International Surgery Journal
Rehmani B et al. Int Surg J. 2017 Aug;4(8):2589-2593
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20173394

Original Research Article

Changing trends in elective splenectomy at a tertiary hospital in North India: a 10-year study

Babar Rehmani, Navin Kumar*, Priyank Pathak

Department of Surgery, Himalayan Institute of Medical Sciences, Dehradun, Uttarakhand, India

Received: 15 June 2017
Accepted: 08 July 2017

***Correspondence:**
Dr. Navin Kumar,
E-mail: surgeon_navin@yahoo.co.in

ABSTRACT

Background: Spleen is the meeting ground of medicine and surgery and most patients for elective splenectomy are primarily evaluated by physicians and then referred to the surgeons. Both physicians and surgeons need to be aware of the utility of splenectomy as a therapeutic option in various medical conditions. This study looks at the indications for elective splenectomy and the outcomes over a decade at a tertiary care centre in North India. It also evaluates the adherence to protocols recommended for prevention of OPSI in adults.
Methods: A hospital based prospective observational study was conducted at a tertiary care hospital situated in Uttarakhand, North India, over a duration of 10 years from October 2006 to October 2016. The inclusion criteria for the study were all the patients undergoing splenectomy for the non-traumatic indications.
Results: Sixty-one patients underwent splenectomy in the 10 years' duration. The age range of patients was from 17-79 years with twenty-six males and rest females. Hypersplenism was the commonest indication for splenectomy. There were eleven cases of primary hypersplenism and there were twenty-five cases of secondary hypersplenism. Portal hypertension was the main cause of secondary hypersplenism requiring splenectomy.
Conclusions: The major indications of elective splenectomy were hypersplenism secondary to portal hypertension due to EHPVO and haematological disorders mainly ITP. Mortality is 2.4% and morbidity is 21.4%. Vaccination rates of 75% were seen in planned splenectomy however, no case of OPSI recorded in this series.

Keywords: Elective splenectomy, Hypersplenism, Primary Hypersplenism, secondary Hypersplenism, Splenectomy

INTRODUCTION

Splenectomy has been performed as a surgical procedure for over 2000 years. Plinius Secundus, a roman naturalist in the first century recorded that the spleen can be taken out by way of incision, and yet the creature can live nevertheless.[1] Splenectomy as a surgical procedure was reported by the old Neapolitan surgeon Adriano Zaccari in a 24-year-old lady with massive splenomegaly. Between 1905 and 1926, Lord Berkeley Moynihan, in his book Abdominal operations, defined medical indications for splenectomy that ranged from leukemia to Hodgkin's disease, from pernicious anemia to Gaucher's disease.[2] Emergency splenectomy in cases of trauma was a common operation done by surgeons. Morris and Bullock in 1919 suggested that splenectomy would increase the susceptibility to infection. King and Schumacker documented this in 1952.[3,4] Growing concern about the risk of overwhelming post splenectomy infection (O.P.S.I) and its awareness led to a reappraisal of the needs for splenectomy and the rates of splenectomy declined. In the emergency settings, also surgeons tried to conserve splenic tissue. A review by Holme and Crosby in 1984 showed that nearly 50% of elective splenectomies were performed as part of the staging for Hodgkin's disease.[5] A number of splenectomies were done as a part of other operations such as total gastrectomy or distal pancreatectomy. Hematological

disease has been cited as one of the leading indications for splenectomy.[6] There is a distinct change in the indications of splenectomy over the last 70-80 years. Spleen is the meeting ground of medicine and surgery and most patients for elective splenectomy are primarily evaluated by physicians and then referred to the surgeons. Both physicians and surgeons need to be aware of the utility of splenectomy as a therapeutic option in various medical conditions. Hence the reappraisal of the indications for splenectomy, the effect of splenectomy on the disease process and the safety and complications of the operations itself need to be evaluated time and again so that the procedure can be confidently advised in the set of patients who are most likely to be benefitted by the operation. This study looks at the indications for elective splenectomy and the outcomes over a decade at a tertiary care center in north India. It also evaluates the adherence to protocols recommended for prevention of OPSI in adults.

