

Splenectomy – A Six Years Experience

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SUMMARY

The complete medical records of 100 patients undergoing splenectomy over a 6 years period (June 1992 – December 1998) for various conditions at Surgical Unit II, Shaikh Zayed Hospital, Lahore, were reviewed. Of these 100 patients, there were 57 males and 43 females. The median age was 35 years (range 8 – 70 years). Spleen was severely enlarged (>20cm) in 45 cases, of moderate size (11 – 20cm) in 6 cases and of normal size in 49 cases. Average weight of the spleen reported after histopathology was 450gm (range 150gm – 2.6 Kg). The overall complication and mortality rates were 21% and 7% respectively. Of the 7 patients who died, 6 patients (85.71%) were cirrhotics. Among these, highest mortality was seen in the patients belonging to Child's grade C (57.1%) and those patients who underwent splenectomy in the emergency setting as an additional procedure along with gastro-oesophageal devascularization for upper gastro-intestinal variceal bleeding (71.4%). The syndrome of Overwhelming Post Splenectomy Infection (OPSI) was not seen in any of our patients. Removal of a massively enlarged spleen with pronounced hypersplenism, especially in portal hypertension, can be taxing for even an experienced surgeon. The operation should be performed by a senior and experienced member of the surgical team. However, the large weight of the spleen does not constitute a contraindication to splenectomy, but indications must be carefully selected, and the operative and peri-operative management, must be appropriate.

INTRODUCTION

Splenectomy as a life saving procedure in patients with splenic trauma is practiced worldwide^{1, 2}. Splenectomy has also been used widely and with great benefit in the treatment of various haematological disorders, either as a diagnostic or therapeutic adjunct^{3, 4}. These two major situations have always been the focus of surgical interest. Although splenectomy has remained an integral procedure in the staging of Hodgkin's disease and the surgical management of variceal haemorrhage as an adjunct to various gastro-oesophageal devascularization and shunt procedures in the emergency and semi-elective setting, the role of splenectomy in the management of various other conditions still remains a controversy⁵⁻⁹.

AIMS AND OBJECTIVES

This retrospective study was done to compare the results and evaluate the outcome in patients

undergoing splenectomy for various indications at our hospital.

PATIENTS AND METHODS

The complete medical records of 100 patients undergoing splenectomy over a 6 years period (June 1992 – December 1998) for various conditions at Surgical Unit II, Shaikh Zayed Hospital, Lahore, were reviewed.

Information was collected regarding demographic data, indications for the procedure, morbidity and mortality and whether the primary aim of the procedure was achieved or not.

All patients underwent routine pre-operative workup comprising of a full blood count and renal and liver function tests. Chest radiography and ECG were done as indicated. Coagulation profile and grouping cross-matching for blood transfusions were done routinely. Ultrasonography was carried out in all patients to see the size of the spleen, presence of enlarged lymph nodes, accessory spleens and any other concomitant pathology.

Spleen size was graded normal up to 11 cm, mildly enlarged 11 – 20 cm, severely enlarged if the spleen was 20 cm or larger in its largest diameter. All patients with portal hypertension and especially those presenting with variceal haemorrhage underwent an upper gastrointestinal endoscopy prior to surgery of any kind.

Pneumovax (pneumococcal vaccine, 1ml subcutaneously) was given to all electively operated patients 2 weeks prior to surgery. Exceptions were the patients who underwent splenectomy either for trauma or for any other condition in an emergency / urgent setting. These patients were administered the vaccine peri-operatively at the earliest most opportune time.

All patients received prophylactic antibiotics (Inj. Omnipen 1gm intravenously) at the time of induction of anaesthesia. A triple antibiotic regime was prescribed only in patients who were considered to have compromised immune function.

All operations were performed by a consultant or senior registrar grade surgeon.

All patients were operated in the supine position with a 30 degree right tilt of the operating table in selected patients. The most commonly used incision in the elective setting was a large left sub-costal incision followed by a midline incision which was utilized in all operations performed in the emergency. A left thoracoabdominal incision was used either in patients with portal hypertension who had massively enlarged spleens or in similar patients in whom an additional shunt procedure was planned.

