

## CASE REPORT

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# A Study on Perioperative Complications of Splenectomy in Emergency & Elective Cases: A Short Term Prospective Observational Study at a Tertiary Referral Hospital

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### **ABSTRACT**

Splenectomy being one commonly performed surgeries throughout the world is well known to have many complications. Heterogeneity exists in presentation, some being hematological or chest infections. Due to advancement of medical science, complications have reduced. Yet still some exist despite precautions and vaguely recorded in literature. We aim to study the incidence of complications of splenectomy in elective & emergency settings during perioperative period to demonstrate the present status and discuss the future changes in preventing or treating complications.

### **KEYWORDS**

Splenectomy; Emergency; Elective; Atelectasis; Wound Infection; Pancreatic Fistula; Opsi

### **INTRODUCTION**

The spleen, a lymphoid aggregate, lies behind ribs 9-10 in the left hypochondriac region of the abdominal cavity where a part of it lies in the epigastric region. Thus, the largest organ of the lymphatic system is situated between the fundus of the stomach and the diaphragm [1].

Due to its heterogeneous structure, the spleen performs a variety of immunological and hematological functions. It plays a key role in both the innate and adaptive immune systems, thereby protecting the body from invading organisms [2].

Yet its removal tends to be potentially beneficial in many cases. The most cases encountered being trauma which are treated by conservative measures until its type 4 and 5 injury including vascular pedicle injury and worsening of hemodynamic conditions. The other indications include hematologic (thalassemia, hereditary spherocytosis,

ITP, polycythemia vera, warm antibody autoimmune hemolytic anemia), malignant diseases (acute myeloid leukaemia, chronic lymphocytic leukaemia, myelofibrosis, hairy cell leukaemia) and miscellaneous (splenic abscess, symptomatic parasitic cyst, splenic artery aneurysm). Not uncommon are also the complications of splenectomy. Usual complications are classified as pulmonary, haemorrhagic, infectious, pancreatic, and thromboembolic [3].

There is deficient data on frequency of these complications due to inadequate reporting and data collection. Usual blood changes occur in post op patient with leukocytosis, spherocytes, Howell jolly bodies, Heinz bodies as shown by PBF smear. However, thrombocytosis can be fatal leading to thromboembolic phenomena. Chest complications are common in relation to others in the list with left basal atelectasis being most common [4].

Complications of splenectomy are required to be known in fundamental sense. Usual complications are chest complications with pneumonia, left basal atelectasis and effusions as presentations. Re-exploration due to reactionary hemorrhage is also a documented complication [5].

### **AIMS AND OBJECTIVES**

The objectives of this study are to study the incidence of complications of splenectomy both in elective and emergency during perioperative period & short-term course of the complication with curative intent.

### **MATERIAL AND METHODS**

Study Area: Patients attending and admitted to Trauma Care Centre, SSKM Hospital and O.P.D of General Surgery.

#### ***Study Population***

Patients with post operative splenectomy for both acute and elective cases.

#### ***Period of Study***

One and half years.

#### ***Sample Size***

50 (both in elective and emergency as will be admitted to both SSKM indoor and Trauma Centre).

#### ***Study Design***

Prospective observational.

#### ***Parameters to be Studied***

- a. Demographic characteristics of study population.
- b. Symptomatology.
- c. Examination findings.
- d. Investigative findings.
- e. Operative detail.
- f. Follow-up.

### ***Inclusion Criteria***

All admitted cases, both emergency and elective splenectomy attending study area within the mentioned timeline.

### ***Exclusion Criteria***

- a. Patient unwilling to take part in this study.
- b. Patients undergoing conservative management for splenic trauma (acute) 32.
- c. Paediatric patients.

### ***Plan for Analysis***

- a. Detailed History.
- b. Clinical Examination and operative detail.
- c. Pathological tests Hematological & Biochemical& Histopathological.
- d. Microbiological test-Blood culture, Gram stain, Afb stain, culture & sensitivity.
- e. Radiological tests CHEST X-RAY, USG(W/A), CECT(W/A).
- f. Therapeutic intervention & its type, if necessary.

