

# Elective laparoscopic splenectomy: A single-center experience and results

● Serdar Öter,<sup>1</sup> ● Metin Yalçın<sup>2</sup>

<sup>1</sup>Department of Gastroenterological Surgery, Manisa City Hospital, Manisa, Türkiye

<sup>2</sup>Department of General Surgery, Antalya Training and Research Hospital, Antalya, Türkiye

## ABSTRACT

**Introduction:** Studies have shown that laparoscopic splenectomy (LS) is effective, safe, and also more advantages to open surgery with relatively fewer complications and improved patient outcomes. In this retrospective study, we evaluated the pre-operative, peroperative, and post-operative patient data, pre-operative diagnoses, and patient demographics of our center experience.

**Materials and Methods:** Between January 2017 and December 2020, 106 patients underwent total or partial splenectomy for traumatic or non-traumatic reasons. Elective LS was performed on 25 patients in our clinic between these dates. Twenty-three of these patients finished with laparoscopically were evaluated in this study.

**Results:** Of the 23 patients who underwent LS, 7 (30.4%) were male, 16 (69.6%) were female, and the mean age was 33.7±12.24. Splenectomy indications are shown in Table 1. The most common indication for surgery in our series was idiopathic thrombocytopenic purpura and the second most was hereditary spherocytosis. The mean operative time was 145±40 min. An abdominal drain was placed in all patients. The drains were removed in an average of 1.4 (1–2) days postoperatively. The blood loss during the operation was 60±15 ml. The mean post-operative hospital stay was 3.17±0.71 days. Post-operative wound infection was observed in the incision in which the piece was removed in four patients. All wound infections resolved with drainage, wound dressing, and antibiotics.

**Conclusion:** LS is a method that can be safely performed by experienced surgeons. Laparoscopy should be the first choice if possible in elective benign conditions of the spleen, especially if the spleen size is not too large.

**Keywords:** Elective surgery, Laparoscopy, Splenectomy, Results

## Introduction

With advances in laparoscopy in gastrointestinal surgery, most cases of the elective splenectomy cases are now performed by laparoscopically. Studies have shown that laparoscopic splenectomy (LS) is effective, safe and also has more advantages to open surgery with relatively fewer complications and improved patient outcomes.<sup>[1]</sup>

LS has few absolute contraindications. These are comor-

bidities that restricted laparoscopy, uncorrected coagulopathy, and non-splenic hematological malignancies. A low platelet count is no longer an absolute contraindication of the LS.<sup>[1,2]</sup>

There is always a risk of conversion to open surgery in LS. The most common factor leading to conversion is intra-operative bleeding, which may occur due to injury of the vessels of the splenic hilum or splenic capsule.



Received: 07.04.2022 Accepted: 14.04.2022

Correspondence: Serdar Öter, M.D., Department of Gastroenterological Surgery,  
Manisa City Hospital, Manisa, Türkiye

e-mail: sdrdr\_@hotmail.com



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

LS is primarily used for elective surgery in patients with benign diseases of spleen. These are splenic hydatid cysts, Idiopathic Thrombocytopenic Purpura (ITP), splenic hamartoma, and hypersplenism. With the rapid advancement of laparoscopic techniques, LS for normal to moderately enlarged spleens is now considered the gold standard.<sup>[3,4]</sup>

In this retrospective study, we evaluate the pre-operative, peroperative, and post-operative patient data, pre-operative diagnoses, and patient demographics of our center's LS experience between January 2017 and January 2020.

## Materials and Methods

After getting local ethical committees approval, patients who underwent splenectomy (laparoscopic or selective) in our clinic were evaluated between January 2017 and December 2020. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee of the Medical Faculty of Harran University (Date: July 05, 2021; Decision No: HRU/21.13.01).

