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A single-institution experience



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Is laparoscopic splenectomy safe in patients with immune thrombocytopenic purpura and very low platelet count? A single-institution experience

PURPOSE: Minimal invasive procedures has become increasingly popular during the last decades. The aim of this retrospective study was to evaluate the safety and feasibility of laparoscopic splenectomy in patients with immune thrombocytopenic purpura who has very low platelet counts.

METHODS: Between March 28, 2005 and June 08, 2013, a total of 132 patients with the diagnosis of immune thrombocytopenic purpura were included to study. The patients who underwent laparoscopic splenectomy were alienated into two groups according to their platelet counts lower than 10000 (group 1) and higher than 10000 (group 2)

RESULTS: There were 16 patients in group 1 with very low platelet counts, and 116 in group 2. One patient in group 1 had converted to laparotomy due to peroperative bleeding, and there were 5 conversion to open in group 2. There were also 2 patients in group 2 who underwent laparotomy on post operative day 1 due to delayed intra-abdominal bleeding. Moreover, one patient in each group had pancreatic fistula.

CONCLUSIONS: Laparoscopic splenectomy is a safe technique in patients with ITP even the patients have very low platelet counts.

KEY WORDS: ITP, Laparoscopy, Low platelet count, Splenectomy

Introduction

Immune thrombocytopenic purpura (ITP) is an autoimmune disease which is characterized by platelet destruction within the spleen due to anti-platelet antibody production ¹. The standard treatment of ITP includes steroids, intravenous immunoglobulins, immunosuppressive agents, and splenectomy ². The initial therapy for ITP is high dose steroids in which reports has shown a

complete remission rates of up to %³, however, long term use of steroids can lead to a wide range of side effects, and moreover, disease can be refractory to medical therapy or it can rapidly relapse whenever the drug is tapered.

In the literature, since its introduction in 1992 ⁴, several studies has shown the safety and advantages of laparoscopic splenectomy as shorter hospital stay, less abdominal trauma compared to open surgery which made it the preferred surgical treatment of ITP ⁵⁻⁷. However, there is one major factor that prohibits successful operation of laparoscopic splenectomy is bleeding disorders due to low platelet count. Although it is not absolutely contraindicated, it is recommended by many surgeons that at least 50x10⁹/L platelet count is needed ^{8,9}, and very low platelet counts as less than 10x10⁹/L are considered to be inappropriate for laparoscopic splenectomy in literature ^{10,11}.

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AIM

The aim of this retrospective study was to evaluate the safety and feasibility of laparoscopic splenectomy in patients with immune thrombocytopenic purpura who has very low platelet counts as less than $10 \times 10^9/L$.

Materials and Methods

Between March 28, 2005 and June 08, 2013, a total of 132 patients with the diagnosis of immune thrombocytopenic purpura who underwent laparoscopic splenectomy were included to study. Patients were alienated into two groups according to their preoperative platelet count: lower than $10 \times 10^9/L$ (group 1) and higher than $10 \times 10^9/L$ (group 2). The patients underwent minimal invasive splenectomy by two different procedure types, including single incision laparoscopic splenectomy (SILS) and three port laparoscopic splenectomy. The patients were informed about the technique and the procedure type was selected by patients' choice. All the patients had signed informed consent form. The patient data including age, gender, diagnosis, operative time, estimated blood loss, spleen weights, type of hilar division, vessel sealing system and endoscopic staplers, volume of drainage, and duration of hospital stay were analyzed retrospectively from prospectively maintained institutional review board approved database. The volume of the spleen was measured with computerized tomography scans. Postoperative data were collected from patient charts, computer archives of surgical clinic database and follow-up files of hematology clinic. All patients were communicated by phone when sufficient data was not found in the department database.

Two weeks prior to the operation, all patients were vaccinated with Pneumovax 23 (Merck&Co.Inc., Whitehouse Station, NJ, USA). In all cases we performed intravenous contrast enhanced abdominal CT scan for preoperative splenic measurements and accessory spleens. During the postoperative period, pain complaints of all the patients were scored based on the Visual Analog Scale defined by Wewers and Lowe ¹².

