



SPLENECTOMY – AN ANALYSIS OF VARIOUS INDICATIONS AND POSTOPERATIVE COMPLICATIONS

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ABSTRACT **Introduction:** The spleen has considerable role in body's immunity. Indications for splenectomy have never been clearly defined. Though trauma is the most common indication, there are some non-traumatic conditions which warrant splenectomy eg. Incidental splenectomy in cytoreductive surgeries and splenectomy in chronic haemolytic disorders and other hypersplenism disorders. Also, potential complications following splenectomy have been discussed in this prospective observational study.

Aims And Objectives:

- To evaluate various diseases of spleen requiring its removal apart from trauma for a period of 18 months.
- To study pattern of traumatic indication when non operative management fails
- To study complications of splenectomy and prevention of sepsis

Materials And Methods: 25 patients who were splenectomised in past one and a half year were analysed. Decision for splenectomy is based on grades of organ injury and hemodynamic stability and those who were successfully managed with Nonoperative treatment were excluded. Complete evaluation including history recording and physical examination were done in all the nontraumatic cases. Prophylactic vaccinations were given in 20 patients, the specimens sent for histopathology were analysed.

KEYWORDS : Incidental splenectomy, explorative laparotomy, overwhelming post splenectomy infection,

ANATOMY OF SPLEEN

Spleen is largest lymphoid organ and wedge shaped structure suspended behind the stomach by gastrosplenic, splenorenal, phrenicocolic ligaments in left hypochondriac region.¹

It is the most common solid organ to be injured in blunt abdominal trauma, also its susceptibility is increased in hypersplenism and splenophrenic, splenocolic ligaments are reflected parts of gastrosplenic ligament² and transverse mesocolon respectively during embryonic fixation

Splenic artery, short gastric arteries, left gastroepiploic artery supply the spleen¹ and splenic vein joins the two mesenteric veins to form portal vein¹. Lymphatics arise from splenic capsule and splenic trabeculae⁴ and form 2 main groups of lymph nodes – 1. hilar, 2. splenopancreatic. Celiac plexus give visceral nerve fibres to spleen, right vagus nerve also supply the spleen¹.

FUNCTIONS OF SPLEEN

Spleen contains – 8% of red cell mass and one third of platelet mass normally which will be increased in splenomegaly². Composition of spleen is of 75-85% red pulp, 10-20 % white and 5% trabecular. Two types of circulations are present in spleen- Open circulation which flow from arteries to cords and sinusoids constituting 90% and closed circulation directly from arteries to veins bypassing cords and sinusoids

At 13th week of gestation, surface Ig bearing B cells, rosette forming RBC and T cells emerge from spleen, IgM and IgG are synthesised from third trimester.

Spleen is the major site of IgM production and components of classical pathway of components. It is also major site of clearance of encapsulated organisms and tumor cells. Spleen also synthesizes opsonins which stimulate white cell motility³, activate alternate pathway of complement fixation and fibrosis in wound healing

Aged and abnormal RBC are removed by cell culling, macrophages in red pulp facilitate opsonisation of particles with IgG and filter RBC and repair them without being destroyed⁴. Defective RBC undergo pitting i.e. removal of Howell-jolly, Heinz bodies and Pappenheimer bodies⁵

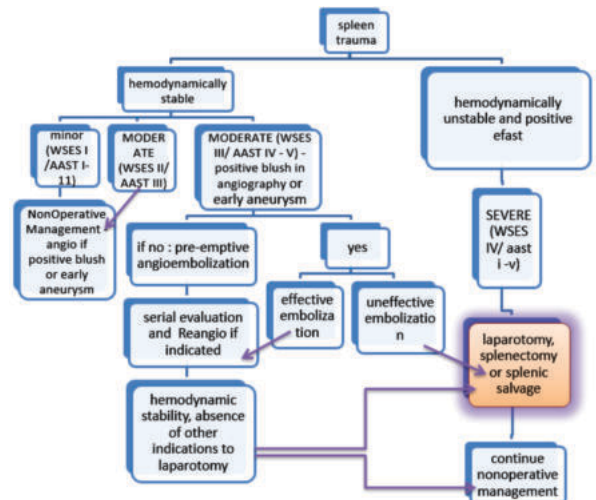
ANALYSIS OF VARIOUS INDICATIONS FOR SPLENECTOMY

Blunt or Penetrating abdominal trauma

Spleen trauma management algorithm for Adult patients⁶:

