>9,10</sup>. On the contrary some studies suggest that PCD can be safely and successfully performed in patients with splenic abscess<sup>13</sup>. Splenectomy has additional risk of infections with encapsulated organisms like Haemophilus influenza, Streptococcus pneumonia and Nisseria meningitidis. The incidence of infection post-splenectomy is 3.2% with a mortality rate of 1.4%<sup>14</sup>.

In our study only eight specimens were sent for cultures five specimens were from PCD and three were splenectomy specimens. Two out of three splenectomy specimens were positive with E.coli and Mycobacterium tuberculosis (M. tuberculosis) each. Whereas three out of five PCD specimens were positive with Pseudomonas aeruginosa in two patients and E.coli in one patient. No fungal cultures were positive and no amoeba was identified. In comparison to a study conducted by Ferraioli and colleagues twelve out of sixteen abscesses were

positive for microbial cultures; seven were bacterial, four fungal and one was positive for M. tuberculosis. Two cases were attributed to amoebic on the basis of appearance of pus and serology. In this study four specimens were positive for gram positive (Staphylococcus aureus and streptococcus) organisms<sup>15</sup>. In our study no gram positive organisms were isolated. Similarly no fungal cultures were positive in our patients, probable explanation for this is that all patients were cancer patients and they received anti fungals prophylactically during febrile neutropenia as per the Infectious Diseases Society of America (IDSA) guidelines<sup>16</sup> and similarly certain chemo protocols include antifungals as an integral part for prophylaxis.

Associated left sided pleural effusion was seen in 25% of our patients. Whereas in other studies it was 18.8%<sup>15</sup>, 19.7%<sup>17</sup>, 22.3%<sup>18</sup> and 55.1%<sup>19</sup>.

In our study group five patients were treated empirically with carbapenems, two with Ceftriaxone and two with Piperacillin tazobactam which was later tailored according to sensitivity results of pus. Three patients were treated with anti-tuberculous therapy. Two patients died; one due to myocardial infarction and other due to sepsis. Two patients were lost to follow up. Eight patients were successfully treated with appropriate antimicrobial regimens.

## CONCLUSION

Splenic abscess is a rare in cancer population as it is in general population. The etiology is different from general population, with more gram negative organisms. PCD along with antimicrobials are the treatment of choice in scenarios where there is a solitary abscess or in cases of multiple abscesses where patient is clinically unstable.

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#### CONTRIBUTORS

AM and FS participated in planning of study, data analysis and manuscript writing. AR and SHN helped in data management. All authors contributed significantly to the final manuscript.