

Splenectomy indications and postoperative follow-up results of a department of general surgery

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Abstract

Aim: Splenectomy is commonly performed in many centers around the world for the treatment of various benign, malign diseases and trauma nowadays. The purpose of this study is to determine the indications in patients undergoing splenectomy in a general surgery department for five years and to investigate the mortality rate and reasons.

Material and Methods: Data of the study were obtained retrospectively by scanning records of patients over the age of 18 who underwent open splenectomy in the general surgery department between December 2012 and December 2017. Demographic data, duration of hospitalization, distribution of emergency and elective operations, main reasons and indications of splenectomy, operation components, histopathological results, the survey of patients and mortality rate were investigated.

Results: 55,4% (n=31) female, 44,6% male, total 56 patients were included in the study. The mean age of the patients was 50.5±22,6. The mean duration of hospitalization was 9±7 days. 71,4% of the patients were operated under elective conditions and 28,6% of the patients were operated under urgent conditions. Splenectomy was done for the reason of carcinoma in 34,2% of patients, traumatic splenic injury in 19,4%, splenic cyst or abscess in 16,2%, coagulopathy in 12,6%, iatrogenic splenic injury in 5,4%, lymphoma in 3,6%, splenomegaly associated with portal hypertension in 3,6%, fibrosarcoma in 1,8%, idiopathic splenomegaly in 1,8%.

Conclusion: Splenectomy is performed in general surgery departments due to traumatic and non-traumatic indications. Mortality due to pure splenic pathologies is uncommon and quite rare. However, mortality caused by other operations and diseases in patients who underwent splenectomy is quite high.

Keywords: Splenectomy; Indication; Mortality.

INTRODUCTION

Splenectomy is commonly performed in many centers around the world for the treatment of various benign and malign diseases as well as injuries caused by trauma nowadays. Open splenectomy is still the most common technique. Also, laparoscopic and robotic techniques are applied in various centers (1-4). Pulmonary, hemorrhagic, infectious, pancreatic, and thromboembolic complications may occur after splenectomy. Especially, the lower lobe atelectasis and pneumonia are the most common complications. In addition, hemorrhages due to inadequate local hemostasis, subphrenic abscess, wound infection, infective complications caused by encapsulated bacteria, pseudocyst and fistula due to traumatic injury of the pancreas during splenic hilus dissection, thromboembolic complications due to hematological changes can develop (5-9). Mortality after splenectomy differs depending on the indications although the mortality rate is 0.97-6.04 times higher than the general population (10). Mortality

in patients undergoing splenectomy develops as a result of other components of surgery made for the treatment of malignancy, or the natural process of these diseases rather than performed splenectomy (10,11).

In this study, it was aimed to determine the indications of splenectomy made in 5 years in a general surgery department and to investigate the mortality rate and reasons.

MATERIAL and METHODS

Data of the study were obtained by retrospectively scanning the records of patients over the age of 18 between December 2012 and December 2017. The general surgery department where the study was conducted consists of two units, service, and intensive care. All patients who were admitted to the general surgery department and underwent splenectomy were included in the study. All operations were performed by open laparotomy. The left subcostal incision was used in isolated elective

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splenectomy operations. All other operations performed by midline laparotomy incision. After the operation, all patients were vaccinated to prevent encapsulated bacterial infections. Demographic data including age and gender of patients, duration of hospitalization, urgent and elective distribution of operations, main reasons of the operation, indications of splenectomy, components of the surgical operation, histopathological evaluation results of splenectomy specimens and survey of patients from the operation until the date of termination of the study, mortality reasons in patients who died were investigated.

Statistical methods

Quantitative data were shown as mean \pm std. (standard deviation), categorical variables as percentages in tables. Chi-square test was used to compare data of alive and dead patients. Variables were examined at the 95% confidence interval and the p-value less than 0.05 was considered significant.

55,4% (n=31) female, 44,6% (n=25) male, total 56 patients were included in the study. The mean age of the patients was 50,5 \pm 22,6. The mean duration of hospitalization was 9.30 \pm 6,85 days. 71.4% (n=40) of the patients were operated under elective conditions and 28.6% (n=16) of the patients were operated under urgent conditions (Table 1).