WSES – World Society of Emergency Surgery

AAST – American Association for Surgery of Trauma



Hypersplenism – accelerated destruction of blood cells resulting in anemia, leucopenia and thrombocytopenia⁷ and compensatory cellularity in bone marrow – primary or secondary - Secondary hypersplenism is associated with specific diseases which are as follows

- Chronic haemolytic diseases** – hereditary spherocytosis⁷, thalassemia, sickle cell disease⁸, elliptocytosis, Glucose 6-Phosphate Deficiency, idiopathic thrombocytopenic purpura⁹
- Congestive splenomegaly** – cirrhosis, extrahepatic portal venous obstruction, noncirrhotic portal fibrosis, splenic vein thrombosis which is usually due to pancreatitis¹⁰
- Chronic inflammatory diseases** – sarcoidosis, systemic lupus erythematosus, felty's syndrome¹¹, rarely amyloidosis, gauchers's disease, niemann pick disease
- Infectious diseases** – tuberculosis, infectious mononucleosis, malaria, kala-azar,
- Lymphoproliferative disorders** – hodgkin's and nonhodgkin's lymphomas
- Myeloproliferative disorders** – chronic myelogenous leukemia, primary myelofibrosis, polycythemia vera, essential thrombocythemia¹²

More than 90 % of hypersplenism don't have splenomegaly, almost all patients with splenomegaly who require surgery have hypersplenism with splenic infarction or splenic rupture Splenic abscesses¹³

Splenic cysts – congenital, nonparasitic, parasitic, dermoid, secondary

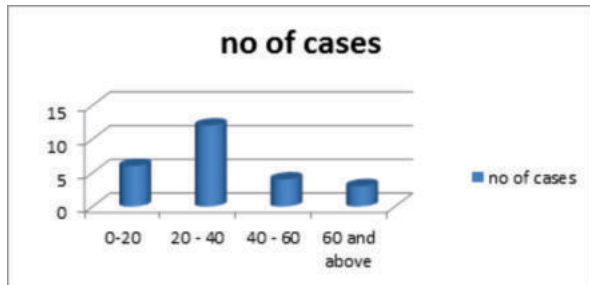
cysts

Splenic tumors –

- **Benign** -hemangiomashartomas or lymphangiomias, lipomas-
- **Malignant** -angiiosarcoma, malignant fibrous histiocytoma, fibrosarcoma, leiomyosarcoma, teratoma, Kaposi's sarcoma –
- **Metastatic infiltration** from colorectal cancer¹⁴, breast, lung, melanoma, cervix etc.,

Age Distribution

Age group	No of cases
0 – 20	6
21 – 40	12
41 – 60	4
Above 60	3



Sex Distribution

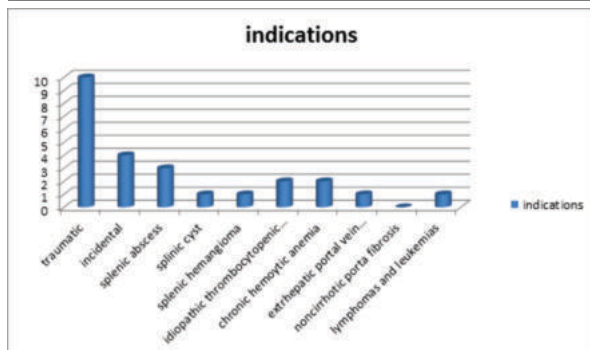
S. No.	No of Cases
MALE	17
FEMALE	8



Indications Graph

With increase in splenic preservation for trauma, hematologic conditions becoming more common indications for splenectomy as reported in most recent series.¹²

s.no	Indication	No of cases
1	Traumatic	10
2	Incidental	4
3	Splenic cyst	1
4	Splenic abscess	3
5	Splenic hemangioma	1
6	Idiopathic thrombocytopenic purpura	2
7	Chronic haemolytic diseases	2
8	Extrahepaticportal venous obstruction	1
9	Noncirrhotic portal fibrosis	0
10	Lymphomas and leukemias	1



APPROACHES AND OPERATIVE TECHNIQUES

Open splenectomy – total or partial – midline incisions are quick and

easy to make and results in little loss of blood, it helps to explore entire peritoneum. Left subcostal give exposure just adequate for removal of normal sized or twice the normal sized spleen where no other procedures contemplated.¹⁵

The lesser sac is entered through the left part of the gastrocolicomentum, short gastric vessels along the greater curvature upwards are divided with clamps and tied. The splenicocolic ligament is divided reflecting the splenic flexure downward. The peritoneum lateral to the spleen is opened and splenorenal and splenophrenic ligaments are divided.