METHODS

A hospital based prospective observational study was conducted at a tertiary care hospital situated in Uttarakhand, North India, over a duration of 10 years from October 2006 to October 2016. The study protocol was approved by Himalayan Institute of Medical Sciences, Dehradun (India) local ethical committee. Patient identity is not disclosed. The inclusion criteria for the study were all the patients undergoing splenectomy for the non-traumatic indications. If splenectomy had been performed as a part of other surgeries like radical gastrectomy, the primary diagnosis was noted along with a brief history and various patient variables like age and gender were recorded. All the cases were evaluated on the basis of indications for splenectomy, type of surgery (open or laparoscopic), pre-and post-operative hematological parameters, additional procedures performed and the post-operative complications. The vaccinations done to prevent OPSI were also noted.

RESULTS

Sixty-one patients underwent splenectomy in the 10 years duration. The age range of patients was from 17-79 years with twenty-six males and rest females. Hypersplenism was the commonest indication for splenectomy. There were eleven cases of primary hypersplenism and there were twenty-five cases of secondary hypersplenism. Portal hypertension was the main cause of secondary hypersplenism requiring splenectomy. This portal hypertension was chiefly due to EHPVO (19 cases) (Table-1). Among hematological diseases, idiopathic thrombocytopenic purpura (I.T.P) was the commonest indication for splenectomy. Most of the ITP cases were of young women of age range 20-35 years. There was no case of thalassemia, sickle cell disease as well as leukemia. In this series, most of the cases were done by open approach (Table 2). Laparoscopic splenectomy was done in ITP (3 cases), primary hypersplenism (2 cases) and splenic cyst (1 cases). Out of these, in four cases spleen was collected and retrieved through endobag after morcellation and no separate incision was used to deliver the spleen.

Table 1: Various indications for elective splenectomy.

Indications	Number of Cases
Primary hypersplenism	11
Secondary hypersplenism	
EHPVO (extra hepatic portal venous obstruction)	19
Cirrhosis of liver with portal hypertension	5
NCPF (non-cirrhotic portal fibrosis)	1
Kala azar	1
Haematological	
ITP (Idiopathic thrombocytopenic purpura)	9
Haemolytic anemia	2
Lymphoma	1
Myelofibrosis	1
Others	
Splenic abscess	5
Spontaneous rupture of spleen	1
Hydatid cyst of spleen	2
Simple cyst of spleen	2
Felty's syndrome	1

Table 2: Types of approach for elective splenectomy.

Procedure	Number of Cases
Open splenectomy	54
Laparoscopic splenectomy	6
Laparoscopic converted to open	1

In the open approach, most common incision used was midline used in 48 cases, followed by left subcostal in 5 cases and left paramedian incision in 1 case. 12 additional procedures were performed along with the splenectomy as shown (Table 3).

Two patients expired, one was due to hemorrhage, in which the patient was re-explored but the source of bleeding could not be identified and the patient expired within 48 hours of surgery. Other patient expired due to progressive liver failure.

Morbidity was seen in 12 cases (19.6%), out of which 4 were intraoperative and 8 in post-operative status. Intraoperatively, diaphragmatic injury occurred in all the 4 cases, in which primary repair was done and intercostal drainage tube insertion was done. In the postoperative time period, chest infection was seen in 2 cases (Table 4). During the course of 10 years, no case of OPSI was reported.

Table 3: Additional procedures with elective splenectomy.

Additional procedures	Number	Underlying disease
Devascularization	3	Portal HTN with bleeding varices
Cholecystectomy	2	Hemolytic anemia with symptomatic cholelithiasis
Central spleno-renal shunt	2	Portal hypertension with pre-hepatic portal vein thrombosis with esophageal varices
Mesocaval shunt	1	Portal HTN with EHPVO
Umbilical hernia repair	1	Portal HTN with ascites with umbilical hernia
Partial cysto-pericystectomy	1	Hydatid cyst of spleen and liver
Biopsy from the para-aortic lymph node mass	1	Hodgkin Lymphoma
Hepatico-jejunostomy with Choledochal cyst excision	1	Type IV Choledochal cyst with simple cyst of spleen

A good response was noted in patients with hypersplenism (both primary and secondary) who underwent elective splenectomy with improvement in all parameters (Table 5).