### ***Study Tools and Technique***

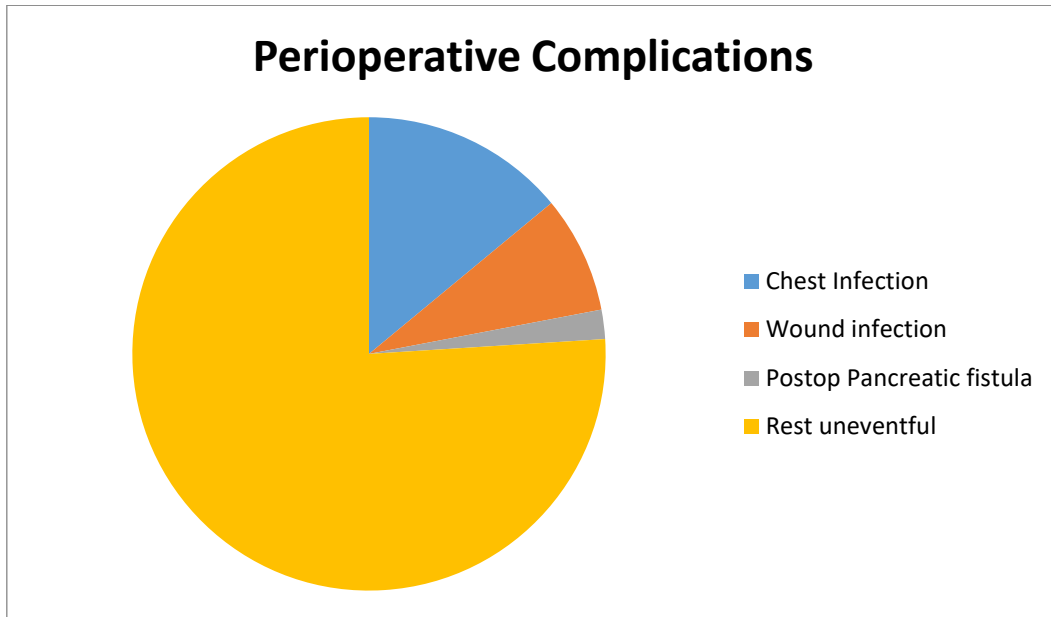
Standard, appropriate analysis of the observational data in the population under study with the help of:

- a. History.
- b. Clinical Examination.
- c. Investigation.
- d. Operative Detail.

## **RESULTS**

- 50 cases of splenectomy, both emergency and elective were taken up for study.
- Age of the patient varied from >12 years to >80 years excluding pediatric population with peak incidence in age group 21 years - 40 years with 46%.
- Out of 50 patients, 66% were males and 34% were females.
- 31 (62%) patients underwent elective splenectomy for indications as thalassemia, splenic cyst, splenic abscess & splenic vein thrombosis.
- 19 patients underwent emergency splenectomy for traumatic causes involving RTAs with grade 5 & grade 4 with hemodynamic instability.
- All the 50 patients were vaccinated as followed routine in the department as a protocol 31(62%) vaccinated preoperatively 2 weeks prior and 19 patients (38%) received postoperatively within 2 weeks (1<sup>st</sup> week most or day of discharge).
- 17 patients (34%) received postoperative blood transfusion; mostly involving traumatic splenic injury due to blood loss.5 patients received preoperative blood transfusion.
- All patients received amoxicillin + clavulanic acid iv in the post operative period for 5 days as being drug of choice against capsulated organisms.
- Out of 50 patients, 7 patients (14%) developed chest complications ranging from pleural effusion to basal atelectasis. 4 patients (8%) developed local wound infections which included only skin dehiscence. No