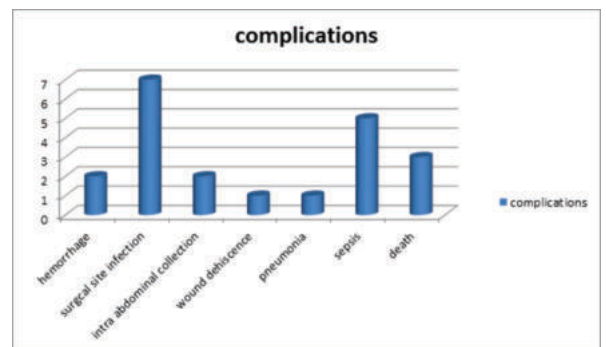
The operators hand is passed behind the spleen and tail of the pancreas, mobilizing the spleen anteriorly and medially by blunt dissection until the spleen is brought up in to operative field. Remaining short gastric vessels are ligated and divided, retracting the stomach to patient's right. Splenic artery and vein are isolated, ligated and divided just distal to tail of the pancreas. Spleen is removed.

Entire retroperitoneum is inspected for hemostasis. A search for accessory spleen should be done during elective splenectomy. Splenic hilum, gastrosplenic ligament, gastrocolic ligament, omentum, mesentery and presacral spaces are the potential sites for accessory spleen.¹⁴

Laparoscopic splenectomy is evolving as a procedure of choice for splenic disorders except for the markedly enlarged spleen¹⁶

ANALYSIS OF POST OPERATIVE COMPLICATIONS

complication	No of cases
Haemorrhage	2
Surgical site infection	7
Intra abdominal collection	2
Wound dehiscence	1
Pneumonia	2
Sepsis	5
death	3



Decreased clearance of bacteria from blood and decreased levels of IgM and decreased opsonin activity are the causes of overwhelming post splenectomy infections in young children¹⁷

RESULTS

Out of 25 patients studied, splenectomy was done as a part of explorative laparotomy in 10 patients and splenectomy for chronic haemolytic disorders was seen in 4 patients. And 4 patients underwent an en bloc resection for malignant infiltration. Of these a case of retroperitoneal sarcoma which resulted in removal tumor along with spleen was seen. Local causes for the surgery was splenic abscess as seen in 3 patients, Splenic cysts and hemangiomas were found in single patient each. Extra hepatic porta vein obstruction was seen in one. Most common complication was surgical site infection. Other complications were atelectasis leading to pneumonia and intra-abdominal collection which were seen rarely. Sepsis was encountered in 3 patients which were managed in intensive care unit.

DISCUSSION

This study shows splenectomy is done more frequently in middle aged male patients and motor vehicle accidents being the common cause here. Followed by splenic loss due to direct tumor extension from adjacent organs or lymphovascular involvement. Also Spleen had to be removed due to compression of portal vein by splenic vein thrombosis

in chronic pancreatitis or pseudocyst.

Next common disease requiring splenectomy is splenic abscess. Splenectomy is always indicated in primary splenic tumors and Hereditary Spherocytosis. Splenectomy is usually indicated in idiopathic thrombocytopenic purpura but is not curative here,

Splenectomy is sometimes indicated especially for staging as in Hodgkin's disease. Splenectomy is rarely indicated in Thalassemia, sickle cell disease, Glucose 6-Phosphate Deficiency, leukemia, splenic lymphoma and sarcoidosis

Polyvalent pneumococcal vaccine protects the asplenic patients for 4 to 5 years after which revaccination is advisable. It is effective against 80% of organisms

CONCLUSION

The overall mortality due to splenic injury was 15%. Splenectomy for non-traumatic indications is now undertaken more for chronic haemolytic anemias and malignancies of adjacent organs and thrombosis of splenic vein where the traumatic indications have been lowered. Primary splenic pathologies requiring splenectomy have been few, The risk of post splenectomy sepsis and the protection offered by vaccination have been stressed. Strict followup of cases along with education to patient is important

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