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# İZMİR EĞİTİM VE ARAŞTIRMA HASTANESİ TIP DERGİSİ

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## LAPAROSCOPIC SPLENECTOMY FOR IMMUNE TROMBOCYTOPENIC PURPURA: A SINGLE CENTER EXPERIENCE

### İMMÜN TROMBOSİTOPENİK PURPURA HASTALARINDA LAPAROSKOPİK SPLENEKTOMİ: TEK MERKEZ DENEYİMİ

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**Keywords:** Laparoscopic splenectomy, immune thrombocytopenic purpura

**Anahtar sözcükler:** Laparoskopik splenektomi, immün trombositopenik purpura

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#### SUMMARY

**Introduction:** Since its introduction in the early 1990s, laparoscopic splenectomy (LS) is considered the standard treatment for patients with hematological disorders especially for immune thrombocytopenic purpura (ITP). Although its well-known considered benefits, outcomes may vary depending on a hospital's profile and the experience of the surgeon and center. We would like to present experience of a single center with LS for ITP.

**Material and Methods:** All patients with ITP who underwent LS were included. Several perioperative variables such as age, gender, operating time, blood loss, length of hospital stay, conversion, operation indications were analyzed.

**Results:** In total, 15 patients were included; 7(46.7%) women and 8(53.3%) men, with a median age of 52 (18-73) years. The median operative time and blood loss were 129 (89-200) min, 130 (50-300) ml respectively. The mean time for hospital stay was four days (3- 7 days).

**Conclusions:** Laparoscopic splenectomy is a safe procedure for patients with hematological disorders with a low risk of perioperative complications and mortality.

#### ÖZ

**Giriş:** 1990'lı yılların başlarında yapılmaya başlanan laparoskopik splenektomi (LS) başta immün trombositopenik purpura (ITP) olmak üzere hematolojik hastalıkların tedavisinde standart tedavi olarak kabul edilmiştir. Bilinen birçok faydasına rağmen sonuçları hastane profili, cerrahın tecrübesi ve merkeze bağlı değişkenlik gösterebilmektedir. Bizde ITP nedeniyle yapılan laparoskopik splenektomi deneyimimizi sunmayı amaçladık.

**Gereç ve Yöntem:** LS yapılan ITP'li tüm hastalar dahil edildi. Yaş, cinsiyet, ameliyat süresi, kan kaybı, hastanede kalış süresi, açığa dönme, operasyon indikasyonları gibi çeşitli perioperatif değişkenler analiz edildi.

**Bulgular:** Toplamda 15 hasta alındı; bunların 7'si (%46,7) kadın ve 8'i (%53,3) erkek ve medyan yaşları 52 (18-73) idi. Medyan operasyon süresi ve kan kaybı sırasıyla 129 (89-200) dk, 130 (50-300) ml idi. Hastanede kalış süresi ortalama dört (3-7)gün idi.

**Sonuç:** Laparoskopik splenektomi, düşük perioperatif komplikasyon ve mortalite riskine sahip güvenli bir işlemdir.

## INTRODUCTION

Spleen is a lymphoid organ that has a dual function in hematopoiesis and immunity. Hematologic disorders are the major indication for elective splenectomy. Laparoscopic splenectomy (LS) first performed in 1991 by Delaitre and Maignien (1), has gained worldwide acceptance surgical procedure in patients with hematological diseases. LS has many reported benefits with open splenectomy (OS), including decreased blood loss, shorter hospital stays, faster recovery, and improved quality of life (2–7).

Especially laparoscopic procedures in benign diseases, spleen can be safely morcellated with in an endoscopic bag prior to removal, fact that enables specimen can be taken out through a small skin incision. LS indications are the same as those of OS, except for the trauma, where the role of laparoscopy is still questionable. It is well known that splenectomy is a curative therapy for most of benign hematologic diseases. Excluding trauma splenectomy is performed most commonly for immune thrombocytopenic purpura (ITP) (8).

ITP is an autoimmune disease caused by anti-platelet antibodies against platelet glycoprotein complexes. Isolated thrombocytopenia with platelet count less than  $100,000/\text{mm}^3$  is seen in ITP but therapy is indicated when the platelet count falls below  $30,000/\text{mm}^3$ . Bleeding risk, the presence of co-morbidities, and the risks of trauma also change therapy choices (9). However, splenectomy is accepted as a second-line therapy for patients with chronic ITP (presence of the disease for > 12 month), as the first line therapy with corticosteroids and/or intravenous immunoglobulin (10).