In the patients with ITP, all had an excellent response to splenectomy. Only one out of 9 patients had a relapse with platelet counts falling to 10,000/cumm after 18 months. She responded well to steroid therapy. Pneumococcal vaccine had been given to 77.41% of the patients.

H. Influenza B vaccine was given to 52% of patients and the rest did not receive any vaccination in the pre-or postoperative period. No patient had been immunized against meningococcal infection. Drain insertion was done electively in only 21.4% of cases.

The histopathology in all the cases of primary hypersplenism was reported as congestive splenomegaly.

Table 4: Post-operative complications seen in elective splenectomy (n=61).

Complication	Number
Chest infection	2
Hemorrhage	1
Wound dehiscence	1
Left subdiaphragmatic collection	1
Thrombocythemia with IVC thrombosis	1
Generalized maculopapular rash	1
Ascites	1
Total	**8**

Table 5: Haematological parameter in patients with primary, secondary hypersplenism and haematological disorders.

Etiology	Mean pre-op Hb (gm%)	Mean post-op Hb (gm%)	Mean Pre-op TLC (/cumm)	Mean post-op TLC	Mean pre-op platelets (/cumm)	Mean post-op platelets
Primary (n=11)	8.18	9.65	3680	12062	57090	178272
Secondary (n= 26)						
Portal HTN	8.21	10.70	4280	7850	50790.4	211391
Haematological (n=13)						
ITP	11.34	11.13	5339	11505	50533	165555

DISCUSSION

Over a period of ten years, sixty-one splenectomies were done on elective basis. The indications for splenectomy vary from one part of the world to the other, and with the course of time a change in indications has occurred. In a study by Fellows in the Trent region from 1972-1985, they reported that 37.4% of these splenectomies were incidental to other surgical operations; 20.3% were in relation to surgery for malignancies such as carcinoma of the stomach, colon, kidney and pancreas. The number of splenectomies performed as part of procedures for intra-abdominal carcinoma increased by 40% between the quinquennia 1972-1976 and 1981-1985. 8.7% of splenectomies were done for lymphoma. The previously casual attitude of some surgeons to incidental splenectomy during other operations seemed unjustified in view of the risk of OPSI recognized increasingly nowadays.[6]

In earlier splenectomy series, it is difficult to differentiate splenectomies performed for iatrogenic trauma from those performed deliberately to facilitate access or because of direct extension of tumor.[7-9] Splenectomy for

lymphoma reached a peak during the period 1974-77 and declined subsequently. The increased numbers of splenectomies at that time probably reflected the enthusiasm of staging laparotomy and splenectomy in Hodgkin's disease.[10]

Indeed, during the period 1973-1979 staging laparotomy for Hodgkin's disease emerged as the most frequent indication for splenectomy in Ohio State University Hospital.[11] A review by Holmes showed that nearly 50% of elective splenectomies were performed as part of the staging for Hodgkin's disease.[12]

In this study, no patient underwent splenectomy as a staging for Hodgkin's disease. The wider use of combination chemotherapy for limited Hodgkin's disease and the introduction of computerized tomography have made staging laparotomy redundant.[13]

Another study by Glass in 1996 showed that the indication for splenectomy was hematological disease in 47% cases and trauma in 21% patients and none was done for Hodgkin's lymphoma; and the most common hematological indication was ITP.[14] In the present study, the most common indication was hypersplenism secondary to portal hypertension followed by hematological disorders.

