Prospective Study of Total Splenectomy Among Thalassemic Major Patients Attending Azadi-Teaching Hospital in Kirkuk City During Three Years Study From 2008- 2011

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Abstract:

Background: This prospective study was conducted for Thalassemic major patients with huge enlargement of spleen attending Azadi-teaching hospital in Kirkuk city during (January 2008- December 2011) on 53 cases (48males and 5 females with mean age 13.3 years; operated on selective basis by open splenectomy through midline or left subcostal incision.

Objective: To determine the role of splenectomy in reducing postoperative blood requirement, the efficacy of prophylactic vaccination and post operative penicillin in reducing the incidence of post-splenectomy infection.

Methods: Patients with ages <5 years were excluded as with associated other disorders.

Results: (81.2%) of the patients were below 10 years old, male preponderance (90.6%), abdominal mass were founded in all patients. Preoperative Hb below 10gm/dl (90.6%), Left sub-costal incision done in (84.9%).Postoperatively, all the patients had an Hb above (8gm/dl.) Seven patients (13.2%) suffered from recurrent URTIs during follow-up.

Conclusion: Splenectomy reduced blood requirements, Left sub-costal incision offers good exposure, prophylactic vaccination definitely needs to prevent postoperative infection.

Keywords: Splenectomy, Thalassemia, post operative complications.

Introduction:

Thalassemia results from a wide variety of mutations of the genes which code for hemoglobin synthesis leading to reduced or absent synthesis of globins chains. The spectrum of the clinical manifestation of beta-Thalassemia varies widely. One end of the spectrum is the serious homogenous form or Thalassemia major presenting in early infancy with progressive pallor, hepatosplenomegaly, bony changes and, if untreated, invariably fatal in first few years of life. [1]

The mainstays of diagnosis under surgical aspects are peripheral smear, hemoglobin electrophoresis and abdominal ultrasonography to rule out associated gall stones. [2]

In Thalassemic patients, packed cell transfusions have improved survival but transfusions also have their own complications of iron overload and so iron-chelating agents are given concurrently with transfusion. Spleen involvement is known to occur in thalassemia. The spleen is most commonly affected in form of splenomegaly because of excessive destruction of abnormal RBCs, extra-

medullary hematopoiesis and transfusional overload. Splenectomy is transfusion requirement, gross splenomegaly causing hypersplenism or if there are pressure symptoms on surrounding organs; so these patients benefit from splenectomy. [3]

The spleen was regarded by Galen as "an organ of mystery", by Aristotle as unnecessary, by Pliny as an organ that might hinder the speed of runners and also as an organ that produced laughter and mirth, a concept reasserted in the Babylonian Talmud. [4]

When splenectomy is unavoidable, patients should be immunized against *Streptococcus pneumoniae* (Pneumococcus), *Haemophilus influenza* type b and *Neisseria meningitides* (*Meningococcus*). Where possible, this should be given at least 2 weeks before surgery [5]. Antibiotic prophylaxis appropriate to the operative procedure should be given, and consideration should be given to the risk of post-splenectomy sepsis. In addition, lifelong prophylactic antibiotics are recommended (oral phenoxymethylpenicillin or erythromycin) [6, 7].

Aim of this study:

1. To determine the role of splenectomy in reducing postoperative blood requirement.
2. To identify the efficacy of prophylactic vaccination and post operative penicillin in reducing the incidence of post-splenectomy infection.
3. To identify the complications of splenectomy.
4. To evaluate quality of life after splenectomy.

indicated if there is increasing blood

Patients and Methods:

This prospective study was conducted for Thalassemic major patients attending Azadi-teaching hospital in Kirkuk city during (January 2008-December 2011) on 53 cases (48 males and 5 females with mean age 13.3 years; range, 6.5-22 years), operated on selective basis by open splenectomy through midline or left subcostal incision. The gastrosplenic ligament is opened up, and the short gastric vessels are divided. The splenic vessels at the superior border of the pancreas are suture-ligated. The posterior surface of the spleen is exposed, the posterior leaf of the lienorenal ligament divided with long curved scissors, and the spleen rotated medially along with the tail and body of the pancreas. Accessory splenic tissue in the splenic hilum or omentum should be excluded by a careful search at operation. After splenectomy patients were followed-up for a period ranging from (6 months to two years) by clinical assessments regarding the post operative complications, blood examination (CBC) for hematological parameters at 15-day interval for one month ,then at monthly intervals for six month and then six-monthly

The following groups of patients were excluded from this study:

- Patients with ages <5 years as in these patients the spleen still plays a major immune role.
- Patients with associated other disorders (diabetics, liver failure…)

The indications for splenectomy in the study sample were:

- Huge splenomegaly causing pressure symptoms.
- Increasing requirements for blood transfusion.
- Hypersplenism.

