

*Research Article***Laparoscopic Splenectomy, early Experience and Short-Term Results in Minia University Hospital****Tohamy A. Tohamy, Ahmed Atiya, Abdel Fattah S. Abdel Fattah and Amr A. El-Heny**

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Abstract

Aim: The aim of the study was to evaluate laparoscopic splenectomy with short – term results. **Patients and methods:** Twenty patients (12 females and 8 males) with pathological disorders, in whom splenectomy was indicated. Patients were either referred from the Internal Medicine and Hematology Department or collected from the Surgery Outpatient Clinics in Minia University hospital in the period between 1st March 2010 to 1st November 2010. **Results:** Operative time ranged from 40-120 with the mean 70±20 by using the lateral approach and the mean 90 min by using the supine approach. Bleeding was the intraoperative complication that was caused by incomplete ligation or injury of splenic vessels, injury of the spleen during port insertion and the last case was converted to open technique to control the bleeding. Intraoperative blood loss ranged from 0-200 cc with the mean 100±50 by using the lateral approach the mean was 70 ml but the mean was 90 ml by using the anterior approach. Postoperative hospital stay ranged from 2-7 day with the mean 5±1 by using the lateral approach 3.5 day and 4 ±1 by using the anterior approach. Two cases were complicated. **Conclusion:** Laparoscopic splenectomy is technically feasible in a growing variety of clinical situations. It should be considered the favored surgical approach for patients with normal size or moderately enlarged spleens.

Keywords: Laparoscopic, Splenectomy, Minia**Introduction**

Splenectomy could be done as an open approach or laparoscopic approach. For many years, open approach remained the traditional one especially in traumatic rupture spleen and hematological disorders with huge splenomegaly.^[1] Laparoscopic splenectomy rapidly gained widespread acceptance for the treatment of the nontraumatic disorders of the spleen during the last 10 years. Increased technical skills and technical development have extended indications for laparoscopic splenectomy.^[1]

Laparoscopic splenectomy has shown the advantages of minimally invasive surgery include (decreased postoperative pain, short hospital stay, reduced recovery time).^[7]

Recent studies revealed the lower complication rate after laparoscopic splenectomy versus open splenectomy include (pulmonary complications, wound infection and systemic infectious complications were decreased).^[4]

Some authors stated technical difficulties of laparoscopic splenectomy in certain cases which considered to be a relative contraindications for this maneuver like, huge splenomegally (splenic size 20 cm or more in its long axis) in which the exposure becomes very difficult, severe portal hypertension as venous collaterals may be very difficult to control laparoscopically splenic abscesses in which spleen is very adherent to surroundings, trauma with ongoing blood loss, previous operative procedures in left upper quadrant.^[6]

Aim of study: to evaluate laparoscopic splenectomy.

Patients and Methods

Twenty patients (12 females and 8 males) with pathological disorders, in whom splenectomy was indicated. Patients were either referred from the Internal Medicine and Hematology Department or collected from the Surgery Outpatient Clinics in Minia University hospital in the period

between 1st March 2010 to 1st November 2010. Full detailed history was taken from each of the included patients, including name, age, sex, occupation, residence and their special habits of medical importance if any.

The presentation of each patient was recorded whether abdominal pain, hemorrhagic diathesis or organomegaly. Asymptomatic patient were discovered during abdominal ultrasound examinations or complete blood picture done for other indications. History of hemorrhagic diathesis attacks, generalized lymphadenopathy, recurrent infections, previous surgical operations especially surgery for the upper abdomen were considered.

History of blood transfusions, liver and kidney diseases or history of diabetes mellitus & hypertension were included in each patient's history. Family history of similar conditions and consanguinity in the family were of great importance.

A thorough examination was conducted for each patient stressing the following points: Vital signs, nutritional status to assess fitness for surgery, icteric tinge, mongoloid features and other skeletal manifestations of hemolytic disorders, signs of bleeding tendency e.g. purpuric eruption, echymosis.