Table 1. Demographic data, splenectomy reasons and indications

		X \pm SD		
Age		50.51 \pm 22.63		
Hospitalization Stay Day		9.30 \pm 6.85		
		n	%	
Gender	Male	25	44,6	
	Female	31	55,4	
Presentation	Elective	40	71,4	
	Emergency	16	28,6	
	Accident,fall	11	19,4	
	Iatrogenic	3	5,4	
	Carsinoma	19	34,2	
Underlying cause	Lymphoma	2	3,6	
	Fibrosarcoma	1	1,8	
	Hydatidcyst, Pseudocyst, Abscess	9	16,2	
	Idiyopatic splenomegaly	1	1,8	
	Portal hypertension	2	3,6	
	Coagulopathy	8	12,6	
	Tumour invasion suspect	9	16,1	
	Tumour staging	2	3,6	
	Underlying cause	Hydatid cyst	5	8,9
		Pseudo cyst	3	5,4
Abscess		1	1,8	
Hypersplenism		5	8,9	
Splenomegaly		1	1,8	
Splenic infarction		1	1,8	
Isolated gastric varices bleed		1	1,8	
Splenic laceration		14	25,0	
Spontaneous splenic rupture		2	3,6	
Part of surgery		12	21,4	

Splenectomy was done for the reason of carcinoma in 34.2% (n=19) of patients, traumatic splenic injury due to traffic accidents or high fall in 19.4% (n=11), splenic hydatid cyst, pseudocyst or abscess in 16.2% (n=9), coagulopathy due to thrombocytopenia in 12.6% (n=8), iatrogenic splenic injuries in 5.4% (n=3), lymphoma in 3.6% (n=2), portal hypertension in 3.6% (n=2), sarcomas in 1.8% (n=1) and idiopathic splenomegaly in 1.8% (n=1) (Table 1).

Splenectomy indications were splenic laceration in 25% (n=14) of patients, part of a surgical procedure in 21.4% (n=12), tumor invasion or tumor suspicious in 16.1% (n=9) splenic hydatid cyst in 8.9% (n=5), hypersplenism in 8.9% (n=5), in splenic pseudocyst 5.4% (n=3), tumoral staging in 3.6% (n=2), spontaneous splenic rupture in 3.6% (n=2), splenic abscess in 1.8% (n=1), splenomegaly in 1.8% (n=1), splenic infarct in 1.8% (n=1), isolated gastric variceal bleeding in 1.8% (n=1) (Table 1).

The only splenectomy was performed in 42.9% (n = 24) of the patients and other surgical procedures with splenectomy were performed in 57.1% (n = 32). The most common surgical procedures performed with splenectomy were radical gastrectomy with 21.4% (n = 12), left nephrectomy with 7.1% (n = 4), pancreatectomy with 5.4% (n = 3), oophorectomy, and omentectomy together with hysterectomy with 5.4% (n = 3).

Bladder repair in one patient, cholecystectomy in one patient, pancreatic debridement in one patient, diaphragm repair in one patient, liver hydatid cystectomy in one patient, sleeve gastrectomy in one patient, subtotal colectomy in one patient, left hemicolectomy in one patient, pancreaticogastrostomy in one patient, right hepatectomy in one patient were performed (Table 2).

Splenic laceration in 28.6% (n=16) of the patients, splenic congestion in 10.7% (n=6), splenic pseudocysts in 8.9% (n=5) and splenic pseudocysts in 5.4% (n=3) hydatid cyst, splenic abscess in 3.6% (n=2) and hypersplenism in 1.8% (n=1) were detected in the histopathological examination of the specimens of the patients. When the specimens of the remaining patients (patients who underwent splenectomy due to tumor invasion or invasion suspect) were examined, tumor invasion was detected in 14.4% (n=8) of the specimens and was not detected in 25.2% (n=14). Splenic invasion was found in all patients who underwent splenectomy due to over-carcinoma, Non-Hodgkin lymphoma or fibrosarcoma; in one patient who underwent splenectomy for renal cell carcinoma; in only one of the 11 patients who underwent splenectomy due to gastric carcinoma. However, splenic invasion was not detected in one patient who underwent splenectomy due to colon carcinoma (Table 2). In the postoperative follow-up period, 78.6% (n=44) of the patients were alive, 17.8% (n=10) of the patients died and 3.6% (n=2) of the patients did not have any records of postoperative survival. Reasons of mortality were multiple organ dysfunction syndrome in five patients, respiratory failure in three, postoperative abdominal hemorrhage in one and intracranial hemorrhage in one (Table 2).