Between January 2017 and December 2020, 106 patients underwent total or partial splenectomy for traumatic or non-traumatic reasons. Patients who underwent splenectomy beside primary other surgical pathology or traumatic reasons were excluded from the evaluation. Elective LS was performed on 25 patients in our clinic between January 2017 and January 2020. In two of the patients, the surgery was planned as laparoscopic, but in these cases, procedure was converted to open surgery because of anatomical difficulty. Twenty-three patients finished with laparoscopically were evaluated in this study (Fig. 1). Patient demographics and perioperative

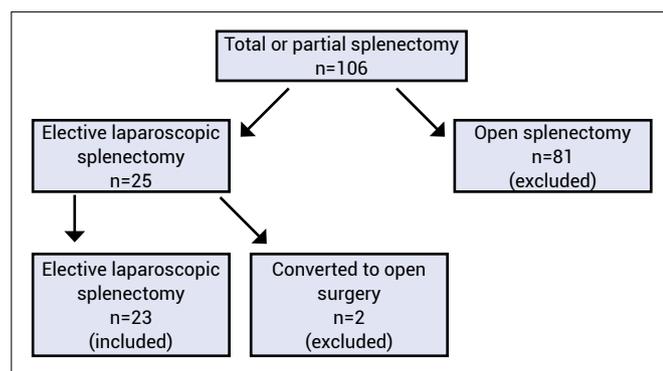


Figure 1. Flowchart of the study.

clinical data were collected and analyzed retrospectively. Patients in the LS group were vaccinated against *Streptococcus pneumoniae*, *Neisseria meningitidis*, and *Haemophilus influenzae* type B at least 2 weeks before or 14 days after surgery. Antibiotic prophylaxis was started intraoperatively.

## Surgical Technique

LS was performed with a lateral approach using 3 or 4 trocars (12 mm, 10 mm, 5 mm, and 5 mm). Perisplenic ligaments were dissected with ultrasonic dissector system or vessel sealing system. Two different methods were used for managing the splenic pedicle, including ligation by endoclips or endoscopic linear vascular stapler. In all patients, the specimen was removed with or without fragmentation of spleen depending on the pathology by expanding the 10 mm trocar entry site.

## Statistical Analysis

Statistical Analysis: Data were analyzed with the IBM Statistical Analyses for the Social Sciences 21.0 for Windows. In the evaluation of distribution of normality, Kolmogorov–Smirnov test was used. The quantitative data were presented as mean  $\pm$  standard deviation (minimum–maximum values) and the qualitative data were presented as number (n) and percentage (%).

## Results

Of the 23 patients who underwent LS, 7 (30.4%) were male, 16 (69.6%) were female, and the mean age was  $33.7 \pm 12.24$  (min–max: 18–56). Splenectomy indications are shown in Table 1. The most common indication for surgery in our series was idiopathic thrombocytopenic purpura (ITP) and the second most was hereditary spherocytosis (HS).

In measurements of spleen dimensions for the male patients, the mean splenic length, width, and depth were  $11.7 \pm 0.8$  (min–max: 10.8–12.6) cm, and for the female patients, the spleen length was  $10.7 \pm 0.6$  (min–max: 10.1–11.5) cm, respectively.

The mean operative time was  $145 \pm 40$  (min–max: 105–190) min. An abdominal drain was placed in all patients.

The drains were removed in an average of 1.4 (1–2) days postoperatively. The blood loss during the operation was  $60 \pm 15$  (min–max: 35–80) ml. The mean post-operative hospital stay was  $3.17 \pm 0.71$  (min–max: 3–5) days. Post-op-

**Table 1. Indications for laparoscopic splenectomy**

| Indication                          | Frequency (n) | Percentage (%) |
|-------------------------------------|---------------|----------------|
| Idiopathic Thrombocytopenic Purpura | 14            | 60.9           |
| Hereditär Sferositoz                | 4             | 17.4           |
| Cysts                               | 3             | 13.0           |
| Thalassemia                         | 1             | 4.3            |
| Splenic Infarction                  | 1             | 4.3            |

erative wound infection was observed in the incision in which the piece was removed in four patients. All wound infections resolved with drainage, wound dressing, and antibiotics.

