



“Early Postoperative Outcome of Splenectomized Children”

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KEYWORDS

Early outcome, splenectomized children.

ABSTRACT:

Background: Splenectomy in children is an uncommon procedure. Data based on children, who underwent splenectomy in Bangladesh are scarcely published. Incidence of early postoperative complications is highest from first to third days after surgery. So, the objective of our study to find out the early postoperative outcome of splenectomized children.

Methods and Materials: Patients who underwent splenectomy from Jan' 2016 to Dec'2023 were reviewed retrospectively from the medical files in the Pediatric Surgery Department of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Datas were analysed by using the Statistical Package of Social Science of Software Program (SPSS) version 26.

Results: In our study 55.7% were male patients. Age range was (4-18) years, mean age 11.02+3.92. Among them 63.9%(101) patients was within the age (> 5 to 12) years., 27.8% (44) patients was (>12- 18) years, and 8.3% (13) patients was (1-5) years of age.

Indication of the splenectomy was mostly (70.3%) Hb E- beta thalassemia.93.1% patients had history of repeated blood transfusion. Patients Hb level significantly($p<0.001$) increased after splenectomy. 66.5%(105) patients developed no complication after splenectomy and 33.5% (53) patients developed different types of early postoperative complications. Of them 37(23.3%) patients developed thrombocytosis, 8(5.1%) patients developed portal vein thrombosis, 5(3.2%) patients intra-abdominal hemorrhage and death occurred only in 3(1.9%) of patients.

Conclusion: Indications for splenectomy in our institution was mostly hematologic disorders patients. Complications after splenectomy were equivalent to other literatures.

Introduction:

Splenectomy is performed for many reasons, like trauma, portal hypertension, benign and malignant hematological disorders¹. Splenectomy is required when medical therapy failed to control the sequelae of hematological disorders, like splenomegaly, hypersplenism and massive infarction^{2,4}. Thalassemia, hereditary spherocytosis, autoimmune hemolytic diseases are the common hematological disorders requiring splenectomy in children⁵. Thalassemia major is a big health problem in Bangladesh. In Bangladesh, patients suffering from thalassemias (beta major and Hb-E beta) with different levels of severity is approximately 60,000-70,000⁶. In Bangladesh, the birth rate is 21.6/1000, so nearly 25,00 thalassemic patients are added in every year⁷.

Splenectomy usually improve the quality of life by decreasing the abdominal discomfort⁸. Post-operative complications like thrombocytosis, postoperative hemorrhage, portal vein thrombosis, pancreatic injury and infectious complications (OPSI, subphrenic abscess) as well as death within 30 days are the most common which was reported in literature⁹.

In many international literature, the pre- peri-, and post operative management of pediatric patients undergoing splenectomy was well described, but there was a paucity of such literature in Bangladesh context².

Usually, immediate and intermediate phase of postoperative period together called early postoperative time. But the highest incidence of postoperative



complications occur in between the first to third days after surgery¹⁰.

The objective of our study was to describe the early postoperative outcome after splenectomy in the largest tertiary hospital in Bangladesh.

Methods and Materials:

Patients who underwent splenectomy between Jan'2016 to Dec'2023 were reviewed retrospectively from the medical files in the department of Paediatric Surgery of BSMMU, Dhaka, Bangladesh.

In outdoor clinic of pediatric surgery department, indication of splenectomy sought out among the patients. Then the patients were admitted into the indoor for preoperative workup. In our institution, there was no emergency set up in paediatric surgery department, so excluded the trauma patients.

Base line investigation like, complete blood count (CBC), liver function test (LFT), blood grouping and cross matching, urine RME and C/S, USG (color doppler) of hepatobiliary system were performed. Blood was transfused of those patients, whose hemoglobin (Hb) below 10 g/dl.

Few patients who referred from Thalassemia Clinic were vaccinated. Rest of the patients after admission 1st dose of vaccine was given against the capsulated organism (*Streptococcus Pneumoniae*, *Hemophilus Influenzae* *Neisseria Meningitidis*). All patients were given long acting penicillin preoperatively and after discharge prescribed oral penicillin either tablet or syrup form. Child who adolescence, advised to take oral penicillin for 3/5 years. But for toddlers and school going children continued upto 21 years of age.

On 3rd postoperative period from CBC report platelet count and hemoglobin level of all the patients were estimated.