Half of the patients who developed mortality were male half-female . Mortality developed after elective operation in 16,7% (n=9) of patients and after emergency operation in only 1.8% (n=1). 70% (n=7) of the patients who developed mortality were treated for carcinoma treatment, while the remaining three patients underwent splenectomy due to massive splenomegaly accompanied by traffic accident-related splenic laceration, iatrogenic splenic jurisdiction, and gastric variceal bleeding due to portal hypertension. As a result, death due to abdominal hemorrhage after splenectomy occurred in one of the 54 patients who achieved follow-up surveillance status. Other patients who developed mortality died due to the other reasons accompanied by serious illnesses (Table 3).

Table 2. Surgical procedure, results of histopathology and causes of mortality

	Splenectomy+Other operation	n	%
Surgery	Only splenectomy	24	42,9
	Splenectomy+ Another operation	32	57,1
	+ Bladder repair	1	1,8
	+ Cholecystectomy	1	1,8
	+ Debridement for pancreatic necrosis	1	1,8
	+ Diaphragmatic repair	1	1,8
	+ Pancreatectomy	3	5,4
	+ Left nephrectomy	4	7,1
	+ Liver hydatid cystectomy	1	1,8
	+ Radical gastrectomy	12	21,4
	+ Sleeve gastrectomy	1	1,8
	+ Subtotal colectomy	1	1,8
	+ Histerectomy+Ooferectomy	3	5,4
	+Omentectomy		
	+ Lef themicolectomy	1	1,8
	+ Pancreaticogastrostomy	1	1,8
	+ Right hepatectomy	1	1,8
	Splenic laceration	16	28,6
	Hydatidcyst (Echinococcus granulosus)	3	5,4
	Pseudocysts	5	8,9
Histopathology	Signs of hypersplenism	1	1,8
	Splenic abscess	2	3,6
	Splenic congestion	6	10,7
	Splenic invasion (-), Colon carcinoma	1	1,8
	Splenic invasion (-), Gastric carcinoma	10	17,9
	Splenic invasion (+), Gastric carcinoma	1	1,8
	Splenic invasion (-), Pancreas carcinoma	2	3,6
	Splenic invasion (-), Renalcell carcinoma	1	1,8
	Splenic invasion (+), Fibrosarcoma	1	1,8
	Splenic invasion (+), Non-Hodgkin Lymphoma	2	3,6
	Splenic invasion (+), Overcarcinoma	3	5,4
	Splenic invasion (+), Renal cell carcinoma	1	1,8
Outcome	Alive	44	78,6
	Dead	10	17,8
	Nonavailable	2	3,6
	Cranial hemorrhage	1	10,0
Causeof mortality	Multiple organ dysfunction syndrome	5	50,0
	Postoperative abdominal hemorrhage	1	10,0
	Respiratuary failure	3	30,0

Table 3. Demographic data, splenectomy reasons and indications of the patients who reached the survey status

		Outcome (Available)					
		Alive(n:44)		Dead(n:10)		p	
		n	%	n	%		
Gender	Male	18	78,3	5	21,7	0.600	
	Female	26	83,9	5	16,1		
Presentation	Elective	30	76,9	9	23,1	0.252	
	Emergency	14	93,3	1	6,7		
	Accident, high fall	10	90,9	1	9,1		0.866
	Iatrogenic	2	66,7	1	33,3		
Underlying cause	Carcinoma	11	61,1	7	38,9	0.156	
	Lymphoma	2	100,0	0	0		
	Sarcoma	1	100,0	0	,0		
	Hydatidcyst, Pseudocyst, Abscess	9	100,0	0	,0		
	Idiyopatic splenomegaly	1	100,0	0	,0		
	Portal hypertension	1	50,0	1	50,0		
	Coagulopathy	7	100,0	0	0		
	Tumour invasion suspect	7	77,7	2	22,3		
	Tumour staging	2	100,0	0	,0		
	Hydatid cyst	5	100,0	0	,0		
Indication	Pseudocyst	2	100,0	0	,0	0.156	
	Abscess	1	100,0	0	,0		
	Hypersplenism	5	100,0	0	,0		
	Splenomegaly	1	100,0	0	,0		
	Splenic infarction	0	,0	1	100,0		
	Isolated gastric variceal bleeding	1	100,0	0	,0		
	Splenic laseration	11	84,6	2	15,4		
	Spontaneous rupture	2	100,0	0	,0		
	Part of surgery	7	58,3	5	41,7		