## Discussion

LS includes several advantages over open splenectomy, such as reduced incision complications, shorter post-operative ileus, better cosmetic results, less post-operative pain, and shorter hospital stay.<sup>[5]</sup>

In our study, similar to other studies, women were in the majority (2/3) when considering the ratio of men to women.<sup>[6,7]</sup> The mean age of our patients was young, similar to another study (mean age 33 years).<sup>[8]</sup> We think that this may be due to the fact that the etiology of the majority of the patients in our study is ITP and HS, and that these two diseases are more common in younger age groups. The most common indication in our study was ITP, similar to another study.<sup>[9]</sup>

In ITP, the spleen enlarges relatively less and can be performed more easily laparoscopically. In our study, the majority of the patients were ITP patients, and the reason for choosing these patients for laparoscopic surgery was that their spleen sizes were close to the normal limits. LS treatment for splenic cysts is controversial. Total splenectomy has been used as a therapeutic approach in many studies, and these studies by Patel et al.,<sup>[9]</sup> Wang et al.,<sup>[10]</sup> and Casaccia et al.<sup>[11]</sup> showed conversion rates to open surgery of 2.4%, 5.8%, and 8%, respectively. Similar to the study of Patel et al.,<sup>[9]</sup> our conversion rate was 8% (2/25) too. Although in the literature, many studies have shown the safety of LS in the presence of low platelet count, according to the pre-operative evaluation of the hematology department in our hospital, the platelet count was wanted to be above  $50 \times 10^9/L$  for the operation.<sup>[12-14]</sup> Therefore, pre-operative platelet transfusion was performed in approximately 2/3 of the cases in our study.

In our study, consistent with the literature, the average hospital stay was 3 days.<sup>[9,11]</sup>

LS is a safe procedure in experienced hands, and the post-operative complication rate in our study was 8%, and only wound infection was observed. All patients were treated without perioperative or post-operative mortality. Studies have also reported that mortality in LS is zero or very rare (0–0.4%).<sup>[11,15]</sup>

Technically, we used the lateral approach in all patients and we believe that this method is quite safe. In the literature, this approach has been used as it is faster, safer, and less blood loss than the anterior approach, appears to be preferred (operation time; 60 min vs. 80 min, complication rate; 4.8% vs. 31.5%, and blood loss; 30 ml vs. 110 ml).<sup>[16-18]</sup>

## Conclusion

LS is a method that can be safely performed by experienced surgeons.

Laparoscopy should be the first choice if possible in elective benign conditions of the spleen, especially if the spleen size is not too large.

## Disclosures

**Ethics Committee Approval:** The study was approved by the Bioethics Committee of the Medical Faculty of Harran University (Date: July 05, 2021; Decision No: HRU/21.13.01).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship Contributions:** Concept – M.Y., S.Ö.; Design – M.Y., S.Ö.; Supervision – M.Y., S.Ö.; Materials – M.Y., S.Ö.; Data collection and/or processing – M.Y., S.Ö.; Analysis and/or interpretation – M.Y., S.Ö.; Literature search – M.Y., S.Ö.; Writing – M.Y., S.Ö.; Critical review – M.Y., S.Ö.

