

Complication view of splenectomy in patients with hematological diseases

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Abstract

Background: Splenectomy is a procedure to treat the symptoms of hypersplenism, to investigate disease stage in hematological malignancies and in the treatment of splenic injuries. The study aims is to evaluated the risk factors influencing mortality in cases undergone splenectomy.

Methods: A retrospective descriptive study was conducted in the hospital, records of 50 patients who underwent splenectomy due to hematological diseases between June 2019 to July 2022 in the Department of Surgery. Data had been included age, sex, indication and complications of splenectomy. Routine physical examination of chest, abdomen, blood pressure, arterial pulse rate, breathing rate and temperature were measured. In addition, routine investigations were done such as random blood sugar (RBS), virology screening, complete blood count (CBC) and coagulation profile. Before 2 weeks of splenectomy, all cases give polyvalent Pneumococcal and *Haemophilus influenzae* B vaccinations..

Results: Of the 50 patients evaluated, 56% (28 patients) were female, the youngest being 28 years old and the oldest being 67 years old. The mean hospitalization time of the patients was 8.44 ± 2.65 days and ranged between 3 and 21 days. The mean age was 38.75 ± 16.85 years. Most of the patients had ITP. There was no significant difference between the pre- and postoperative CBC. However, we observed a statistically significant difference between the WBC and platelets ($p < 0.001$). Complications occurred in 66% of the cases. Complications were observed in all patients with ITP and hemolytic anemia. Blood transfusions were administered to ten patients preoperatively and 8 cases postoperatively. There were no case of death recorded during hospitalization.

Conclusion: The mortality did not occur following splenectomy. The most commonly observed morbidity was effusion.

Keywords: splenectomy, hematological diseases, ITP, blood transfusion

Introduction

The spleen is responsible for filtration of the organisms that leaking into circulation, synthesis of specific IgM antibodies and opsonization proteins, hematopoiesis during fetal development and the removal of abnormal blood cells from the circulation [1]. In pathological situations, the spleen unable to work, leading to destruction of spleen or hypersplenism. Hypersplenism is a splenomegaly, anemia, leukopenia, thrombocytopenia or pancytopenia or any combination. In addition to compensatory blood marrow hyperplasia and regression [2]. Splenectomy is a procedure to treat the symptoms of hypersplenism, to investigate disease stage in hematological malignancies and in the treatment of splenic injuries [1]. The complications of splenectomy are grouped into early and late complications. Early are including hemorrhage and infection in the postoperative time. Late complications are secondary features of hypersplenism. The most important and fatal late complication is bacteremia or septicemia [3].

The study aims is to evaluated the risk factors influencing mortality in cases undergone splenectomy.

Methods

A retrospective descriptive study was conducted in the hospital, records of 50 patients who underwent splenectomy due to hematological diseases between June 2019 to July 2022 in the Department of Surgery. Data had been included age, sex, indication and complications of splenectomy. Routine physical examination of chest, abdomen, blood pressure, arterial pulse rate, breathing rate and temperature were measured. In addition, routine investigations were done such as random blood sugar (RBS), virology screening, complete blood count (CBC) and coagulation profile. A caution in the cases of ITP must be taken if: The platelet count is under the threshold of ($<20 \times 10^9/L$), a preoperative steroids, immunoglobulins and intraoperative platelet transfusion are mandatory; If thrombocytopenia present (platelets $<50,000$), platelets must be store on standby at the operating room because patient may be required a transfusion of the platelets after ligation of the splenic artery. Before 2 weeks of splenectomy, all cases give polyvalent Pneumococcal and *Haemophilus influenzae* B vaccinations.

The procedure start by anterior approach show great exploration for accessory spleen, splenic artery, and attempted faster conversion into open midline incision, while required arising. Lateral approach used to retracted the belly and colon; then dissection of pancreas tail and lower pole; splenic pedicle assessed and addressed; trocar positions had been carried out to greater operative ergonomics achievement; as a consequence to control of short gastric vessels and minimum manipulation of the spleen which prevent splenic trauma and spillage. Right up position with surgeon standing on the right side; cameraman on the left of the surgeon. A 30-degree telescope and harmonic scalpel were used. Generally, patients may be primarily start on a clear liquid diet in the evening of day zero postoperatively or in the following morning.

The data were analyzed using SPSS 22.0 statistics software. Categorical data are reported as numbers and percentage and quantitative data are reported as mean and SD. The Student's t-test was used for comparison of means. A P-value <0.05 was deemed statistically significant.

