

# Safe and Aesthetic; Laparoscopic Cholecystectomy on the Bikini Line

## Güvenli ve Estetik; Bikini Hattında Laparoskopik Kolesistektomi

Ayberk Dursun\*<sup>1</sup>, Emre Erdoğan<sup>1</sup>, Mert Güler<sup>2</sup>

<sup>1</sup>Erciş Şehit Rıdvan Çevik Government Hospital, Van, Türkiye

<sup>2</sup>İstanbul Education and Research Hospital, İstanbul, Türkiye

**Cited:** Dursun A, Erdoğan E, Güler M. (2023). Safe and aesthetic; Laparoscopic cholecystectomy on the bikini line. *Van Sağlık Bilimleri Dergisi*, 16(1), 9-13.

### ABSTRACT

**Objective:** Laparoscopic cholecystectomy (LC) is the gold standard treatment for symptomatic cholelithiasis and is the most commonly performed surgical procedure worldwide. It is superior to open cholecystectomy in terms of aesthetics, but the visibility of the trocar ports is a cosmetic problem due to increasing aesthetic concerns. We report the results of patients who underwent conventional four port LK with all incisions below the bikini line.

**Material and Method:** The study included patients who underwent LK through bikini incision in our clinic between 01.11.2020 and 31.11.2021. Age, gender, comorbidities, indications for cholecystectomy, previous abdominal surgeries, anesthesia scores, and body mass index (BMI) were recorded. The procedure was not performed in patients undergoing emergency surgery for acute cholecystitis and other causes.

**Results:** The study included 9 patients, all of whom were female. The mean age was  $30 \pm 7.8$  years and mean BMI was  $23.1 \pm 4.3$ . Mean operative time was  $33.9 \pm 8.5$  minutes. Open operation was not performed in any patient. The hospitalization period was one day for all patients. There were no complications in any of the patients. Eight of the nine patients (89%) expressed cosmetic satisfaction in the first month after surgery.

**Conclusion:** The prevalence of LC leads to an increase in the number of patients expecting less scarring. Here, we propose a modified four-port laparoscopic cholecystectomy that is easy to perform, safe, requires no additional cost, and has high patient satisfaction.

**Keywords:** Cholecystectomy, Laparoscopic cholecystectomy, Gallbladder, General surgery

### ÖZET

**Amaç:** Laparoskopik kolesistektomi (LK) semptomatik kolelitiazis tedavisinde altın standart tedavidir ve dünyada en sık uygulanan cerrahi prosedürdür. Estetik açıdan açık kolesistektomiye göre üstündür fakat günümüzde estetik kaygıların artması nedeniyle trokar girişlerinin görünürlüğü kozmetik açıdan sorun oluşturmaktadır. Konvansiyonel dört port LK'yi tüm insizyonlarının bikini çizgisi altında kalacak şekilde uyguladığımız hastaların sonuçlarını sunuyoruz.

**Materyal ve Metod:** Çalışmaya kliniğimizde 01.11.2020 - 31.11.2021 tarihleri arasında bikini insizyonla LK uygulanan hastalar dahil edildi. Hastaların yaş, cinsiyet, ek hastalıkları, kolesistektomi endikasyonları, geçirilmiş batin cerrahileri, anestezi skorları, vücut kitle indeksleri (VKİ) kaydedildi. Prosedür, akut kolesistit ve diğer nedenlere bağlı acil ameliyat edilen hastalara uygulanmadı.

**Bulgular:** Çalışmada tümü kadın olmak üzere 9 hasta yer aldı. Hastaların ortalama yaşı;  $30 \pm 7.8$ , ortalama VKİ'si;  $23.1 \pm 4.3$  tü. Ortalama ameliyat süresi;  $33.9 \pm 8.5$  dakikaydı. Hiçbir hastada açık operasyona geçilmedi. Yatış süre tüm hastalar için bir gündü. Hastaların hiçbirinde komplikasyon gelişmedi. Dokuz hastanın sekizi (%89) ameliyattan sonraki ilk ayda kozmetik olarak memnun kaldığını ifade etti.

**Sonuç:** LK prevalansı, daha az yara izi bekleyen hasta sayısında artışa neden olur. Burada kolay uygulanabilen, güvenli, ek maliyet gerektirmeyen ve yüksek hasta memnuniyeti ile modifiye edilmiş dört portlu laparoskopik kolesistektomi öneriyoruz.