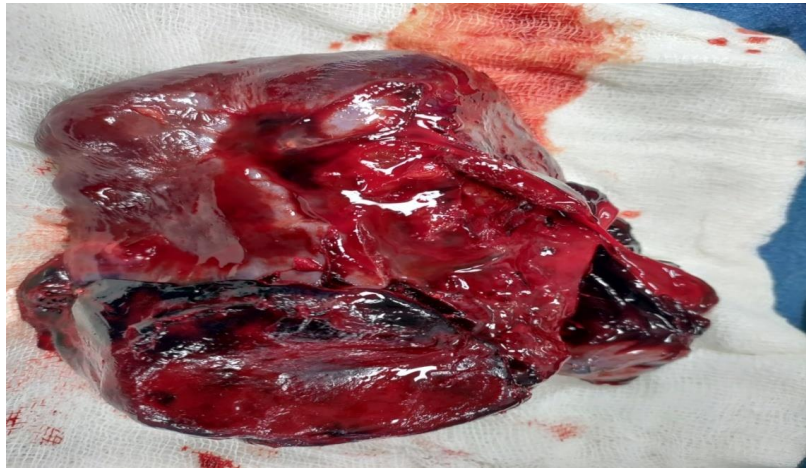
features of burst abdomen seen. Only 1 patient (2%) developed postoperative pancreatic fistula which eventually managed conservatively (Figure 1 - Figure 5).