Results:

The present series of 53 patients at ATH/ Kirkuk were observed to have the following details; the maximum number of patients was observed to be in the age grouping 5 to 10 years 43 (81.2%). The youngest was 5 years old and the oldest was 22 years old. There was a definite male preponderance 48 (90.6%) as shown in table no. (1)

Abdominal mass was present in (100%) of our patients while there was pain in (83%), as shown in table no.(2)

Most of patients 48 (90.6%) had a preoperative Hb below 10gm/dl, with an average of 8.7gm/dl. as shown in table no.(3)

Most of patients 46 (86.8%) had a preoperative blood transfusion requirement of 250-300ml/kg/year with an average of 279 ml/kg/year. as shown in table no. (4).

Left sub-costal incision was most commonly used in this study (84.9%). as shown in table no. (5).

Wound infection was the only post-operative complication and was found in 6 patients (11.3%). as shown in table no.(6)

Postoperatively, all the patients showed improvement in their Hb levels; all the patients had an Hb above (8gm/dl.) as shown in table no.(7).

Most of the patients 49 (92.4%) were discharged within 5 to 10 days after the operation, with an average stay of (9 days). as shown in table no. (8).

Most of the patients had a decrease in blood transfusion (BT) requirement (96.2%) of patients having a (BT) requirement below 150ml/kg/year. as shown in table no. (9) Seven patients (13.2%) suffered from recurrent URTIs during follow-up. as shown in table no.(10)

Table (1): Correlation between age and sex in the study sample.

Age (years)	Male patients	%	Female patients	%	Total No.	%
5-10	40	75.5	3	5.7	43	81.2
11-15	6	11.3	2	3.7	8	15.0
16-20	1	1.9	-		1	1.9
21-25	1	1.9	-		1	1.9
Total	48	90.6	5	9.4	53	100.0

Table (2): Presenting symptoms in the study sample.

Symptoms	No .of patients	Percentage (%)
Abdominal mass(splenomegaly)	53	100
Abdominal pain	44	83
Generalized weakness	21	39.6
jaundice	7	13.2

Table (3): Distribution of patients according to pre-operative Hb (hemoglobin) (gm/dl) level

Pre-operative Hb (gm/dl %)	No .of patients	Percentage (%)
6-8	16	30.2
8-10	32	60.4
>10	5	9.4
Total	53	100.0

Table (4): Distribution of patient according to pre-operative blood transfusion (packed cell) requirement

Pre-operative packed cell transfusion requirement (ml/kg/year)	No. of patients	Percentage %
250-275	23	43.4
276-300	23	43.4
301- 325	7	13.2
Total	53	100.0

Table (5): Percentage distribution according to the type of incision.

Type of incision	No .of patients	Percentage %
Left subcostal incision	45	84.9
Left paramedian	7	13.2
Midline	1	1.9
Thoracoabdominal	0	0
Total	53	100.0

Table (6): Distribution of patients according to wound infection by type of incision.

Incision type	No.of patients	No.of Infection	Percentage %
Left subcostal incision	45	3	6.7
Left paramedian	7	2	28.5
Midline	1	1	25.0

Table (7): Distribution of patient according to post-operative Hb (gm/dl).

Post-operative Hb(gm /dl)	No. of patients	Percentage %
8-10	42	79.2
10-12	11	20.8
Total	53	100.0

Table (8): Distribution of patient according to post-operative hospital stay.

Post-operative hospital stay(days)	No. of patients	Percentage %
5-10	49	92.4
10-15	4	7.6
15-20	-	-
Total	53	100.0

Table (9): Distribution of patients according to post-operative blood transfusion (packed cell) requirement.

Post-operative packed cell transfusion requirement (ml/kg/year)	No. of patients	Percentage%
100-150	51	96.2
151-200	2	3.8
Total	53	100.0

Table (10): Complications over period of follow-up in splenectomized patients.

Follow –up (6month to 2 years)	No. of patients	Percentage %
Recurrent URTI(upper respiratory tract infection)	7	13.2
Post-splenectomy overwhelming septisemia (OPSI)	-	
Post-operative adhesions	-	
Incisional hernia	-	

Discussion:

Most common age (5-10) 40% distributions of the patients were between 6.5 to 22 years with an average of 13.3 years Table (1). In another study conducted by Chaudhary *et al.* [8], the age range was 2 to 6 years with an average of 5 years. It can affect males as well as females.