After opening the abdomen, a thorough exploration was carried out in all cases for the evaluation of splenic size, difficulty in dissection, presence of any enlarged lymph nodes, accessory spleens and any other additional pathology.

As a first step in all cases, lesser sac was opened and the splenic artery ligated in continuity before handling the spleen. Platelet concentrates were transfused at this stage if the immediate pre-operative counts were less than 50,000. Splenectomy was then performed following precise anatomical landmarks in all cases. The Gastrosplenic ligament containing the short gastric vessels was clamped and ligated. Lower pole of the spleen was dissected by dividing the splenocolic ligament taking care to avoid injury to the splenic

flexure of the colon. Inferior polar branches of the splenic vessels were divided. Any adhesions between the spleen and the undersurface of the diaphragm and the parietes were freed ensuring meticulous haemostasis with the diathermy. Tail of the pancreas was identified and safeguarded. Splenic artery and vein were identified in the splenorenal ligament and ligated separately. This was followed by removal of the spleen. The wound was closed in layers after providing wide bore tube drainage to the splenic bed.

Intra-operative blood loss was graded as mild (<300ml), moderate (300 – 500ml) or severe (>500ml).

Clinical and haematological monitoring was done daily post-operatively. Post-operative complications, total hospital stay, requirements for blood transfusions and mortality were noted. Patients were discharged and followed up in the surgical out-patients department on a weekly basis for the first post-operative month and then monthly for the next 6 months. All patients were submitted to a clinical examination and their hemoglobin estimation and platelet counts repeated at each follow-up visit.

RESULTS

Although a total of 127 patients underwent splenectomy at our unit during the study period, the complete medical records of only 100 patients were available and were thus included in this retrospective analysis.

Of these 100 patients, there were 57 males and 43 females. The median age was 35 years (range 8 – 70 years).

The indications for splenectomy were as shown in Table 1.

Average pre-operative platelet count in all the patients was 90,000 / L. Spleen was severely enlarged (>20cm) in 45 cases, of moderate size (11–20cm) in 6 cases and of normal size in 49 cases. Average weight of the spleen reported after histopathology was 450gm (range 150gm – 2.6 Kg).

Splenectomy in the 37 cirrhotic patients was done as an adjunct to various procedures as shown in Table 2.

Table 1. Indications for Splenectomy (n=100).

Indications	No. of patients
Hypersplenism due to portal Hypertension*	37
Idiopathic Thrombocytopenic Purpura	25
Splenectomy as a part of radical gastrectomy	10
Haematological malignancies	08
Trauma	14
• Blunt trauma**	11
• Iatrogenic trauma	03
Other rare causes	06

* As an adjunct to gastro-oesophageal devascularization and proximal lienorenal shunt procedures for bleeding varices.

** Two patients had splenectomy along with distal pancreatectomy
Spherocytosis, Haemolytic autoimmune anaemia, Thallacemia.

Table 2. Splenectomy in the Cirrhotic (n=37)

Procedures	Child's grade		
	A	B	C
Gastro-oesophageal Devascularization	0	9	7
Proximal Lienorenal Shunt	12	8	0
Gastro-oesophageal Devascularization & Transection.	0	1	0

Average blood loss was minor in most of the cases. Severe blood loss was observed in 4 patients of portal hypertension and only one patient with blunt trauma. Average blood loss and other outcome parameters were as shown in table 3.

Table 3. Outcome parameters in 100 splenectomies.

Mean Operative Time	120 min (range 1 – 5 hours)
BLOOD LOSS	
• Minor (<300ml)	85 patients
• Moderate (300 – 500ml)	10 patients
• Severe (>500ml)	05 patients
No. of transfusions required	Average 0.3 (range 0 – 10)
Mean Hospital Stay	07 days (range 5 – 56 days)

Although the mean hospital stay in all the patients was 7 days, one patient who had sustained blunt abdominal trauma remained admitted for 56 days as his post-operative course was complicated with a pancreatic fistula which settled on conservative management.

There was significant morbidity seen in this study group and the overall complication rate was 21% (Table 4).

Table 4. Post-operative complications / morbidity.