Full abdominal examination looking for organomegaly e.g. splenomegaly and hepatomegaly, ascites, abdominal hemorrhagic peteciae, scars of previous operation, divarication of recti, ventral hernias or associated intra-abdominal diseases e.g. gall bladder stones was applied for each included patient.

Preoperative investigations including liver function tests, blood urea and serum creatinine, complete blood picture, fasting blood sugar, coagulation profile and sternal or iliac puncture for bone marrow morphology. Abdominal ultrasound examination was requested for each patient included in this study.

Patient exclusion criteria:

Patients with previous upper laparotomies, diagnosis of generalized diseases that

contraindicate laparoscopic maneuvers, huge splenomegaly with longitudinal axis more than 12cm, pregnancy and other benign splenic disorders as (splenic abscess and congestive splenomegaly).

Patients presenting with altered blood picture e.g. low hemoglobin percentage or reduced platelet count were prepared before surgery. Patients with ITP or auto immune hemolytic anaemia received an oral administration of prednisolone of 30-40 mg twice a day and high doses of immunoglobulin G (400 mg/Kg per day) 3-5 days for at least one week prior to surgery to raise the platelet count at least to 30,000-50,000/dl with immediate preoperative booster dose of prednisolone to avoid steroid insufficiency. Packed red cells transfusion was given to anaemic patients to elevate their Hb concentration to reach at least 10 gm %. Prophylactic antibiotics one day preoperative usually in the form of parenteral third generation cephalosporin.

Laparoscopic splenectomy was a challenging procedure. An experienced surgeon and assistant were essential for the best results. It is important to search for accessory spleens before beginning and at each stage of the splenectomy. The following steps were required to mobilize and remove the spleen. Elevation of the spleen and dissection of the inferior aspect of the spleen using the harmonic scalpel or legasure. The colon was mobilized exposing the lower pole of the spleen. The posterior attachments of the spleen were divided.

Dissection of the lateral aspect and retroperitoneal attachments were done using the coagulating system either harmonic scalpel or legasure. An endoretractor was inserted laterally to lift the spleen superiorly. The tail of the pancreas was identified. Using the harmonic scalpel instrument with electrocautery, the splenorenal and colosplenic ligaments were divided. The dissection is continued superior and lateral to mobilize the entire spleen.

Transecting the Splenic Hilum was done. The Endoclips or endo GIA stapler or

vascular stappler were applied on splenic vessels. It is important to have a suction-irrigation cannula next to the stapling device. Cutting the Short Gastric Vessels and the Retrosplenic Attachments was done.

Abdominal ultrasonic examinations were done to any patient with any suspected postoperative collection. Blood transfusion was required postoperatively in the form of packed red cells or whole blood transfusion when severe anaemia was present. Thrombocytosis might develop during the first 10 days post splenectomy. It was important to take blood sample to evaluate that condition and treat it with aspirin.

Any patient following splenectomy may be in danger of major post splenectomy sepsis. Careful observation was therefore required and, if present, the condition was treated vigorously. Penicillin should continue till the age of 20 years. Usually the patients were discharged from the hospital on the 2nd or 3rd day post operatively if no post-operative complications.

All patients were followed in surgical outpatient clinic for 2 months as a whole with especial emphasizes on surgical sites complications e.g. wound infection or incisional hernias. Complete blood picture was done in the 1st two weeks to detect the efficiency of the operation with gradual withdrawal of steroid therapy to the ITP and immune hemolytic anemia patients that showed improvement and continued their medical follow up in hematology department.

Ethical approval:

The title, aim, and plan of the study were discussed in and approved regarding ethics of research from General Surgical Department, Faculty of Medicine, Minia. Full written, informed consent was obtained from all participants.

Results

The study included 20 patients with pathological disorders in whom splenectomy was indicated 12 (60%) were females and 8 (40%) were males. Their ages ranged from 16 to 63 years. Their age distribution

is shown in Table (1) with most of the patients between 26 and 30 years.

