

# Complications Associated with Splenectomy in Thalassemia

F ZAHRA M ASHRAF M ASLAM Q DEEN J MANNAN

Department of Surgery, Fatima Jinnah Medical College/Sir Ganga Ram Hospital, Lahore  
Correspondence to Dr. Farogh Zahra, Assistant Professor, drashraf74@yahoo.com.

**Aims and Objectives:** The study aims at investigating the complications associated with splenectomy in thalassemic patients **Study Design:** It was a prospective clinical study. **Materials and Method:** Sixty Splenectomies were performed electively after pre-operative preparation in Sir Ganga Ram Hospital, Lahore during the year Jan 2003 to Sep 2005.

**Results:** Complications were categorized into per-operative, early post-operative and late complications. The frequency of per-operative complications was 3%, early post-operative complications were 10% and late complications were 1.6%.

**Interpretation and Conclusion:** The rate of complications has decreased markedly as the patients are well prepared and improved post operative care has also reduced the post-operative complications. With good perioperative management, splenectomy in children with massive splenomegaly is both safe and effective.

**Key words:** Thalassemia, splenectomy, Complications.

Splenectomy has been performed for hemolytic disorders for many decades. These spleens are producing hypersplenism. Because of destruction of red blood cells, the transfusion requirement of patients increases markedly. In thalassemia extramedullary haematopoiesis is stimulated when hemoglobin remains equal to or less than 7gm/dl.<sup>1</sup> This leads to splenic hypertrophy and the bigger spleen destroys more blood cells.<sup>2</sup> Splenectomy is indicated when the transfusion requirement is more than 200ml/kg/year. In the past these Splenectomies were associated with a large numbers of complications and therefore they were placed among debatable indications of splenectomy, with invent of vaccination against the encapsulated bacteria<sup>3</sup> (pneumovax, meningovax, gonovax) and improving care of thalassemic has changed the scenario in favour of splenectomy.

Our present study is aimed at the investigation of type and frequency of complications after elective splenectomy for thalassemia.

## Materials and methods:

**Pre-operative preparations:** The thalassemic patients registered at thalassemia centre of Sir Ganga Ram Hospital, Lahore. 60 were referred for splenectomy to Surgical Unit-III of Sir Ganga Ram Hospital. 38 female, 22 male, age ranged from 5 to 34 years (average 19.5 years) from year Jan 2003 to Sep 2005. These patients were prepared for splenectomy with help of packed cell transfusions, correction of PT with Injection Vitamin-K and FFP, vaccination against encapsulated bacteria 6 week prior to splenectomy with pneumovax, meningovax.<sup>3</sup> The serum ferritin level was recorded and chelation therapy was given to patients when level exceeded 1000 ngm/ml of serum. Ultrasonography abdomen was performed in all patients to see Cholelithiasis and splenunculi. Echocardiography was performed in children more than 10 years to asses the function of hemosidrotic heart.<sup>4</sup> After satisfactory preparation, patients were referred to surgical unit-III, where they were assessed by surgeons as well as anesthetist for feasibility of splenectomy. Fresh

investigations of Hb%, TLC, DLC, Hepatitis B and C were done in surgical ward.<sup>5</sup>

**Splenectomy:** Surgery was performed on elective list and continuous monitoring in the form of pulse, blood pressure and oxygen saturation was done throughout the procedure. Incision was decided according to age of the patient and whether gallstones were present or not. Fifty six patients were operated through left transverse incision in the left hypochondrium, where 3 patients were operated through left paramedian incision and one patient having Cholelithiasis as well, was operated through midline incision.

Splenic artery ligation was the first step in splenectomy. A period of 5 to 10 minutes was allowed for auto-transfusion which resulted in marked reduction in the size of spleen. Meanwhile splenocolic, linorenal, gastrosplenic ligaments were incised, ligating short gastric vessels in the last mentioned ligament. Now the spleen was mobilized and delivered in the wound and the last structure to be ligated was the splenic vein, taking great precaution to avoid damage to the tail of pancreas. Splenunculi were looked for and excised. Gall bladder was palpated for stones and biopsy of liver was done in all patients. Post-operative care involved the care of nasogastric tube, drain and intake output record. Patients were kept NPO for 24 hours. In 56 of the patients only one patient had to keep the drain for 05 days as clear fluid was coming through it, on average 300ml/day. This patient had the injury to the tail of pancreas. All 59 patients were referred back to thalassemia centre on the next day. One patient died on the evening of operation. All patients were put on tablet erythromycin 250mg b.i.d., as prophylaxis against overwhelming post splenectomy infection.

## Results:

Among sixty patients 38 were females (63.3%) and 22 were males (36.6%), age ranged from 5 years to 34 years (average 19.5), and 34 (56.6%) were suffering from thalassemia major and 26 (43.3%) were thalassemia intermedia patients.