It has been calculated that the mortality rate for sepsis in splenectomized adults is 540 times greater than in the general population although the risk after splenectomy for trauma may be less marked.[15]

Musser et al. reported a very substantial morbidity and mortality after splenectomy.[16] Them in-hospital mortality rate was 9.25% compared with mortality of 2.4% of the present study (two cases). However, complication rate (21.4%) of the present study is very similar to those reported elsewhere.[17,18]

Immunization has long been recommended, but in 1986-1990 only some 35% of British splenectomized patients received pneumococcal vaccine.[19] Penicillin prophylaxis is still recommended however none of the patients in this series were given chemo-prophylaxis for OPSI.[20] Post operatively, the most common complication was chest infection similar to that in a study by Meshikhes AN.[21] Duckett et al reported a positive response to splenectomy in 88% of their 118 patients with hypersplenism and Letoquart observed a positive response in 94% of 47 patients underwent splenectomy.[22,23]

In a study by Al-Salem, in 26 patients the indication for splenectomy was hypersplenism and the need for in the form of frequent blood transfusions. The blood parameters of these patients improved significantly after splenectomy, and their transfusion requirements decreased markedly.[24]

Kumar et al reported of 140 adult patients with ITP who had therapeutic splenectomy, 88% achieved a response that was sustained for at least 1 month. In multivariate analysis, younger age and higher peak post splenectomy platelet counts were significantly associated with a favorable response to splenectomy.[26]

In an overview of 321 patients by Pamuk, splenectomy was performed in 76 patients and complete response was obtained in 68.4% of the regularly followed up patients and splenectomy seemed to be effective in patients unresponsive to steroids.[26]

With the changing concepts about the role of staging laparotomy in Hodgkin's Lymphoma, from its introduction, staging laparotomy was intended only for patients in whom radiation therapy potentially could be the sole therapeutic modality. Surgical staging allows treatment to be chosen with specific knowledge regarding the extent of disease but has an associated morbidity and mortality. Published mortality rates range from 0.3% to 1%. Morbidity poses the greater threat. Major complications include cardiac arrest, wound infection or dehiscence, postoperative hemorrhage, subphrenic abscess, pulmonary embolism, pneumonia, sepsis and small bowel obstruction from adhesions. Because pathologic staging incurs so many risks, the major current controversy in Hodgkin's disease management involves the selection of patients who can avoid staging laparotomy without jeopardizing outcome.[27]

Despite the efficiency of splenectomy as a therapeutic tool in the types of hematological disorders, it is still important to weigh the potential benefits against possible morbidity and mortality when considering a patient for splenectomy. The indications for splenectomy in hematological disease are still evolving. The indications and relative contraindications must be carefully judged in each case.

CONCLUSION

In this study, spanning over a decade, the major indications of elective splenectomy were hypersplenism secondary to portal hypertension due to EHPVO and hematological disorders mainly ITP. Good response to splenectomy is obtained for hypersplenism and ITP. Mortality is 2.4% and morbidity is 21.4%. Vaccination rates of 75% were seen in planned splenectomy however, no case of OPSI recorded in this series. Laparoscopic splenectomy is a feasible option for selective cases of splenectomy.