Results

Of the 50 patients evaluated, 56% (28 patients) were female, the youngest being 28 years old and the oldest being 67 years old. The mean hospitalization time of the patients was 8.44 ± 2.65 days and ranged between 3 and 21 days. The mean age was 38.75 ± 16.85 years. Most of the patients (N=36) had ITP (Table 1).

Table 1: Indication of splenectomy

Disease	No	%
ITP	36	72
Lymphoma	5	10
Hereditary Spherocytosis	3	6
Hemolytic Anemia	2	4
Other*	4	8
Total	50	100

There was no significant difference between the pre- and postoperative CBC. However, we observed a statistically significant difference between the WBC and platelets ($p < 0.001$) (Table 2).

Table 2: Pre- and post-operative investigation results.

Test	Pre	Post	t-test	p-value
	Mean \pm SD			
Hb	11.78 \pm 3.03	11.73 \pm 2.19	0.125	0.901
HCV	34.15 \pm 6.75	34.37 \pm 5.67	-0.300	0.766
WBC	11.10 \pm 14.06	8.80 \pm 20.29	-3.684	0.001
Thrombocyte	116.74 \pm 121.57	148.56 \pm 105.09	-4.096	<0.001

Complications occurred in 66% of the cases (Table 3). Complications were observed in all patients with ITP and hemolytic anemia. Blood transfusions were administered to ten patients preoperatively and 8 cases postoperatively. There were no case of death recorded during hospitalization.

Table 3: The complications.

Complication	No	%
Effusion	22	44
Wound infections	4	8
Intestinal obstruction	3	6
Splenic hematoma	3	6
Septicemia	1	2
TOTAL	33	100.0

Discussion

Indications for splenectomy include various hematological disorders. Horowitz *et al.* retrospectively evaluated the files of 135 splenectomized patients with hematological malignancies, reporting a complication rate of 52%. The most significant risk factor for complications was spleen size. Reported complication rates following splenectomy vary widely, between 14% and 61% [3-5]. Horowitz *et al.* reported the mortality rate as 9%. The most common complications were pulmonary complications, including pleural effusion atelectasis, pneumonia and bronchitis [4].

Musser *et al.* examined 306 splenectomy cases, the rate of accessory spleen was reported as 19%. Incidences of accessory spleen are much higher within hereditary spherocytosis (40%). The morbidity and mortality rates were 25% and 28%, respectively. These relatively high mortality rates

may be attributable to historically poorer anesthetic care, elderly patients and underdeveloped technical facilities compared to modern surgical facilities [7]. In a retrospective study of 245 splenectomy cases, the mortality rate was reported as 0.4% [8].

In Ozkok *et al.* reported successful splenectomies in ITP cases refractory to medical treatment, especially in patients under 40 years of age. They stated that splenectomies were the preferred mode of treatment due to low mortality rates and long term success in therapy [9].

Splenectomy is commonly used to treat hemolytic anemias, thalassemia, sickle cell anemia and other hemolytic anemias which are more common in the Mediterranean. As a Mediterranean population an important portion of our patient group consists of individuals with hemolytic anemia. In cases of hemolytic anemias, splenectomy is performed due to hypersplenism and/or splenic sequestration crises. Edo-Osagie *et al.* reported 79% of cases were diagnosed with hemolytic anemias. The majority had either sickle cell anemia or thalassemia. The most common indication for splenectomy was splenic sequestration crises, followed by hypersplenism [10].

The requirement for transfusion in the early and late postoperative periods of splenectomy declined in all patients and the mechanical pressure applied by the over-sized spleen was resolved following splenectomy [11].

In this study, no mortality recorded. The morbidity was quite low (5.6%) [9]. Wang *et al.* conducted a study of 149 ITP patients who underwent splenectomy, reported a mortality rate of 0.7% [13]. In another study involving 134 patients who underwent splenectomy, one patient was lost due to hemorrhage [14].

In the retrospective study by Wang *et al.*, wound infection was occurred in two patients (1.3%), pneumonia in four patients (4%), effusion in 31 patients (20.8%) and infection was observed in one patient (0.7%) [13]. In the present study, we detected pleural effusion in 22 patients (44%), splenic hematoma in 3 patients (6%), intestinal obstruction in 3 patients (6%) and wound infection in 4 patients (8%) which consistent with the previous studies.

In a study of 420 elderly patients who underwent elective splenectomy, the mean hospitalization time was 6.5 days (9.1±8.5). The long hospitalization time required for treatment of hemolytic anemias could be due to the need to monitor hemolysis and the need for erythrocyte transfusion in the post-operative period [15].

Conclusion

The mortality did not occur following splenectomy. The most commonly observed morbidity was effusion.

Conflict of Interest

The author declare no conflict of interest.

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None

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