Pre-operative hemoglobin was in the range of 5-10gm/dl (average 7.5gm/dl), Prothrombin time was prolonged 1 to 3 seconds in 6 patients (average 2 seconds). Serum ferritin level was in the range of 1000ngm/ml to 7000ngm/ml (average 4000nmg/ml). Abdominal Ultrasonography showed Cholelithiasis and ascites in one patient. Echocardiography was performed in 23 patients and they all were above 10 years of age, however no cardiac dysfunction was seen in any one of them.<sup>4</sup> Hepatitis B surface antigen was positive in all patients and Anti HCV antibodies were positive in 17 patients and 5 patients were positive for both Hepatitis B as well as anti HCV antibodies.<sup>5,6</sup> The results are tabulated in table 1.

Table 1: Results of pre-operative investigations

Name of investigations	n=	Results
Hemoglobin in gm/dl	60	5gm/dl 10 patients 6-7gm/dl 33 patients 7-8gm/dl 13 patients 9-10gm/dl 04 patients
Prothrombin time in seconds	60	2-3 seconds prolonged 4 patients 1 second prolonged 2 patients
S.ferritin level nanogram/ml	60	101-40000ngm/dl 59 patients 7000ngm/dl 01 patient
Hepatitis B surface Antigen	60	Positive in 11 patients
Anti HCV antibodies	60	Positive in 17 patients
Echocardiography	23	Normal in all patients
USG Abdomen	60	Cholelithiasis and ascites in 01 patient

Splenectomies went uneventful in 57 patients, one patient had injury to splenic flexure of colon, which was 2x1 cm through and through perforation, and primary repair was done with vicryl 3/0 in two layers. Patient was kept NPO for 5 days and afterward tolerated oral diet comfortably. One female patient of thalassemia intermedia, sixteen year old had injury to the tail of pancreas because of difficult excision of multiple splenunculi embedded in the hilum of spleen. It was difficult splenectomy, there were multiple necrotic patches on spleen and a lot of adhesions and small abscesses were present in the spleen. Pancreatic tail was covered with omentum and mattress sutures were applied to prevent formation of pancreatic fistula. Same patient had Cholelithiasis, ascites and was anti HCV positive.

Post-operatively her drain poured 300-400ml of clear fluid daily. On third post-operative day she developed deep jaundice and fever. She died on 7th post-operative day because of multiple organ failure due to septicaemia. One male patient of 12 year old developed tachyarrhythmia on the evening of operation. There was no evidence of intra-abdominal bleed as drain contained 50ml over several hours. His tachycardia was continuous and developed cardiac arrest at 12 midnight, on the same day. His serum ferritin level was 7000ngm/dl and echocardiography was normal in pre-operative assessment.

Two patients developed wound infection in the form of stitch abscesses which improved in 7 days time after removal of particular stitch and dressings.

On long term follow up for more than 6 months only one patient developed over whelming post splenectomy sepsis, 5 months after splenectomy. That patient was receiving steroids for allergic reactions due to blood transfusions.<sup>7</sup> His infection was controlled with injectable broad spectrum antibiotics and he survived this over whelming infection. The complications and their frequencies are shown in table Table-II

Table II: Complications and their frequencies

Complications	=n	%age	Outcomes
Injury to splenic flexure of colon	1	1.6	Stitched primarily recovery un-eventful
Injury to tail of pancreas	1	1.6	Patient had average 300ml/24hr serous fluid in drain Died on 7 <sup>th</sup> day because of multiple organ failure due to septicemia.
Cardiac arrhythmia	1	1.6	Patient had high serum ferritin level 7000ngm/dl developed arrhythmia due hemosidrotic heart. Died on night of operation.
Thrombocytosis	2	3.3	Thrombocytes >10,00,000/ml were treated with antiplatelet successfully
Wound infection	2	3.3	Treated successfully with removal of stitch and dressing
Over whelming post splenectomy sepsis	1	1.6	Treated with injectable broad spectrum antibiotics Patient survived.

**Discussion:**

New developments in the epidemiology, treatment and prognosis of thalassemia have dramatically altered the approach to the care of affected patients, and these developments are likely to have an even greater impact in the next few years.<sup>8</sup> The most important aspect of splenectomy in thalassemic patients is the fact that these patients are suffering from ill health since birth. Therefore this major surgery will result in high rate of complications in poorly prepared patients. These apprehensions have lead to the concept of collaborated effort on the part of paediatricians, haematologists, surgeons and anesthetists.<sup>9</sup> In our study a perfect liaison between the thalassemia centre and surgical team avoided the preventable complications to great extent. The objective of observing hazards associated with splenectomy were achieved by registering the complications in per-operative, early post-operative late post-operative categories. It was evident that pre-operative preparation of these patients was exhausting

as hemoglobin falls within 3 to 4 days in these patients due to huge splenomegalies, causing hypersplenism. Because of this reason 10 patients were operated upon with 5mg/dl of hemoglobin only as they could not improve their hemoglobin better than that.

Prolonged prothrombin time did not cause any problem during hemostasis, however injection Vitamin-K was continued for few days post-operatively. The rate of intra-operative complications was 3.3%. This involved, injury to splenic flexure of colon and tail of pancreas. This frequency is quite low however can further be minimized by careful dissection.