**Anahtar kelimeler:** Kolesistektomi, Laparoskopik kolesistektomi, Safra kesesi, Genel cerrahi

\*Corresponding author: Ayberk Dursun. E-mail address: [dursunayberk845@gmail.com](mailto:dursunayberk845@gmail.com).

ORCID: Ayberk Dursun: [0000-0001-9187-0463](https://orcid.org/0000-0001-9187-0463), Emre Erdoğan: [0000-0001-9963-0480](https://orcid.org/0000-0001-9963-0480), Mert Güler: [0000-0002-8790-9051](https://orcid.org/0000-0002-8790-9051)

Received: 09.04.2022, Accepted: 21.01.2023 and Published: 30.04.2023



## INTRODUCTION

Colonic, jejunal and gastric transposition methods Laparoscopic cholecystectomy (LC) is the gold standard treatment for symptomatic cholelithiasis and is the most frequently performed surgical procedure worldwide (Begum et al., 2019). Although there were doubts initially about the risk of biliary tract injury, the method is being applied safely all over the world. Its cosmetic outcomes are superior to LC, however due to an increase in aesthetic concerns nowadays, the visible multiple port incisions in LC poses a cosmetic problem (Gulaydin, 2021).

Today, with the progress in technology, minimally invasive treatments are becoming increasingly popular for purposes such as reducing postoperative pain and eliminating aesthetic concerns, especially due to visible scars. Surgeons have started to create alternatives to conventional four-port LC; many methods have been developed, such as three-port LC, single-incision laparoscopic surgery (SILS), transluminal endoscopic surgery with natural orifice (NOTES) (Nemani et al., 2014; Lirici et al., 2016; Shah et al., 2021). These procedures have not become widely popular due to surgical difficulties and the steep learning curve (Gulaydin, 2021). In the last decade, it has been aimed to keep the port incisions below the bikini line for invisibility, but the results of this method were described to be extremely limited in a few centers (Ersoz et al., 2011; Gulaydin, 2021).

In this article, we aimed to share the results of an alternative method to traditional LC with the increasing aesthetic concerns as well as surgical safety. We present the results of patients who underwent surgery so that all incisions of the conventional four-port LC remained below the bikini line. The present study is one of the rare studies in the literature where all trocars were placed below the bikini line and will contribute to the literature.

## MATERIAL and METHOD

All cases were operated on for cholelithiasis between November 2020 and December 2021. The data of the patients whose incisions of all ports were below the bikini line were analyzed in the hospital electronic system. Age, gender, presence of additional disease, cholecystectomy indications, previous abdominal surgery, American Society of Anesthesiologists (ASA) scores, body mass indexes (BMI) of the patients were recorded.

The procedure was not performed on patients who underwent emergency surgery for acute cholecystitis and other causes. Those with incomplete data and patients under the age of 18 were excluded in the study. The cosmetic satisfaction levels of the patients who were called for outpatient clinic control were questioned in 5 different degrees ranging from very satisfied/ satisfied/ indecisive/ dissatisfied/ not satisfied at

all. The research was designed retrospectively, and the approval of the local ethics committee was obtained (2022/18-02). All patients were informed about this procedure before the operation and their informed consent was obtained.

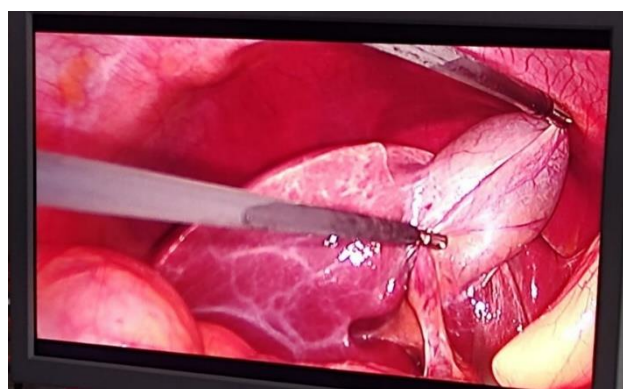
## Operative Technique

All stages were carried out as described by Ersoz et al. (2011). The patients were put in a reverse trendelenburg position with the legs open. The surgeon took a position between the legs of the patient. All incisions were made parallel to one another so as to remain below the bikini line determined before the operation. A 10 mm trocar was inserted into the peritoneal cavity by the open technique through an incision in the median suprapubic region and pneumoperitoneum was provided. A second 10 mm port was placed to the left of the first trocar, and two other 5 mm trocars were placed to the right (Figure 1).