The findings of abdominal ultrasounds showed that 14 cases (70%) had splenomegaly with splenic axis (12-14 cm) and 3 cases (15%) had splenomegaly with splenic axis (14-22 cm) (Table 2).

Patients were subjected to laparoscopic splenectomy with ligation of the pedicle using endo GIA (2 cases), endoscopic titanium vascular clips (4 cases), harmonic scalpel (3 cases), ligasure (3 cases) and harmonic scalpel with endoscopic titanium vascular clips (3 cases) (Table 3).

Spleens were extracted out of the abdomen via a pfannenstiel incision in 14 cases and via a retrieval bag via one port in 3 cases (Table 4). Laparoscopic splenectomy was performed using the anterior approach in 2 cases (10%) and the right lateral approach in 16 cases (80%).

Operative time ranged from 40-120 with the mean 50±20 by using the lateral approach and the mean 90 min by using the supine approach (table 5).

Bleeding was the intraoperative complication that was caused by incomplete ligation or injury of splenic vessels (3 cases) & injury of the spleen during port insertion (1 case) the last case was converted to open technique to control the bleeding. The intraoperative bleeding ranged from 20 ml to 100 ml on average 100 ml except in the case which was converted to open the blood loss was about 300 ml (Table 6).

Intraoperative blood loss ranged from 20-200 cc with the mean 100±50 by using the lateral approach the mean was 70 ml but the mean was 90 ml by using the anterior approach. 2 cases 10% need intraoperative blood transfusion 3 of them done by using the anterior approach.

Conversion to open occurs in one case due to the severe intraoperative blood loss. Patients were discharged from the hospital on the 2nd post-operative day (16 cases), (3

cases) were discharged on the 7th day and one case discharged after 9 days which was converted to open technique (Table 5).

Postoperative hospital stay ranged from 7-9 day with the mean 8.1 by using the lateral approach 8.2 day and 8.1 by using the anterior approach.

In our cases only two cases were complicated one case showed marked

thrombocytosis with platelets count reached 8.0 millions was treated vigorously with aspirin and full heparinization for a week and the other case suffered from left basal atelectasis treated by antibiotics and chest physiotherapy for four days. Patients improved post operatively were (17 cases) but (3 cases) showed relapse of the original diseases and (1 case) do not improve (Table 6).



Fig. (1): Showing splenic extraction.

Table (1): Age distribution of patients

Age group (years)	Number (%)
• 16-20	3 (15%)
• 21-25	0 (0%)
• 26-30	7 (35%)
• >30	0 (0%)
Total	20

Table (2): Splenic size

Abdominal ultrasound findings	No.	%
• Splenic axis (12-18 cm)	17	85
• Splenic axis (18-22 cm)	3	15
Total	20	100

Table (3): Distribution of technique for ligation of splenic vessels

Types of splenic vessels ligation	No.	%
• Endo GIA	4	20
• Titanium clips	8	40
• Harmonic scalpel	3	15
• Ligasure	3	15
• Harmonic + clips	2	10
Total	20	100

Table (4): Methods of splenic extractions

Sites of extraction	No.	%
• Pfannenstiel incision	17	85
• Retrieval bag	3	15
Total	20	100

Table (5): Operative time

Time in minutes	No.	%
• < 50	4	20
• 50-90	13	65
• 90-120	3	15
Total	20	100

Table (6): Intraoperative of blood loss

Blood loss	No.	%
• < 150	18	90
• > 150	2	10
Total	20	100

Table (7): Distribution of post-operative discharge

Postoperative day	No.	%
• 2 nd	16	80
• 3 rd	3	15
• 4 th	1	5
Total	20	100

Table (A): Distribution of post-operative improvement among the studied cases

No.	No.	%
• Improvement	17	80
• Relapse	2	10
• No improvement	1	0
Total	20	100

Discussion

Nowadays laparoscopic splenectomy can be considered the gold standard for the treatment of haematological disorders (11,12), and this surgical approach is preferred especially by young patients who find the small scars cosmetically preferable. It is also of great value for the management of other benign and malignant splenic diseases.^[1] Besides, laparoscopic splenectomy can be used successfully as an immediate treatment option in hemodynamically stable patients with severe splenic injury^[1], as the laparoscopic approach has the same hemostatic efficacy as the open technique, but with much better outcome for the patient.^[4]