**Figure 1:** Pie chart showing perioperative complications.



**Figure 2:** Showing splenectomy for thalassemic patient.



**Figure 3:** Showing splenic trauma following RTA.

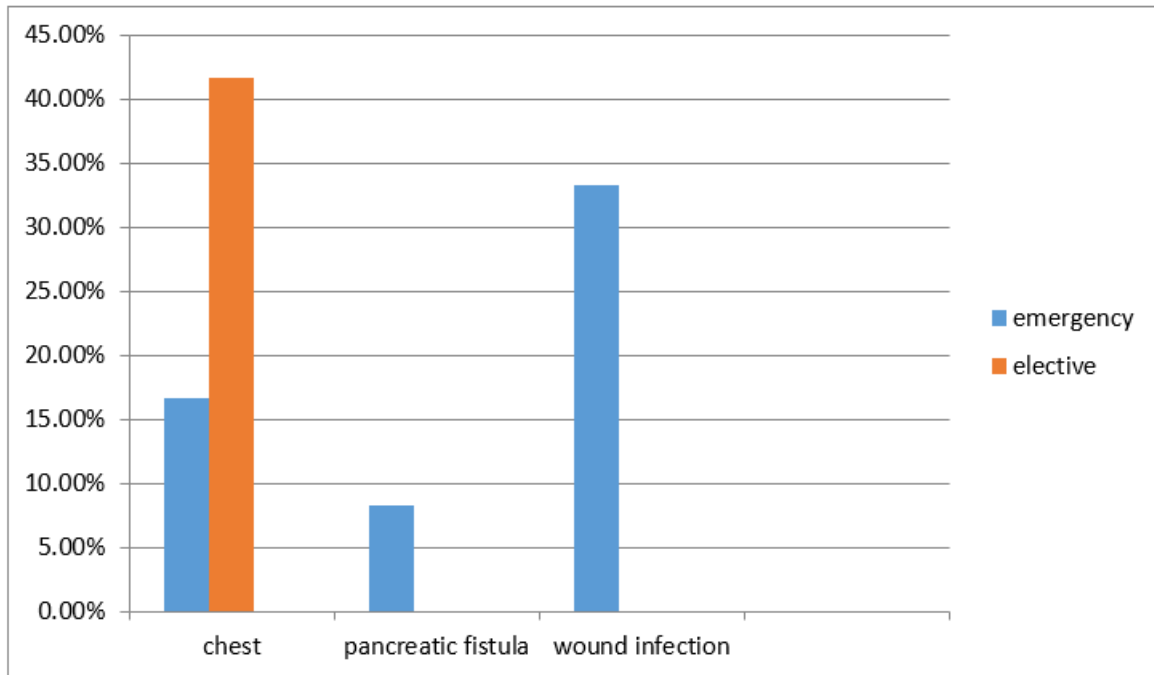


**Figure 4:** Showing large splenic cyst

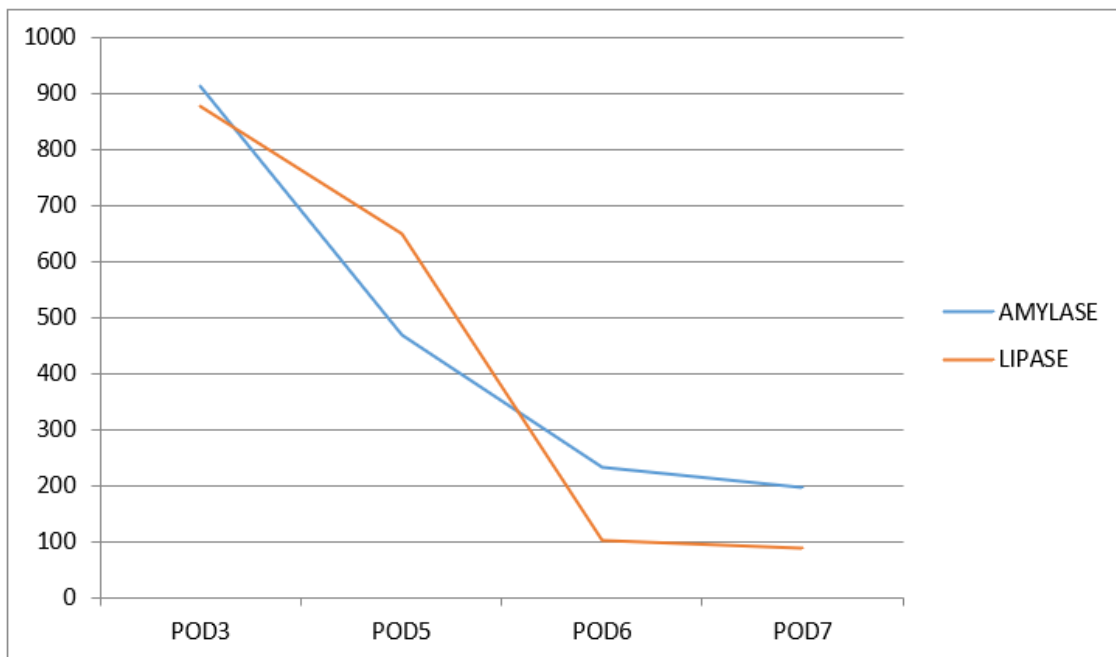


**Figure 5:** Showing pancreatic fistula.

Seven complications occurred with emergency splenectomy and 5 complications including only chest ones with elective splenectomy (Figure 6 and Figure 7).



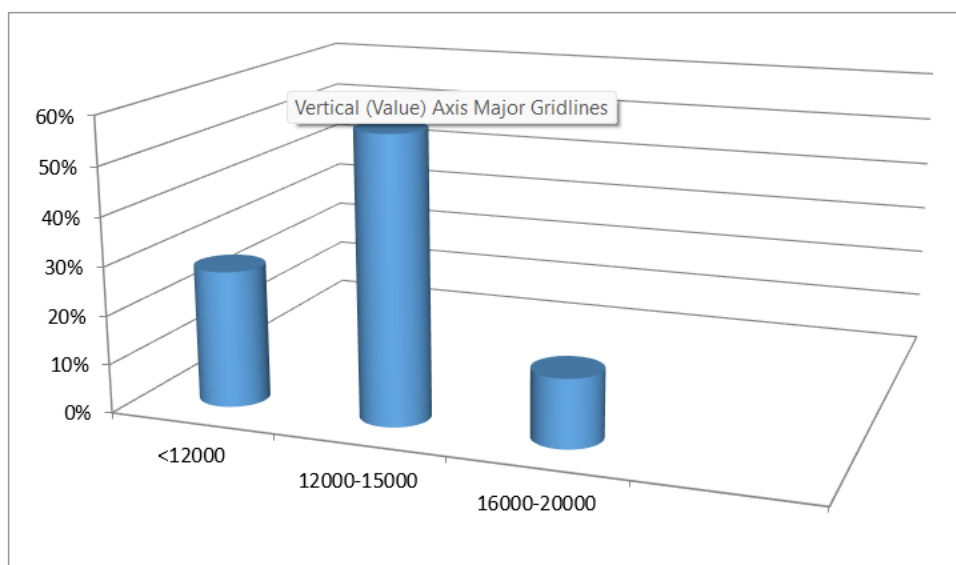
**Figure 6:** Bar diagram showing complications in elective and emergency cases.