Complications	No. of patients
Wound Infection	11
Respiratory infections	17
Post-operative Fever	08
Septicaemia with negative blood culture	03
Pleural Effusion	10
Subphrenic Collection	07
Post-op GI rebleeding in cirrhotic patients	04
Persistent ascitic fluid leakage from drainage site	03
Hepato-renal shutdown	01
Hepatic encephalopathy	03

Four of the 10 patients with a post-operative pleural effusion and 2 of the 7 patients with a subphrenic collection had to undergo ultrasound guided needle aspiration. The remaining patients were managed conservatively without any significant problems.

There were 7 (7%) deaths in this study group. Out of these 7 patients, 6 (6%) patients were cirrhotic and had splenectomy for associated hypersplenism. Among these cirrhotic patients, 4 deaths were due to hepatic encephalopathy. One of these patients died after hepatorenal shutdown. The last death among these cirrhotic patients was due to overwhelming septicaemia leading to Multiple System Organ Failure (MSOF).

A detailed analysis of mortality in relation to Child's grading in cirrhotic patients is shown in Table 5.

A further analysis of the mortality of splenectomy in cirrhotic patients according to the additional procedure performed is shown in Table 6.

The only other mortality in this series was a poly-trauma trauma patient who had received

massive peri-operative transfusions as a result of which he developed Disseminated Intravascular Coagulation (DIC) (Table 7). There was no other mortality in the remaining study group.

Table 5: Mortality in the Cirrhotics. (According to Child's Grade.)

Child's Grade	No. of patients	Mortality (%)
A	12	00 (00%)
B	18	02 (11.1%)
C	07	04 (57.1%)
Total	37	06 (16.2%)

Table 6: Mortality in the Cirrhotic's (According to additional procedure)

Procedure	No. of patients	Mortality (%)
Gastro-oesophageal Devascularization	16	05 (31.25%)
Proximal Lienorenal Shunt	20	01 (05%)
Gastro-oesophageal Devascularization & Transection	01	00 (00%)
Total	37	06 (16.21%)

Table 7. Total Mortality in 100 Patients.

Cause	No. of patients (%) n=100
Hepatic Encephalopathy	04
Hepatorenal Shut-down	01
Septicaemia (MSOF)	01
Disseminated Intravascular Coagulation (DIC)	01
TOTAL	07 (7%)

There was no recurrence of disease or need for re-exploration in patients with haematological disorders.

Accessory spleens were removed in only 8 patients.

Sustained rise in platelet count were seen in 80% of the cases with Idiopathic Thrombocytopenia Purpura After cessation of steroid therapy. Only 4 patients needed anti-platelet therapy for constant rise in platelet count ($> 9 \times 10^9 /L$). All the patients

with hypersplenism had improved haemoglobin concentration and raised white cell and platelet counts in the post-operative period. The only exception was one female patient who had sustained low platelet counts post-operatively. Imaging failed to reveal a missed accessory spleen in this lady till she was lost to follow up. Patients with thalassaemia and haemolytic anaemia partially responded after splenectomy.

Lymphomas were diagnosed in 4 patients with previously undiagnosed splenomegaly. Patients with haematological malignancies were pain free following splenectomy.

DISCUSSION

The main indication for splenectomy in the majority of the patients in our series was secondary hypersplenism^{6, 7, 10}. Portal hypertension, Leukemia, Lymphoma and almost any other disease that causes splenomegaly can result in secondary hypersplenism^{8, 11}. Secondary Hypersplenism, with thrombocytopenia, leucopenia, anaemia, or any combination of two or even three elements being deficient in the peripheral blood, coupled with a hypercellular marrow in the involved elements, is one of the more demanding clinical states that a surgeon is required to address in consultation with a haematologist. Usually, as is also true in our case, surgery is resorted to only after all other medical measures have been tried and failed^{7, 12}. In our experience of splenectomy for secondary hypersplenism, we have had a substantially favourable response rate, although we have infrequently observed the abnormality recur at a later date despite the initial response^{8, 13, 14}. The majority of our patients responded well to splenectomy and remained so for the duration of the follow-up.