When through drain tube, fresh blood came out and patients became hemodynamically unstable then re-exploration performed to control bleeding.

In postoperative period, some patients developed one or more non-specific clinical features like fever, upper left quadrant pain with or without convulsion. So, required CT angiogram to exclude cerebral vasculopathy, Color Doppler USG of portal vein for measuring portal vein

diameter. But autopsy was not performed to find out the confirm diagnosis of death after splenectomy.

Early postoperative outcome were summarized by hematological outcome and early surgical (postoperative) complications.

Data were analyzed by using SPSS, version -26. Paired t- test was performed and P value <0.05 was defined as statistically significant.

Results:

Of the 158 patients, 88(55.7%) were male and 70(44.3%) were female, so M: F= 1.3:1. The mean age was 11.02 ± 3.92 (range 4-18 years) Table-1.

Age (>5-12) years was in 101(63.9%) patients. 13(8.3%) patients was belong to (1-5) years Table-11.

The indications of elective open splenectomy mostly was (70.3%) was HbE Beta thalassemia Figure-I.

93.3% patients were presented with repeated blood transfusion Figure-II.

Early postoperative outcome were summarized by

- Hematological outcome of patients by comparing the result in preoperative (baseline) and postoperative (after splenectomy) period, which was significantly increased (p value <0.001) after splenectomy Figure-III.
- Early postoperative complications showed 23.3% patients developed thrombocytosis, 5.1% developed portal vein thrombosis and 1.9% died with unknown etiology. Out of 5(3.2%) patients re-exploration were performed only two (1.3%) patients for controlling intra-abdominal hemorrhage Table-III.

Table-I: Sex distribution of the study patients (n=158)

Sex	No of patients	Percentage (%)
Male	88	55.7
Female	70	44.3
Total	158	100.0
Male : Female ratio	1.3 : 1	



Table-II: Age distribution of the study patients (n=158)

Age group (years)	No of patients	Percentage (%)
1 – 5	19	12.0
>5 – 12	71	45.0
>12 – 18	68	43.0
Total	158	100.0
Mean±SD	11.02±3.92	
Range (min – max)	(4 – 18) years	

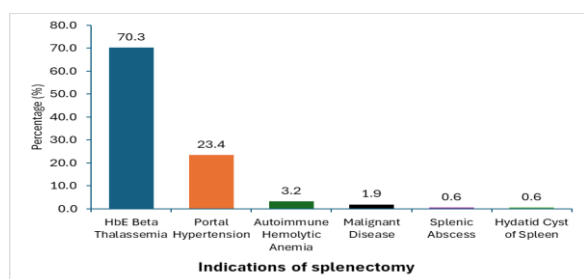


Figure-I: Indications of splenectomy

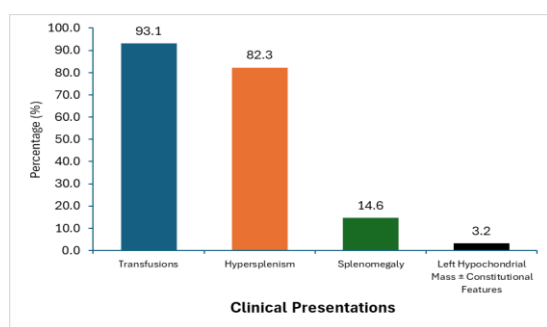


Figure-II: Clinical presentation

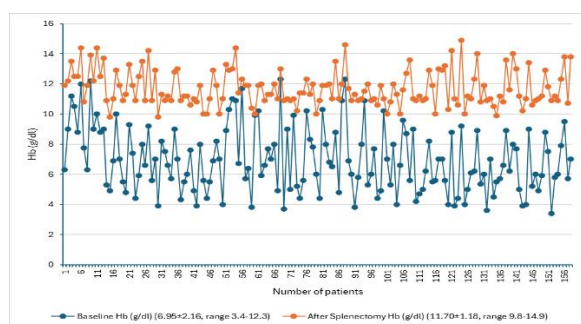


Figure III: Hb level at baseline and after splenectomy y

Table-III: Complications after splenectomy (n=158)

	No of patients	Percentage (%)
No complications	105	66.5
Complications	53	33.5
Thrombocytosis	37	23.3
Portal vein thrombosis	8	5.1
Intra-abdominal hemorrhage	5	3.2
	3 (Conservatively control)	1.9
	2 (Re explored)	1.3
Death	3	1.9

Discussion:

Splenectomy became increasing due to advances in anatomical knowledge and surgical techniques. In the early 20th century, the first splenectomy of children for hematological disorders was performed, which was more than 400 years after the first recorded splenectomy in adult¹¹.