ACKNOWLEDGMENTS

Authors are highly thankful to their surgical colleague who have allowed them to include their patients in this series namely, Dr. (Prof.) P K Sachan, Dr. (Prof.) Shantanu K Sahu, Dr. Hemant Nautiyal and Dr. Mayank Nautiyal.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. JM Glass, JM Gilbert. Splenectomy in a general hospital. J R Soc Med. 1996; 89:199-201.
2. Dionigi R, Boni L, Rausei S, Rovera F, Dionigi G. History of splenectomy. Int J Surg. 2013;11(S1):S42-43.
3. Morris DH, Bullock FD. The importance of the spleen in resistance to infection. Ann Surg. 1919;70:513-21.
4. King H, Schumacker HB. Splenic studies. I. Susceptibility to infection after splenectomy performed in infancy. Ann Surg. 1952;136:239-42.
5. Holme TC, Crosby DL. Elective splenectomy. Indications and complications in 102 patients. J Coll Surg Edin. 1984;29:229-3.
6. Fellows IW, Hart S, Toghill PJ. Trends in splenectomy in the Trent region 1972-85. Postgrad Med J. 1988;64(750):267-70.
7. O'Neal BJ, McDonald JC. The risk of sepsis in the asplenic adult. Ann Surg. 1981;194:775-8.
8. Goonwardene A, Bourke JB, Ferguson R, Toghill, PJ. Splenectomy for undiagnosed splenomegaly. Br J Surg. 1979;66:62-5.
9. Wagner DS, Schlueter TM. Splenectomy: indications, complications and mortality. Ohio State Med J. 1984;80:610-13.
10. Worthy TS. Evaluation of diagnostic laparotomy and splenectomy in Hodgkin's disease. (Report No.12). Clin Radiol. 1981;32:523-36.
11. Traetow WD, Fabri PJ, Carey LC. Changing indications for splenectomy: thirty years experience. Arch Surg. 1980;115:447-51.
12. Holme TC, Crosby DL. Elective splenectomy. Indications and complications in 102 patients. J Coll Surg Edin. 1984;29:229-31.
13. Larson RA, Ultmann JE. The strategic role of laparotomy in staging Hodgkin's disease. Cancer Treat Rep. 1982;66:767-74.
14. Glass JM, Gilbert JM. Splenectomy in a general hospital. J R Soc Med. 1996;89:199-201
15. Dickerman JD. Traumatic asplenia in adults: a defined hazard? Arch Surg. 1981;116:361-3.
16. Musser G, Lazar G, Hocking W, Bussutil RW. Splenectomy for hematologic disease. The U.C.L.A. experience with 306 patients. Ann Surg. 1984;200:40.
17. Jockovich M, Mendenhall NP, Sompeck MD, Talbert JL, Copeland EM, Bland KI. Long term complications of laparotomy in Hodgkin's disease. Ann Surg. 1994;219:615-24.
18. Hays DM, Ternberg JC, Chen TT. Complications related to 234 staging laparotomies performed in the intergroup hodgkin's disease in childhood study. Surg. 1984:471-8.
19. Hosea SW, Brown EJ, Burch CG, Berg RA, Frank MM. Impaired immune response of splenectomized patients to polyvalent pneumo coccal vaccine. Lancet. 1981;i:804-7.
20. Kinnersley PK, Wilkinson CE, Srinivasan J. Pneumococcal vaccination after splenectomy: survey of hospital and primary care records. BMJ. 1993;307:1398-9.
21. Meshikhes AW, Mubarek MA, Abu-Alrahi AI, Al-Saif OH. The pattern of indications and complications of splenectomy in Eastern Saudi Arabia. Saudi Med J. 2004;25(12):1892-5.
22. Duckett JW. Splenectomy in treatment of secondary hypersplenism. Ann Surg. 1963;157:737-46.
23. Letoquart JP, La Gamma A, Kunin N, Grosbois B, Mambrini A, Leblay R. Splenectomy for splenomegaly exceeding 1,000 grams: analysis of 47 patients. Br J Surg. 1993;80:334-5.
24. Al-salem. Splenectomy for haematological diseases: The Qatif central hospital experience. Ann Saudi Med. 1999;19(4):325-30.
25. Kumar S, Diehn FE, Gertz MA, Tefferi A. Splenectomy for immune thrombocytopenic purpura: long-term results and treatment of postsplenectomy relapses. Ann Hematol. 2002;81(6):312-9.
26. Pamuk GE, Pamuk ON, Başlar Z, Ongören S, Soysal T, Ferhanoğlu B, et al. Overview of 321 patients with idiopathic thrombocytopenic purpura. Ann Hematol. 2002;81(8):436-40.
27. Multani PS, Grossbard ML. Staging Laparotomy in the management of Hodgkin's disease: is it still necessary?. Oncol. 1996;1:41-55.

Cite this article as: Rehmani B, Kumar N, Pathak P. Changing trends in elective splenectomy at a tertiary hospital in North India: a 10 year study. Int Surg J 2017;4:2589-93.