The patients were operated under general anesthesia by the same senior surgeon (UB). All the patients received the same non-steroid anti-inflammatory agents. A suction drain was routinely positioned to the operative field in all of the cases and amylase was studied routinely from drain on post-operative day 2. Drains were extracted only if the drain amylase was normal and the amount was less than 50cc; otherwise kept until the drainage was over.

STATISTICAL ANALYSIS

Comparison of categorical variables including gender, complication, blood transfusion was carried out using

chi-square test, however continuous variables as age, blood loss, length of hospitalization were evaluated using student's t-test. Statistical significance was reached at $p < 0.05$.

THE SURGICAL TECHNIQUE

Laparoscopic Splenectomy Procedure

The patients were positioned in a right lateral decubitus position and tilted at a 15-30° reverse Trendelenburg position. Three working trocars were introduced including two 5 mm trocars, one at the border of 11th rib laterally and one to the midline medially. Then five cm below the costal margin a 15 mm trocar was inserted. The spleen was mobilized from inferior to superior plane in a standard fashion. After the liberation of the splenicocolic ligament, short gastric vessels were divided and splenic hilum was explored. The spleen was totally mobilized with the aid of the phrenosplenic ligament partially intact which was used for a natural counter traction during hilum for division. The splenic hilum was divided by using a white cartridge laparoscopic linear vascular stapler (EndoGIA, AutoSuture, Norwalk, CT) in the majority of cases. In three of the patients, splenic vein and artery were dissected separately and divided with Ligasure (Valleylab division of Tyco Healthcare, Mansfield, MA) bipolar vessel sealing system. After hilar division, the spleen was retrieved out of the abdominal wall from the 15 mm trocar place and was morcellated before removal.

SILS Splenectomy Procedure

The patient position was same as conventional three port laparoscopic technique. We generally perform a transumbilical incision and position the trocar as in open technique. SILSTM port of Covidien, Mansfield, MA was used in all patients. After the introduction of SILSTM port in to the abdomen, the pneumoperitoneum was then obtained via SILSTM port. A 30° angle 5mm telescope and two articulated instruments were used for exploration of the abdominal cavity and also for the rest of the operation. For SILS technique, due to less instrumentation and space, using anatomical structures as diaphragmatic attachments have significant importance for counter-traction of the spleen. We support the inferior to superior dissection technique and start with mobilization and division of splenic flexure. After liberation of lower pole of the spleen, in order to enter the retrogastric pouch we divide gastro-splenic ligament with Ligasure. During dissections, positioning of the patient with table tilts is very important for SILS technique. In our series, the first four patients of the SILS group were operated by the technique which was defined by

our team¹³ via three 5 mm ports were introduced through the same umbilical incision from different fascial defects, whereas in the latter fifteen patients were operated by using the special SILSTM port (Covidien, Mansfield, MA) introduced from a single 2 cm fascial opening.

Results

A total of 132 patients underwent minimally invasive splenectomy of whom 16 were in group 1 and 116 in group 2. The male/female ratio was similar between study groups with 5/16 in group 1 versus 49/116 in group 2. The mean age of the group 1 was 40.3 ± 15.0 (22-69) years vs 35.8 ± 17.5 in group 2. The weight of morcellated spleen was 315 ± 10 grams (range between 220-450) in group 1 and 295 ± 15 grams (range between 185-415) in group 2. Estimated blood loss was similar in both groups (90 ± 60 , range 0-400cc versus 100 ± 50 , range 0-300cc, respectively). The amount of drainage was 100 ± 50 cc in group 1 compared to 100 ± 50 cc in group 2. The mean length of hospital stay was same in both groups with 3 days (range between 1-19). The prominent technique for hilum control was the use of vascular stapler in 90% of the cases.