We initially adopted the anterior approach because we were more comfortable with it. As our experience increased, we started using the lateral approach, with the patient placed in the right lateral decubitus position. It provides better exposure of the splenic hilum and the pancreatic tail because the abdominal viscera are retracted away from the upper-left quadrant by gravity, allowing easier dissection of the splenic hilar structures and greater vascular control.^[4,11]

Some authors reported that the lateral approach results in reduction of the number of trocars needed, operative time, intraoperative blood loss, and hospital stay as well as a lower conversion rate.^[11] Our study confirms these findings. Moreover, the lateral approach led to a significant decrease in postoperative complication rate, with minimal morbidity at the surgical site. Standardization of the surgical procedure and extensive experience of the surgeon in addition to adequate instrumentation can

induce a significant reduction in operative time, conversion rate, and complication rate.

The hilar vascular control is widely accomplished using an endovascular stapler, and it has been reported that the use of radiofrequency^[11] or ultrasonic shears^[17] is safe for this purpose. However, we consider it safer to accurately dissect the vessels at the splenic hilum and clip them individually in order to avoid pancreatic tail injury, thus reducing the development of pancreatic fistulas or Fluid collections in the splenic fossa.

In our study the results as regarding operative time ranged from 40-120 with the mean 70±21 by using the lateral approach and the mean 90 min by using the anterior approach. These results are comparable to the results of Francesco and Felice (2012) who reported that the mean operative time was 70 min (range= 20-360 min) and was longer for AA (mean = 80 min) than for LA (mean = 70 min)^[11] and also the results were in agreement with the results of Xin and Yongbin (2012) who reported that mean operative time was 134 ± 70.^[10]

In our study the results as regarding intraoperative blood loss are comparable to the results of Bai and Yingchao (2012) who reported the intraoperative blood loss was 200.0 ± 22.4 mL by the lateral approach vs. 300.0 ± 40.2 mL by the anterior approach.^[11] In contrast the study of Adrian Park and Michael, reported that open splenectomy with the mean intra-operative blood loss 380.8 ml (1999).^[17]

Only one patient in our study bled considerably during the operation and was

converted to open 0%; while in the study of XinWang and Yongbin Li, five patients (1.7%) bled considerably during the operation and were converted to open.^[10]

In our study the results as regarding postoperative hospital stay ranged from 7-9 day with the mean 7 ± 1 by using the lateral approach 8.7 day and 8 ± 1 by using the anterior approach. These results were comparable to the results of Fisichella et al., (2014) who reported that the average length of stay was 7 ± 2 days.^[14]

In our cases only two cases were complicated, one case showed marked thrombocytosis and the other case suffered from left basal atelectasis. While in the study of Francesco Corcione and Felice Pirozzi (2013) reported three patients (1.0%) required reoperation because of postoperative bleeding, subphrenic abscess, and intestinal ischemia.^[14]

Conclusion

Laparoscopic splenectomy is technically feasible in a growing variety of clinical situations. It should be considered the favored surgical approach for patients with normal size or moderately enlarged spleens. The operative times for laparoscopic splenectomy are longer than those for open splenectomy but they tend to decrease with experience. The intraoperative blood loss and complications of laparoscopic splenectomy are generally better than those reported for open splenectomy. Postoperative complication rate after laparoscopic splenectomy is low. Splenic size (described as maximum interpolar length) is most important predictor for the difficulty of the operation (intraoperative blood loss, operative time and rate of conversion), and for postoperative outcomes and complications.

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