**Figure 1.** Trocar placement

The gallbladder was retracted by entering the rightmost 5 mm trocar with an appropriate instrument (Figure 2).



**Figure 2.** Retraction of the gallbladder

The gallbladder was extracted through the second 10 mm trocar incision. An abdominal closed suction drain was placed through the rightmost 5 mm trocar incision. All skin incisions were sutured with a subcutaneous suture (Figure 3).



**Figure 3.** Subcutaneous closure of incisions

#### Analysis of the Data

Data analysis was made by the SPSS software version 25.0. The conformity of the variables for normal distribution was examined using analytical methods. Continuous variables with normal distribution were presented as mean and standard deviation (SD). Descriptive statistics were used in the evaluation.

**Table 1:** General characteristics of the patients.

	Number of patient (n)	Minimum	Maximum	Mean	Std. Deviation
Age	9	19	42	30,00	7,842
BMI	9	19	32	23,11	4,372
Operative time(min)	9	18	45	33,89	8,565
Length of hospital stay(days)	9	1	1	1,00	,000

BMI: Body mass inde

'Critical view of safety' was provided in the surgeries of all the patients in the study. In one patient, abdominal drain was placed due to intense inflammation and edema of the gallbladder. Other patients did not have abdominal drainage. All operations were completed laparoscopically and the need for additional trocar placement did not occur. The length of stay in the hospital for all patients was one day. 8 of the 9 patients (89%) in the study stated that they were very satisfied / satisfied about the cosmetic outcomes in the first month after surgery (Figure 4). One patient was undecided.



**Figure 4.** First month after surgery

## RESULTS

Nine patients, all of them women, took part in the study. The mean age of the patients was  $30 \pm 7.8$  and the mean BMI was  $23.1 \pm 4.3$  (Table-1). When the ASA scores of the patients were examined, 7 of them were ASA-1 and 2 of them were ASA-2. Among the additional diseases, one patient had asthma and type-2 diabetes mellitus. Among the previous abdominal surgeries, there was a history of cesarean section in 2 patients, open appendectomy in one patient, and umbilical hernia surgery in one patient.

All patients underwent elective surgery. Indications for surgery included symptomatic cholelithiasis in 7 patients, chronic cholecystitis in one patient and polyps in the gallbladder in one patient. The mean duration of surgery was  $33.9 \pm 8.5$  minutes (Table-1). The operation times of 2 patients with a history of cesarean delivery were 26 and 40 minutes. Mortality and morbidity did not develop.

## DISCUSSION

Laparoscopic cholecystectomy has revolutionized gallbladder surgeries in symptomatic cholelithiasis and other gallbladder diseases that are very common all over the world (Sanford, 2019). This is due to the fact that LC has less postoperative pain and incisional hernia rates, shorter return-to-work times, and offers much better cosmetic outcomes (Lirici et al., 2016). However, many new techniques have been developed for better cosmetic results, as LC may cause undesirable cosmetic outcomes due to visible scars (Hauters et al., 2013).

The most commonly used of these methods are the SILS and Natural Orifice Transluminal Endoscopic Surgery (NOTES) procedures. SILS has been described as a safe and effective technique for cholecystectomy (Zanghi et al., 2015). Compared to the classical LC, SILS has a longer operative time, but it increases patient satisfaction aesthetically because it offers better cosmetic outcomes (Hauters et al., 2013). In the experience of Zanghi et al. , the mean operative time was described as approximately one hour (Zanghi et al., 2015). In our study, the mean operative time was 33.9 minutes, which was much shorter. The lack of angulation

between the trocars is thought to be the reason for the long operative time in SILS, and additionally the visible incision scar in the umbilicus cannot be completely avoided (Ersoz et al., 2011).

Cholecystectomy performed using the NOTES technique is another current and specialized minimally invasive method. Due to the difficulty of the procedure, the transvaginal procedure was modified and the 'Hybrid NOTES' method, in which an additional trocar was used from the umbilicus, was developed (Nijhawan et al., 2013). Although it was defined as a safe method in a meta-analysis, the duration of surgery was found to be longer and the conversion rate to open surgery was higher than classical LC due to the lack of endoscopic instruments specifically designed for NOTES and limited experience (Peng et al., 2016). This method has not yet become one of the routine practices due to the difficulties involved. Among the advantages of cholecystectomies performed with bikini incision over NOTES include that it does not need an additional umbilicus trocar, the learning curve is short, and newly designed, expensive laparoscopic instruments are not needed. In our practice, we only used routine laparoscopy instruments used in classical LC.