## References

1. Moris D, Dimitriou N, Giniatsos J. Laparoscopic splenectomy for benign hematological disorders in adults: a systematic review. *In Vivo* 2017;31:291–302. [\[CrossRef\]](#)
2. Bai YN, Jiang H, Prasoon P. A meta-analysis of perioperative outcomes of laparoscopic splenectomy for hematological disorders. *World J Surg* 2012;36:2349–58. [\[CrossRef\]](#)
3. Orcalli F, Elio A, Veronese E, Frigo F, Salvato S, Residori C. Conservative laparoscopy in the treatment of posttraumatic splenic laceration using microfibrillar hemostatic collagen: three case histories. *Surg Laparosc Endosc* 1998;8:445–8.
4. Ermolov AS, Tlibekova MA, Yartsev PA, Guliaev AA, Rogal MM, Samsonov VT, et al. Laparoscopic splenectomy in patients with spleen injuries. *Surg Laparosc Endosc Percutan Tech* 2015;25:483–6. [\[CrossRef\]](#)
5. Rodríguez-Luna MR, Balagué C, Fernández-Ananín S, Villalonga R, Targarona Soler EM. Outcomes of laparoscopic splenectomy for treatment of splenomegaly: a systematic review and meta-analysis. *World J Surg* 2021;45:465–79.
6. Vianelli N, Palandri F, Polverelli N, Stasi R, Joelsson J, Johansson E, et al. Splenectomy as a curative treatment for immune thrombocytopenia: a retrospective analysis of 233 patients with a minimum follow up of 10 years. *Haematologica* 2013;98:875–80. [\[CrossRef\]](#)
7. Liu EH, Dilip CK, Yeh TS, Wu JH, Jan YY, Chen MF. Long-term relapse-free survival rate and predictive factors of idiopathic thrombocytopenic purpura in adults undergoing splenectomy. *Biomed J* 2013;36:23–7. [\[CrossRef\]](#)
8. Rehmani B, Kumar N, Pathak P. Changing trends in elective splenectomy at a tertiary hospital in North India—a 10-year study. *Int Surg J* 2017;4:2589–93. [\[CrossRef\]](#)
9. Patel AG, Parker JE, Wallwork B, Kau KB, Donaldson N, Rhodes MR, et al. Massive splenomegaly is associated with significant morbidity after laparoscopic splenectomy. *Ann Surg* 2003;238:235. [\[CrossRef\]](#)
10. Wang Y, Zhan X, Zhu Y, Xie Z, Zhu J, Ye Z. Laparoscopic splenectomy in portal hypertension: a single-surgeon 13-year experience. *Surg Endosc* 2010;24:1164–9. [\[CrossRef\]](#)
11. Casaccia M, Torelli P, Pasa A, Sormani MP, Rossi E. Putative predictive parameters for the outcome of laparoscopic splenectomy: a multicenter analysis performed on the Italian Registry of Laparoscopic Surgery of the Spleen. *Ann Surg* 2010;251:287–91. [\[CrossRef\]](#)
12. Chen X, Peng B, Cai Y, Zhou J, Wang Y, Wu Z, et al. Laparoscopic splenectomy for patients with immune thrombocytopenia and very low platelet count: Is platelet transfusion necessary? *J Surg Res* 2011;170:e225–32. [\[CrossRef\]](#)
13. Wu Z, Zhou J, Li J, Zhu Y, Peng B. The feasibility of laparoscopic splenectomy for ITP patients without preoperative platelet transfusion. *Hepatogastroenterology* 2012;59:81–5.
14. Cai Y, Liu X, Peng B. Should we routinely transfuse platelet for immune thrombocytopenia patients with platelet count less than  $10 \times 10^9/L$  who underwent laparoscopic splenectomy? *World J Surg* 2014;38:2267–72. [\[CrossRef\]](#)
15. Corcione F, Pirozzi F, Aragiusto G, Galante F, Sciuto A. Laparoscopic splenectomy: Experience of a single center in a series of 300 cases. *Surg Endosc* 2012;26:2870–6. [\[CrossRef\]](#)
16. Özcan B, Çevener M, Deveci B, Karadoğan İ, Erdoğan O. Efficacy of endoscopic vascular staplers for splenic hilar control during laparoscopic splenectomy. *Laparosc Endosc Surg Sci* 2018;25:87–92. [\[CrossRef\]](#)
17. Uranüs S. Laparoscopic partial and total splenectomy in non-trauma patients. *Laparosc Endosc Surg Sci* 2017;24:38–45.
18. Barbaros U, Aksakal N, Tükenmez M, Deveci U, Dinçkaya A, Mercan S. Minimal invaziv splenektomi: 71 olguluk deneyimimiz. *Laparosc Endosc Surg Sci* 2007;14:162–71. [\[CrossRef\]](#)