Chi-square test; a:0,05

DISCUSSION

Splenectomy is currently being performed due to many benign and malign diseases such as erythrocyte disorders that cause platelet and erythrocyte dysfunction, hemoglobinopathies as well as cysts, abscesses, tumors, and ruptures of the spleen (12–14). Splenic abscess, splenic infarction, thalassemia, idiopathic thrombocytopenic purpura, agnogenic myeloid metaplasia, sarcoidosis, amyloidosis, Gaucher's and Niemann-Pick diseases, Felty syndrome are some of the splenectomy indications (13,15–20). In addition to these, malignant diseases of the spleen, invasion of malignant diseases and traumatic injuries are other indications (21–23).

The most common splenectomy indications are splenic injuries due to iatrogenic or external trauma nowadays (21,22,24–26). The most common indication for elective splenectomy is ITP (26). The most common indication for splenectomy was malignant diseases (34.2%) while traumatic external splenic injuries were the second

most frequent indication (28.6%) in the general surgery intensive care department of this study because of being the first reference center for trauma patients in our region as well as frequent operations for cancer treatment in our center. Laparoscopic methods are increasingly being used in splenectomies, especially with haematological indications (27–30) We performed open splenectomy in our cases because of we have not enough laparoscopic splenectomy experience.

Pulmonary, hemorrhagic, infectious, pancreatic, and thromboembolic complications may occur after splenectomy (10,11). Especially, the lower lobe atelectasis and pneumonia are the most common postsplenectomy complications. Also, hemorrhages due to inadequate local hemostasis, infective complications caused by a subphrenic abscess, wound infection and encapsulated bacteria, pseudocyst and fistula development due to traumatic injuries of the pancreas during splenic hilus dissection and thromboembolic complications due to hematological changes may occur in patients (5–8).

Splenectomy indications are the most important risk factor for the development of post-splenic mortality (12,31,32). Trauma patients with isolated splenic injuries are the best indication group for the prognosis (33,34). The mortality rate in these patients varies between 2 to 9.3% and the lowest mortality rates are seen after splenectomy due to these indications (35,37).

However, mortality rates in patients who undergo splenectomy as a component of the cancer surgeon are substantially high. For example, it was found as 30% in Weledji' study (31). But unlike other studies, Bagrodia found equal mortality rates between splenectomies due to malign and benign diseases (38). In this study, the mortality rate after elective operation was 16%, after emergency operation 1.8% and the overall mortality rate 17.8% in patients who underwent splenectomy and reached follow-up surveillance status. Death due to abdominal hemorrhage after splenectomy occurred in only one of the 54 patients who achieved follow-up surveillance. Mortality in this patient without any additional pathology could be considered as preventable mortality. All of the remaining patients had at least one additional mortality disease and mortality was associated with these diseases. For this reason, the contribution of splenectomy to mortality in these patients is controversial. In this study, it was observed that the sex of the patients and the urgent or elective operation did not have a statistically significant effect on mortality. Mortality in patients undergoing splenectomy develops as a result of other components of surgeries performed for the treatment of malignancy, or the natural process of these diseases.

CONCLUSION

Splenectomy is performed in general surgery departments due to traumatic or various nontraumatic indications. Mortality after splenectomy, which is an indication of isolated splenic traumatic injuries, is not uncommon.

The mortality caused by other operations or diseases in patients undergoing splenectomy is quite high.

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