Splenectomy is recommended when the patient has persistent thrombocytopenia after a 6-week therapy with steroid or intravenous immunoglobulin because remission after that time is not expected (11). Splenectomy can be proposed also in patients who receive near-toxic doses of immunosuppressive therapy for a complete remission to be achieved (12). Also, splenectomy is considered in patients under remission with medical therapy, but the thrombocytopenia has been relapsed. LS is considered as treatment method in these cases actually (4).

The aim of the study was to evaluate single center, single surgeon outcomes of laparoscopic splenectomy in 15 patients with ITP and compare with the current literature.

## MATERIAL AND METHOD

A consecutive series of 15 patients undergoing elective LS for ITP at the Department of General Surgery, University of Health Science Izmir Bozyaka Education and Research Hospital from January 2015 until May 2018 were assessed retrospectively. Before surgery, all patients underwent preoperative evaluation and were treated by a hematologist. In the case of treatment failure or complications related to used medical therapy, patients underwent elective splenectomy. Patients were vaccinated for pneumococcus, Haemophilus influenzae, and meningococcus before two weeks from surgery. Patients taking corticosteroids should be given steroids parenterally during the perioperatively. Preoperative computed tomography scan was performed in all patient so evaluate the anatomic relationships and vascular anatomy and accessory spleens. No patient underwent preoperative splenic artery embolization. Preoperatively, platelet level was routinely measured within 8 hours prior to surgery. Patients taking corticosteroids should be given steroids parenterally perioperatively. A first-generation cephalosporin was given perioperatively within 1 hour of incision time. All patients provided their written consent to the treatment. Variables analyzed were gender, age, previous surgeries, underlying disease, indications for surgery, spleen size, complete blood count, radiological examinations, type of operation, intraoperative findings, operative, complications, conversion rate, blood loss, operating time, postoperative morbidity, mortality, length of hospital stay and histologic findings. Patients were called for control at the 10<sup>th</sup> day after surgery the follow-up scheduled at 6 months and annually.

### **Surgical procedure:**

All patients were placed in the standard right lateral decubitus position with the table flexed at the flank. The stomach was decompressed with a nasogastric tube. Operation started with the laparoscopic abdominal access using open



technique with Verres needle. Firstly 12 mm port inserted in the midclavicular line at 4-6 cm below the costal margin; the second medial trocar in the midline subxiphoid region, the third in the anterior axillary line in the left subcostal margin; last one laterally at the tip of the 11<sup>th</sup> rib. A 10-mm 30 angled telescope was used. Usually the dissection was performed using a 5-mm ultrasonic dissector. First, abdominal cavity was carefully examined for accessory spleens. The spleen was mobilized starting at the posterolateral side by dividing the splenocolic and splenodiaphragmatic ligaments. Short gastric vessels were divided by ultrasonic dissector, and pancreas was carefully dissected from the splenic hilum so splenic hilum was completely freed. Then splenic hilum is divided with an 45 mm endoscopic vascular stapler. After hilum division, hemostasis is ensured and stapler line bleeding or additional segmental splenic vessels controlled with clips. Specimen was put into an endoscopic bag, morcellated by clamping or finger fraction, and taken out through an enlarged 12-mm trocar incision then a suction drain is placed, the abdomen is insufflated and the skin incisions are closed.

## RESULTS

The study group consisted of 7 (46.7%) women and 8 (53.3%) men. The median age was 52 (18-73) years. Common indication for all 15 patients LS surgery were refractory to steroid treatment for ITP. The median operative time was 129 (89-200) min. The median blood loss was 130 (50-300) ml. The median platelet count preoperatively was 130000 /mm<sup>3</sup> (88000-330000). The median platelet count at third day post-operatively was 297000 /mm<sup>3</sup> (97000-560000). The median period for taking suction drain was 3 day (2-6). The mean time for hospital stay was four days (3-7 days). Accessory spleen found in three patients pre-operatively by CT scan. Also, in these three patients' accessory spleens found in the operation and removed successfully. One patient re-operated because of hemorrhage with open procedure and stapler line bleeding sutured. All cases finished laparoscopically.

There was no mortality. Subcutaneous hematoma at the incision site occurred in one patient. No other morbidities were seen. All incisions healed uneventfully and no hernia

formation or wound was observed during follow-up period (2-30 months). One patient who had no accessory spleen in either pre- and post-operative imaging or peroperative exploration had recurrent thrombocytopenia within the follow-up period.