The reasons for the older age in the study sample is due to delayed referral of patients for splenectomy and unwillingness of parents for major surgery and excluding of patients less than five years because of immunological problem. In the current study, the male-to-female ratio was approximately 5:1, a finding similar to Chaudhary [8], who had a ratio of 6:4. Definite male preponderance has been noted by various other [9]. Splenectomy should be delayed till the age of 5 year as there is a greater risk of sepsis. [10]. the majority of patients were in the age group 5 to 10 years (43 patients) (81.2%).

The youngest patient was 6.5 years old and the oldest was 22 years old. There was a definite male preponderance in the above series (48 patients) (84.9% males).

Abdominal mass (splenomegaly) 100% and pain 83% were the most common presenting symptoms Table (2). A similar finding was noted by Bhattacharya [9], who reported abdominal mass in almost (90%) of cases. Most of the patients (48) (90.6%) had a preoperative hemoglobin (Hb) below 10gm/dl, with an average of 8.7gm/dl Table (3).

The minimum pre-operative blood transfusion requirement was 250ml/kg/year and the maximum was 320ml/kg/year, with an average of 279ml/kg/year Table (4). Forty six patients (86.8%) had a preoperative blood transfusion requirement of 250-300 ml/kg/year with an average of 279 ml/kg/year. In a similar study by Chaudhary *et al.* [8], the blood transfusion requirement was 180-200ml/kg/year. The frequency of blood transfusion in was more than 1 unit (300 ml) in 15 days whereas in the study by

Chaudhary *et al* [8] it was 1 unit in 1 month. Both of this finding were probably due to delayed referral and unwillingness of parents for major surgery. This difference between two studies may be related to the indications of splenectomy.

Left sub-costal or a midline incision is suitable for the removal of a spleen of normal size, or one which is moderately enlarged Table (5).

Most surgeons use a midline or transverse left subcostal incision for open splenectomy [11]. A variety of incisions may be used, depending on the nature of the disease and the personal preference of the surgeon. A Left subcostal incision was most commonly used in this study sample (45) (84.9 %); this is the safest and most effective incision considering good exposure and easy closure. The type of incision depend on the operator's choice, midline incision is generally applied to cases of traumatic injury because of the speed of access as well as exposure of the spleen and other possibly injured viscera [4].A Left paramedian incision also has been employed, particularly for marked splenomegaly. Rarely, a thoracoabdominal incision maybe necessary for a massive spleen that is adherent to the Diaphragm the thoracoabdominal approach largely has been abandoned because of its associated morbidity [4, 11, 12]. In this study different surgical approaches are used according to the age of the patient, body built and the direction of splenic enlargement.

Wound infection was the only post-operative complication and was found in 6 patients (11.3% Table (6). Wound infection was rare with Left subcostal incision (6.7%). This is because muscles are generally split rather than cut [13].

Postoperatively, all the patients showed improvement in their Hb levels; all the patients had an Hb above 8gm/dl. The average Hb postoperatively was 10gm/dl; this improvement of postoperative Hb was sustained over the follow-up period (6 months to 2 years).This result is similar to the study done by Sedgwick [13].

This indicates that the huge enlargement of spleen in Thalassemic patient will increase the hemolytic process, so removal of the enlarged diseased spleen is of benefit in decreasing the blood transfusion requirement. Most of the patients 49 (92.4%) were discharged within 5 to 10 days after the operation, with an average of 8 days Table (8). While only four (7.6%) remain in the surgical ward for more than ten days because of simple superficial wound infection.

Most of the patients (51) had a decrease in blood transfusion (BT) requirement, with (96.2%) of patients having a (BT) requirement below 150ml/kg/year Table (9). In similar studies done splenectomy for hematological disease show no major difference as the removal of spleen in hypersplenism will decrease the blood transfusion. Twelve Patients felt less fatigue and were able to carry out their daily activity in a better way. Decreasing blood transfusion requirement helped them to reduce the hospital visits. The cost of iron chelating therapy was also reduced. Most patients had improved school attendance and better academic performance. Their family members also benefited due to decreased hospitalization. Overall, quality of life of entire family improved.