Among early post-operative group of complications, two patients became very serious and expired. One of 11 years old patient developed cardiac arrhythmia because of haemosiderosis had a short post-operative period of 12 hours. This mortality was reviewed in detail with paediatricians and it was learnt that high serum ferritin level of 7000ngm/dl was overlooked during pre-operative preparations and therefore it was preventable mortality, with chelation therapy. Overall mortality was 3.3%. Cardiac disease is reversible in some patients with intensive iron chelation therapy.<sup>8</sup>

Second patient who expired on seventh post-operative day had a more complex scenario. She had a thalassemia intermedia and pre-operative her spleen was densely adherent to omentum, colon, and kidney. There were necrotic patches on the surface of spleen with small multiple abscesses.<sup>9</sup> Her tail of pancreas was damaged as multiple splenunculi were studded there. There was moderate ascites in the abdomen. She developed fever on second post-operative day and deep jaundice on third post-operative day.

It was evident that she developed septicaemia due to handling of infected spleen and her liver functions were deranged because of Hepatitis C. She received heavy doses of injectable antibiotics but could not survive.<sup>10</sup> Among other post-operative complications two patients developed minor wound infections and two had thrombocytosis more than 10, 00,000/ml which required antiplatelet drugs.<sup>11</sup>

Overall morbidity in the early post-operative group was 10% and is comparable to other studies.<sup>12</sup> The more common complications of hemorrhage and acute gastric dilatation were not seen in our study supporting the fact that surgical technique has been improved and short gastric vessels are ligated more carefully. In the late complications, overwhelming post splenic sepsis was seen in only one patient (1.6%).<sup>13</sup> This strongly shows the success of prophylactic vaccination against the encapsulated bacteria responsible for this sepsis. Early recognition and the use of broad spectrum antibiotics can save these patients as was in our case. Besides the prophylactic long term antibiotics

(erythromycin 250mg b.i.d.) is another protection against this complication. Three types of preventive measures are recommended: immunoprophylaxis (vaccines); chemoprophylaxis (antibiotics); and education.

#### Conclusion:

Frequency of complications of splenectomy done for thalassemia has decreased markedly and made the procedure more comfortable for the patients because of careful pre-operative preparation. It is concluded that a team effort has a great impact on the outcome of splenectomy in thalassemic patients. With good perioperative management, splenectomy in children with massive splenomegaly is both safe and effective.<sup>12</sup>

#### References:

1. Ludlam C A. Clinical Haematology. 1st ed Singapore Churchill livingstone. 1990;12; 84-86.
2. Dacie S J. the Haemolytic Anaemias. 5<sup>th</sup> ed. Hong Kong. Churchill Livingstone. 1995;3:96-97.
3. Shatz DV. Vaccination considerations in asplenic patient. Expert Rev Vaccines. 2005 Feb; 4(1):27-34.
4. Aessopos A, Farmakis D, Deftereos S, Tsironi M, Polonifi A, Moyssakis I, Diamanti-Kandaraki F, Papalambros E, Cardiovascular effects of splenomegaly and splenectomy in beta-thalassemia. Ann Hematol 2005 Jun;84 (6):353-7.
5. Chakravarti A, Verma V, Kumaira R, Dubey AP. Anti HCV Seropositivity among multiple transfused patients with beta-thalassemia. J Indian Med. Assoc.2005 Feb; 103(2):64-6.
6. Lee WS, The CM, Chan LL, Risks of seroconversion of hepatitis B, hepatitis C and human immunodeficiency Virus in children with multitransfused thalassemia major. J Paediatr Child Health.2005 May-Jun;41 (5-6):256-8.
7. Salma MA, Sadek NA, Hassab HM, Abadeer AF, Mikhael IL. Erythrocyte autoantibodies and expression of CD59 on the surface of red blood cells of poly transfused patients.
8. Cohen AR, Galleno R, Penell DJ, Cunningham MJ, Vichinsky E. Thalassemia Am Soc Hematol Educ Program 2004;14-34.
9. Kitoh T, Tanaka S, Hasegawa J, Otagiri T. Anaesthetic management of a patient with thalassemia intermedia undergoing splenectomy: a case report. J Anesth 2005; 19(3):352-6.
10. Al-Hawsawi ZM, Humaida TI, Splenic abscesses in childhood B-thalassemia major. Saudi Med J. 2002 Mar; 23(3):345-7.
11. Al-Hawsawi ZM, Haouimi AS, Hassan RA, Tarawah AM. Portal vein thrombosis after splenectomy for beta-thalassemia major. Saudi Med J. 2004 Feb;25 (2):225-8.
12. Al-Saleem AH. Is splenectomy for massive splenomegaly safe in children? Am J Surg. 1999 Jul;178 (1):42-5.
13. Allebouyeh M, Moussavi F. Occurrence of overwhelming gram-ve infections in splenectomised patients with thalassemia major. Eur J Pediatr. 2003 Sep;162(9); 637-8.