The patients with very low platelet count were transfused preoperatively preferably after the ligation of the splenic pedicle. There was one pancreatic fistula in group 1, whereas, in group 2 there were 7 non-bleeding complications including, pneumonia (n:3), lobar atelectasis (n:3), and pancreatic fistula (n:1). There was 1 conversion to open in group 1 (5 %) and 5 in group 2 (4%). Two patients in group 2 were also re-laparotomized on postoperative day 1 in order to control post-operative hemorrhage. There was no mortality in either group and there was no significant difference between study groups for the transfused packed red cells. All patients who needed transfusion received only 1 unit of apheresis platelets.

Discussion

The most effective treatment options of ITP are steroid therapy and splenectomy¹⁴⁻¹⁶. Even the initial therapy is steroid treatment, because of the low definitive remission of the disease as described previously in literature as 20%^{17,18}, especially in patients who do not respond to medical treatment, splenectomy is indicated. Nowadays almost all of the general surgical procedures can be done via minimal invasive approaches. As a consequence of technological developments and patient demands, surgeons are urged to further minimize their techniques. However, the abundant vascular structures around the splenic hilum is surrounded by other vital organs including, pancreas, colon, diaphragm, and stom-

ach which makes it difficult to perform safe laparoscopic splenectomy with acceptable outcomes^{19,20}. On the other hand, laparoscopic technique can allow enlightened magnified visualization of sites where accessory spleens, whose removal is essential for definitive treatment of the disease, are located.

There is scant data in the literature regarding the platelet consumption in laparoscopic splenectomy. It is believed that the lesser extent of the trauma with laparoscopy is the key point of better coagulative results when compared to open surgery. There was no statistical difference in conversion to open surgery between study groups. Regarding the vascular ligation techniques, some authors²¹⁻²³ usually use ultrasonic shears for dissection, and some use laparoscopic clips for each vessel²⁴, however, we routinely use endoscopic GIA stapler to ligate splenic artery and vein together.

In our clinic, the control of hilum is generally maintained by vascular staplers. The splenic artery and vein were not dissected separately and also were not totally skeletonized. In the patient who converted to open surgery in group 1, the problem was the lack of enough preparation of the hilum. The exploration revealed that the bleeding site was the stapler line. In the other patient from group 2, who needed laparotomy during the early postoperative period due to bleeding, we determined multiple small parenchymal lacerations due to iatrogenic trauma of the laparoscopic instruments. In general, the parenchymal lacerations could easily be dealt with standard three-port laparoscopy technique. However, in this case we could not achieve a clear visualization of the hilum from the coagulum for control.

Conclusion

In conclusion, regarding our results and also up-to-date literature, laparoscopic splenectomy is safe and feasible in patients with ITP and very low thrombocyte count.

Riassunto

Gli interventi chirurgici miniminvasivi sono diventati sempre più diffusi negli ultimi decenni. Con questo studio retrospettivo si è voluto valutare la sicurezza e la fattibilità della splenectomia laparoscopica in pazienti con porpora trombocitopenica autoimmune, con una conta piastrinica molto bassa.

Sono stati inclusi nello studio tra il 28 marzo 2005 e l'8 giugno 2013 un totale di 132 pazienti con la diagnosi di porpora trombocitopenica autoimmune. I pazienti sottoposti a splenectomia laparoscopica sono stati suddivisi in due gruppi in base alla conta piastrinica inferiore a 10.000 (gruppo 1) e superiore a 10000 (gruppo 2): 16 pazienti nel gruppo 1 con conta piastrinica molto bassa e 116 nel gruppo 2. In un paziente del gruppo 1

l'intervento è stato convertito a laparotomia per un sanguinamento peroperatorio, e cinque riconversione a chirurgia open sono state effettuate per 5 pazienti del gruppo 2.

Due pazienti del gruppo 2 sono stati riconvertiti a chirurgia open per primo giorno postoperatorio per sanguinamento intraddominale tardivo. Inoltre un paziente in ciascun gruppo ha presentato lo sviluppo di una fistola pancreatica.

In conclusioni la splenectomia laparoscopica si è dimostrata un tecnica affidabile per pazienti con trombocitopenia autoimmune anche se con conta piastrinica molto bassa.

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