Although accessory spleens were removed in 8% of the patients in our series, the single patient in our series who failed to demonstrate an improvement in her thrombocytopenia after the splenectomy and two others who responded well initially but had a relapse of the haematodyscrasia for which the splenectomy was initially done, may be attributed to retained / missed accessory spleens at the original operation¹⁵. However, according to

available records, imaging failed to reveal any residual hyperactive splenic tissue in at least two of these patients. Accessory spleens have been reported in 14 – 30% patients in literature¹⁵⁻¹⁷. During operations on patients with splenic hyperfunction, accessory spleens should be sought and removed, especially when multiple or medium to large in size (>1cm in diameter). These small structures are found most commonly in the splenic hilus, along the vessels, and extending to the superior border of the pancreas, where they may resemble lymph nodes. Accessory spleens have been documented at other and more rare sites also¹⁶⁻¹⁸. Characteristically, patients respond to the initial splenectomy, but months or even years later exacerbation of the disease process should occasion a radionuclide scan for splenic tissue, and a CT scan to localize the accessory spleens that have become hyperplastic and functional¹⁶⁻¹⁹.

Contrary to traditional teaching, most of the patients in our series did not require any heparin or anti-platelet drug therapy (aspirin) to counter the reactive thrombocytosis that develops after splenectomy^{15,16,21}. In our experience, the rise of the platelet count to very high levels (1 million or more) was seen in only a few patients, was usually transient and did not result in any thrombotic sequelae^{15-17,22,23}. Only 4 patients with evidence of Deep Vein Thrombosis (DVT) in addition to dangerously high platelet counts required post-operative heparin followed by anti-platelet therapy in the form of oral aspirin.

The technique of splenectomy is usually not particularly complicated and we have elaborately described our operative technique^{6,7}. A left thoraco-abdominal incision was used in 22% of our patients to improve access, either when an additional shunt procedure was being carried out or when operation was being done for the removal of an enormous spleen. No increase in morbidity was noted on account of the incision. The increased mortality noticed in patients who had this incision was related more to the primary disease (portal hypertension secondary to cirrhosis) and the pre-operative condition / Child's grade of the patients^{27,31-33}.

Ligation of the splenic artery through the lesser sac, performed as an early step in the operation prior

to mobilization of a giant spleen, not only resulted in a less "bloody" and safer operation but also resulted in retrieval of the cellular elements sequestered in the spleen back into the circulation while mobilization was being carried out. Ligation of the artery also resulted in some reduction of the splenic size thus facilitating dissection and removal of the huge organ^{7,10,15,27,31-33}. In patients who had low platelet counts pre-operatively, infusion of platelet concentrates was more useful after prior ligation of the splenic artery.

In contrast to the series published by other authors more recently, we chose to drain the splenic bed in all our cases¹⁵⁻¹⁷. However, prolonged drainage of ascitic fluid (more than one week) was observed in only three patients. No other complications or increase in morbidity was noticed in relation to providing drainage to the splenic bed routinely.

Our 21% complication rate is comparable to that of other authors although higher complication rates have been recorded in literature^{20,24,26,28,29}. Although a few infective complications were noted in the post-operative period, the syndrome of Overwhelming Post Splenectomy Infection (OPSI), much recorded in western literature, was not seen in any of our patients even in those few patients who had a long follow-up²⁸.

Of the 7 patients who died (7% mortality), 6 patients (85.71%) were cirrhotics. Among these, highest mortality was seen in the patients belonging to Child's grade C (57.1%) and those patients who underwent splenectomy in the emergency setting as an additional procedure along with gastro-oesophageal devascularization for upper gastrointestinal variceal bleeding (71.4%). In this respect, our results are similar to those of other authors²⁶⁻³¹.

In addition to being the "the registrar's operation" for splenic injuries in abdominal trauma, splenectomy for massive splenomegaly is frequently performed for hematologic disorders for diagnostic and therapeutic indications^{1,4,20}. The role of splenectomy is complex and controversial. The aims of our retrospective study were to focus on postoperative complications and mortality and the advantages of splenectomy for massive splenomegaly. Removal of a massively enlarged spleen with pronounced hypersplenism, especially

in portal hypertension, can be a trying experience for even the veteran surgeon. The operation should be performed by a senior and experienced member of the surgical team. The large weight of the spleen does not constitute a contraindication to splenectomy, but indications must be carefully selected, and the operative and perioperative management, must be appropriate^{32, 33}

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