In our study, male child predominant, which was similar to Faisal G and his colleagues¹² studied. On the other hand, Ahmad I and his colleagues¹³ studied showed female predominancy. Age ranged(4-18)years of the patients in our study almost similar of Patel N and his colleagues studied⁵.

In our study, most common group was (5-12) years of age for splenectomy, on the other hand, Aisyi M and his colleagues¹⁴ showed 15 years or above age was the most common group. But splenectomy was rarely performed in the (< 1-5)years of age group in our study, which was consistent to Aisyi M and his colleagues study¹⁴.

The indications for splenectomy in our series was similar to those found in international literatures^{12,13} the majority of cases performed for hematological disorders.

In our study, patients presented by history of repeated blood transfusion, splenomegaly, hypersplenism and left



hypochondriac mass with or without constitutional features Rice HE and his colleagues¹⁵ showed that their patients presented with splenic sequestration, transfusion history, aplastic or anemic crisis, hypersplenism and splenomegaly. This variation of presentation may be due to different pattern of diseases required splenectomy in different countries.

After splenectomy hemoglobin level of patients were significantly increased (p value < 0.001) compared to baseline level in our study like the another study¹⁶.

Postoperative complications in our study was 33.5%. The discrepancy in the complication rate of open splenectomy in our series and the 1% reported in the international literature^{11,15} may be due to the low sample size. But Petal N and his colleagues⁵ showed complication rate 36% in the case of laparoscopic splenectomy and 9% in the case of open splenectomy.

Thrombocytosis was frequently encountered incidental laboratory finding and defined by a platelet count $> 500000/\text{ml}$ ² ¹⁷.

It can be either primary (clonal) and reactive ¹⁸. Reactive thrombocytosis (RT) was usually benign and self limiting, which was secondary to other conditions such as infections, trauma, malignancy or splenectomy^{19,20}.

Splenectomy was a well recognized cause of reactive thrombocytosis, as because spleen was a reservoir in healthy persons was 1/3 rd of the total body platelets ²¹⁻²³.

37 out of 158 patients in our study developed postsplenectomy/ reactive thrombocytosis (RT) without any complications such as bleeding, thrombosis. But Zvizdic Z and his colleagues²⁴ showed 49 out of 52 patients developed reactive thrombocytosis.

Portal vein thrombosis (PVT) after splenectomy usually manifested as non-specific features and also common postoperative complication ²⁵. The literature concerning the incidence of portal vein thrombosis post - splenectomy was heterogeneous. It varied from 5%²⁶ to 55% ²⁷ and seems to be particularly high in Japanese studies ²⁸⁻³⁰. The differences can be explained by heterogeneous patient selection and the reasons for splenectomy.

In our study 5.1% (out of 158) patients developed PVT, which was similar to other studies^{31,32}.

Intraabdominal hemorrhage was a fatal complication following splenectomy^{33,34}. It was associated with surgical manipulation and hematologic coagulation.

In our study 5(3.2%) out of 158 patients developed intraabdominal hemorrhage in the early postoperative period. Among them only 2(1.3%) patients required reexploration for control bleeding and no death occurred. One the other hand though Qu Y and his colleagues³⁵ showed in their study 14(2.3%) out of 604 patients developed postsplenectomy intra-abdominal hemorrhage, but among them reoperation was performed in 13(2.2%) patients and 3 (0.5%) patients died after re-exploration.

No case of OPSI was recorded in our study. Due to short follow up, this data regarding OPSI in our setting was difficult to compare with international literature.

Mortality rate in our study was 1.9% which was similar to Madenci AL and his colleagues study³⁶. On the other hand Patel N and his colleagues⁵ showed 9% mortality rate.

Our study had several limitations including its retrospective nature, single center experience and early postoperative follow up. By late postoperative follow-up would be give valuable data regarding late thrombotic events among the splenectomized children with persistent RT.

Conclusion:

Indication of splenectomy in our institution was hematological disorders. Complications after splenectomy was equivalent to other literatures.

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