## DISCUSSION

With the widespread use of laparoscopic approaches in intraabdominal surgical interventions, almost 27 years since its introduction LS has become a standard procedure for elective splenectomy especially in ITP. Like all other laparoscopic approaches, LS offers less pain than open splenectomy, shorter hospital stays, earlier return to work, and better cosmetic results (13). Nowadays, LS is frequently applied due to hematological diseases but it has been shown in various studies that it can be performed safely in some traumatic and in splenic abscesses (14,15). In addition, LS can be safely applied not only to adults but also to very young children (16).

Although LS is superior in many respects to OS, operation time is longer. Depending on each study's methodology, the median operative time was reported as being between 109 and 144 min (17, 18). In our study the median operative time was 129 (89-200) min similar the literature. LS can be performed with minimal blood loss (mean 36-60 ml) and significantly less blood loss compared to OS (19). In the study of Vecchio et al., platelet transfusion was occasionally required (1 out of 12 patients) (20); in other studies, the need for packed erythrocyte transfusion was rare (20). In our experience there was no need for transfusion of any blood supply.

Very low conversion rate to OS, varying between 0 and 4% reported in the literature. In order of frequency, intraoperative bleeding, splenomegaly, anterior approach and surgeon's inexperience constitute the main predisposing factors for conversion (19). Our conversion rate was 0%.

The postoperative complications rate varied from 0% to 35.7% including bleeding, portal vein thrombosis, subphrenic abscess, intestinal ischemia, pancreatic leakage, wound infections and respiratory complications (19). The reoperation rates varied from 0% to 6.7% (20).

One of our patients (6.6 %) reoperated because of stapler line bleeding. Mortality rates varied from 0% to 3.9%. There was no mortality in our patient group.

The postoperative hospital stays varied from 1 to 25 days, mainly related to the patient status, age and the development or not of postoperative complications. The mean time for hospital stay was four days (3- 7 days) in our study.

Overwhelming post-splenectomy infection (OPSI) is a medical emergency for which only prompt diagnosis and immediate treatment can reduce mortality (21). The mortality rate is 50-70%, and most deaths occur within the first 24 h (22). To date, no data are available regarding whether LS is correlated with lower incidence of OPSI.

Generally, a lateral approach provides better exposure of the splenic hilum and the pancreatic tail results in reduction of the number of trocars needed, shorter operative time, less intraoperative blood loss, lower conversion rate and shorter postoperative hospital stay (23, 24). We prefer lateral approach for LS in all cases (25).

Splenectomy is suggested a second-line treatment for ITP patients mainly in refractory to medical therapy. Responses to surgery were evaluated a after the operation based on the American Society of Hematology 2011 evidence-based practice guidelines for ITP (9). Response of ITP after splenectomy, either open or laparoscopic, is usually very high, with an incidence of surgical failure as low as 5% (26,27).

Gonzalez-Porras et al. showed an overall 89% favorable response to both laparoscopic and open splenectomy. The favorable response was significantly less common in patients older than 65 years compared to younger ones (79% vs. 92%,  $p=0.005$ ) (28). Chen et al. compared the surgical outcomes in two groups of patients with

ITP and low platelet count who underwent LS with and without intraoperative platelet transfusion. A steady growth of the platelet count was observed within the first week after surgery, while at discharge, 89% of the patients had achieved complete response, 9% a response and 2% did not respond (29). The authors concluded that a very low platelet count should not be a contraindication for LS in patients with ITP and perioperative platelet transfusion may be unnecessary. Wu et al. reported the feasibility and safety of LS in the treatment of patients suffering from ITP with a preoperative platelet count of less than  $1 \times 10^9 \text{mm}^3$  (30). Zheng et al. presented a 10-year experience of LS for cases of chronic ITP. Within a mean follow-up of 43.6 months, the overall initial and long-term response rates were reported as 89.0% and 80.3%, respectively (31). An accessory spleen, which may be overlooked especially in patients with ITP, may cause the operation to fail. An autopsy study of 720 cases reported that 6.7% of accessory spleens were detected, while 44% reported accessory spleens (32,33). In our study one patient (6.6%) had recurrent thrombocytopenia within the follow-up period and accessory spleen was found operatively in three (20%) patients.

Limitations of this study are linked to its retrospective nature and to the limited sample size affecting overall ratios.

## CONCLUSION

Laparoscopic splenectomy is associated with less operative time and a shorter hospital stay and the long-term outcomes of LS are comparable with open splenectomy for patients with ITP. Laparoscopic splenectomy should be considered as the modality of choice in managing refractory ITP. Also further randomized controlled trials are needed to confirm these results.

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