**Figure 7:** Line diagram showing pancreatic fistula patient trend of amylase and lipase.

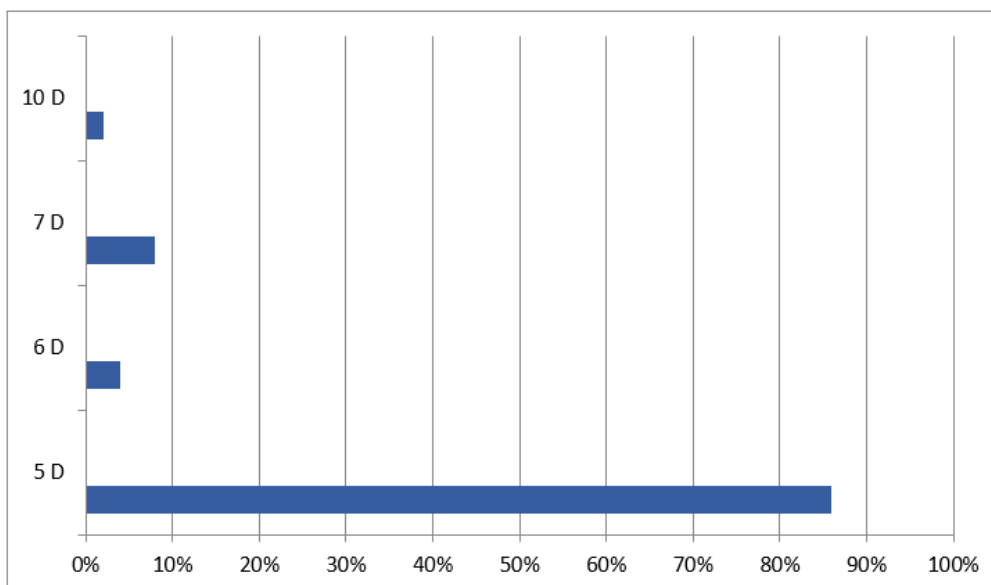
- Out of most imaging methods, we used only chest X-ray and USG w/a in suspicion of underlying complication for final diagnoses.
- Out of many blood changes, most patients showed leucocytosis which normalized within weeks. Highest peak observed within the range 12000-15000/cmm with 29 patients (58%). Rest were <12000/cmm with 14 patients (28%), 16000-20000/cmm with 7 patients (14%)<sup>61</sup>.

- All 50 patients showed some thrombocytosis following splenectomy which did not seem to reduce to complete normal levels. Most were in the range of 7 - 9 lakhs/cmm with most levels >7 lakhs/cmm with 41 patients (82%). None showed any signs of DVT, P.E or portal vein thrombosis (Figure 8).



**Figure 8:** Bar diagram showing leukocytosis distribution.

- All 12 patients with complications were managed conservatively. No surgical intervention or interventional radiology was necessary to deal with complications.
- There was no mortality in this study.
- In this present study, most patients (43) had average duration of hospital stay being 5 days. Only 7 patients had extended duration >5 days, 2 patients with 6 days, 1 patient with 10 days and rest 4 with 7 days (Figure 9).



**Figure 9:** Bar diagram showing hospital stay distribution.

## **DISCUSSION**

All patients admitted under General surgery department of IPGME&R and SSKM Hospital during the period of study i.e. from were taken into account.

Total number of patients was 50. An observational prospective study done from time of admission to discharge or death, taking into account the perioperative complications, clinical findings, investigation reports, vaccination, requirement of blood transfusion and in particular the management of individual patient.