Overall, only seven (13.2 %) of patients suffered from Recurrent URTI (upper respiratory tract infection), none of our patients had septicemia or other

infective complications Table (10). All of them were probably viral in origin and not bacterial; none of the patients suffered LRTI or pneumonia and none of patients had overwhelming post-splenectomy infection (OPSI), thereby indicating the efficacy of pre-operative vaccination. This finding is similar to that by Chaudhary *et al* [8] who had no cases of septicemia or meningitis. Post-splenectomy septicemia may result from *Streptococcus pneumonia*e, *Neisseria meningitides*, *Haemophilus influenzae* and *Escherichia coli*. The risk is greater in the young patient, in splenectomized patients treated with chemoradiotherapy and in patients who have undergone splenectomy for Thalassemia, sickle cell disease and autoimmune anemia or thrombocytopenia [15].

Opportunist post-splenectomy infection (OPSI) is a major concern. Most infections after splenectomy could be avoided through measures that include offering patient's appropriate and timely immunization, antibiotic prophylaxis, education and prompt treatment of infection. It is thought that children who have undergone splenectomy before the age of 5 years should be treated with a daily dose of penicillin until the age of 10 years.

Prophylaxis in older children should be continued at least until the age of 16 years, but its use is less well defined in adults [16]

Conclusion:

1.Thalasaemia is a condition affecting mainly pediatric age group patients.
2. Left sub-costal incision offers good exposure and is easy to close with minimum chances of wound infection.
3. Splenectomy definitely reduced blood requirements and improved Hb levels. These improvements are sustained over a prolonged period of time.
4. Preoperative vaccination definitely needs to prevent postoperative OPSI and other infective complications. Although strong clinical evidence is lacking, routine use of penicillin also helps to reduce postoperative infective complications.
5. Quality of life improved after splenectomy because of improved hemoglobin.

Recommendations:

1. Splenectomy for ages more than five years.
2. Immunization of all patients before surgery.
3. Splenectomy for those with frequent and repeated blood transfusion.
4. Transverse incision for all patients because it is easy procedure and cause less complications.

Refrences:

[1]- Weatherall, D. J. "The hereditary anaemias."BM J, 6, (1997): 314-492.

[2]- Marwaha RK, L. A. "Present status of hemoglobinopathies in India. Indian Pediatric;." 31, (1994): 267-271.

[3]- Shah D, C. P., Dubey AP. "Current trends and the management of beta-thalassemia ."Indian Pediatr 36 (1999): 1229-1234.

[4]- Schwartz S.. "Splenectomy for haematological conditions."Arch Surg101 (1970): 338-347.

[5]- Davies, J. M., Barnes, R. and Milligan, D.. "Update of guidelines for the prevention and treatment of infection in patients with an absentor dysfunctional spleen." Clin Med 2(2002): 440–443.

[6]- Bisharat N., Omari, H., Lavi, I. and Raz, R. "Risk of infection and death among post-splenectomy patients."J Infect 43(2001): 182–186.

[7]-Force, W. P. o. t. B. C. f. S. i. H. C. H. T.."Guidelines for the prevention and

treatment of infection in patients with an absent or dysfunctionalspleen."Br Med J 4(1996): 312- 430.

[8]-Chaudhary N, S. N., Bose S, Maity CR. "Prospect of splenectomy in thalassemia."Indian Pediatr31 (1991): 90-988.

[9]-Bhattacharya."Splenectomy for haematological disorders."Indian Journal of Surgery48 (3) (1989): 183-187.

[10]- Anupam Sachdev, Bharat Agarwal: IAP National Guidelines; 2006; pp. 185-86.

[11]-Garden OJ: The spleen. In: Norman S. Williams, C. J. B., P. Ronan O'Connell. "Bailey and Love's Short Practice of Surgery."Hodder Arnold, London (25th edition) (2008): pp. 1101-1110.

[12]- Jameson JS, Thomas WM, Dawson S, *et al*. Splenectomy for haematological disease. *J R Coll Surg Edinb* 1996; 41: 307–11.

[13]- Sedgwick CE, Hume H: Elective splenectomy: an analysis of 220 operations. Ann Surg; 151(2) (1960): 163-168.

[14]- Brigden M, P. A.. "Prevention and management of overwhelming postsplenectomy infection—an update."Crit Care Med 27(4) (1999): 836–842. [PubMed: 10321679]

[15]- Lynch AM, K. R.. "Overwhelming postsplenectomy infection."Infect Dis Clin North Am 4(1996) ;(693–707).

[16]- McRae HM, Y. W., Reynolds T. "Perioperative complications of splenectomy for hematologic disease."Can J Surg35(1992) : 432–436 .