### ***Indication of Splenectomy***

In this study, out of 50 patients, 31 patients (62%) underwent elective splenectomy for indications as thalassemia, splenic cyst, splenic abscess & splenic vein thrombosis.

19 patients underwent emergency splenectomy for traumatic causes involving road traffic accidents with grade 5 & grade 4 with hemodynamic instability. Studies of Bailey (1939) showed 60% of blunt trauma splenic injury was due to RTAs with Jay L. Grosfeld, Mark A. Malangons (1972-1978) with 77.3%.

### ***Vaccination***

In this present study, all 50 patients were vaccinated with 31(62%) preoperatively 2 weeks prior. Rest 19 patients (38%) received postoperative vaccination within 2 weeks, most received by end of 1st week or day of discharge. French cohort study Coignard-Biehler et al. showed vaccine coverage among 92 adults & 62 children postsplenectomy was 75% & 65% respectively for *S pneumoniae*, 10% & 40% for *N meningitidis*, 37% & 89% for *H. influenza* 4% of adults and 40% children received all vaccinations.

### ***Blood Transfusion***

In this study, 17 patients (34%) received blood transfusion postoperatively, mostly involving traumatic splenic injury and thalassemia patients. 5 patients received preoperative blood transfusion involving pre-existing anemia with associated thalassemia. Trauma patients owing to ingoing bleeding require blood transfusion as a part of resuscitation.

### ***Operative Findings***

In all elective cases, it was clean surgery with splenectomy performed through right methods of division of ligamentous attachments, ligation of short gastric vessels and splenic pedicle with delivery of the specimen.

However traumatic spleen injury was mostly delivery of shattered spleen with haemostatic control and ligation of splenic artery and vein.

### ***Perioperative complications***

In this present study, out of total 50 patients of the study, 7 patients (14%) developed chest complications ranging from pleural effusion to basal atelectasis.

4 patients (8%) developed local wound infections which included only skin dehiscence. No features of burst abdomen seen.

Only 1 patient (2%) developed postoperative pancreatic fistula which eventually managed conservatively.

Out of total 50 patients, total complications occurred on the side of emergency splenectomy. Total 5 complications occurred on side of elective splenectomy with including only chest complications.



Incidence of infection is highest in the first two years after splenectomy, but risk persists throughout life. In longitudinal studies, 50%-75% of post splenectomy infections occurred within first two years, at an average interval of 22.6 months. OPSI mostly involved S pneumonia infection. Large 2001 literature review by Bishareh et al. included 19,680 patients with an average follow-up of 6.9 years, found 3.2% incidence of OPSI & 1.4% mortality for all patients with OPSI in that period.

Risk of death from infection in splenectomised patients before the era of pneumococcal conjugate vaccines was 0.29/100 patient years in children and 0.13/100 patient years in adults.

Eraklis & Filler (1972) reported OPSI in 3 of 342 children (0.9%), Singer (1973) reported 10 of 688 children (1.45%) with OPSI, Balfanz et al. (1976) reported 5 of 12 adults with OPSI, Satish D. et al. (1995) reported 5% after splenectomy and over all incidence 3-8%.

## **CONCLUSION**

Splenectomy can vary among different age groups depending on indications. Emergency splenectomy however continues to be more common among younger age groups with male predominance due to more exposure to outside [6].

Incidence of postoperative complications has reduced due to proper education, timely surgical intervention, antibiotic prophylaxis against capsulated organisms and timely vaccination (pre & post immunization depending on cases). There has been a great paradigm shift in severity of complication from fatal hemorrhage, OPSI to simple wound and chest infections, thereby decreasing mortality and morbidity overall [7].

Proper clinical examination and judicious judgment regarding suspicion complications helps to intervene at early stages with conservative approaches. Judicious uses of imaging and blood parameters help in diagnosis.

Proper enhanced recovery with early feeding and physiotherapy helps to decrease any minimal chances of complications [8].

Consideration should be there for prophylactic immunization well ahead of operative intervention to prevent OPSI in cases of elective splenectomy [9].

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