De la Cruz-Munoz and Koniaris (2010) recommended alternative port site selection (APSS) in the bikini line in the treatment of LC in order to improve cosmetics and increase patient satisfaction. It is presented as a technique that can be easily used by all surgeons who actively perform laparoscopy, without the need for additional laparoscopic instruments and a significant learning curve. In this method, a trocar is placed into the umbilicus for the scope and the other trocars are located below the bikini line. 23 patients with BMI < 30 were included in the study and patients with acute cholecystitis were also operated on. All patients in the study were female. The mean operation time was described as 35 minutes, and all operations were completed laparoscopically (De la Cruz-Munoz and Koniaris (2010). When our results are compared with the results of this study; our average operation time is similar. In addition, there was no need for conversion to open surgery in our patient series, and all patients were female. This LC procedure, in which all trocars remain below the bikini line, was performed by Ersoz et al. for the first time on 2 patients and the results were published (Ersoz et al., 2011).

This method, which we have applied in the same way, has been defined by Ersoz et al. as a safe and effective method with a short learning curve and can be applied without the need for additional laparoscopic instruments (Ersoz et al., 2011). The main advantage of this method is the improved cosmetics without a visible abdominal scar. This new technique has the potential to be an alternative to traditional LC. Later, Gulaydin described a "Modified Bikini Incision" in order to make the operation easier, and it was suggested that

one trocar be shifted to the umbilicus which is different from the original method (Gulaydin, 2021). In this way, it was thought that the technical difficulties could be eliminated and the risk of organ injury in patients who have undergone pelvic surgeries could be avoided compared to the technique developed by Ersoz et al. (2011). To reduce this risk, Gulaydin (2021) recommends that the other 3 trocars be entered through the bikini line after the scope is entered through the trocar in the umbilicus. We adhered to the original method in which the first trocar through the bikini line is inserted into the intraperitoneal cavity by the open technique, and the other trocars are inserted under the scope of the camera. This method seems to be more effective aesthetically. 89% of the patients in our group were cosmetically satisfied with the incisions below the bikini line.

Although LC has many advantages, it has various complications like any surgery and rarely causes biliary tract injuries. The most common complication in LC is perforation of the gallbladder, which causes stones and bile to spill into the peritoneal cavity (Begum et al., 2019). In addition, it is vital to obtain a "critical view of safety" before cutting the cystic duct and artery to reduce the risk of biliary tract injury, which is a serious problem in LC (Strasberg and Brunt, 2010). In our study, no perforation developed and no major complications were experienced. The limited number of patients may also be a factor in this. We provided safe vision for every patient in our patient series. The limitations of this study include its retrospective design and the limited number of patients.

## Conclusion

The prevalence of LC leads to an increase in the number of patients awaiting better cosmetic recovery (Gulaydin, 2021). This leads surgeons to develop to new methods that do not cause additional costs, have low complication rates and a short learning curve. In this study, we recommend LC on the bikini line as a new procedure with limited data in literature, as an alternative method that can be applied easily and safely, with no additional cost and high patient satisfaction. Before applying this method, the surgeon must have sufficient experience in conventional LC and laparoscopy instruments. However, the most important issue in surgery is patient safety. For this reason, 'critical view of safety' should be provided as in the traditional method to prevent biliary tract injuries.

## Conflict of interest

There is no conflict of interest.

## Ethics Approval

The present study with the recordings of the participants has been approved by Local Ethical Committee (approval number: 2017/1-12).

## REFERENCES

- Begum S, Khan MR, Gill R. (2019). Cost effectiveness of glove endobag in laparoscopic cholecystectomy: Review of the available literatur. *The Journal of the Pakistan Medical Association*, 69 (1), 58-61.
- de la Cruz-Munoz N, Koniaris L. (2010). Alternative port site selection (APSS) for improved cosmesis in laparoscopic surgery. *Journal of Gastrointestinal Surgery*. 14(12), 2004-2008.
- Ersoz F, Ozcan O, Sari S, Bektas H, Arikan S. (2011). Laparoscopic cholecystectomy on the bikini line for invisible scar. *Surgical Laparoscopy Endoscopy Percutaneous Techniques*, 21(1): e7-e10.
- Gulaydin N. (2021). Laparoscopic cholecystectomy by the modified bikini line approach as a simple and safe technique. *Revista da Associação Médica Brasileira (1992)*, 67(8), 1172-1176.
- Hauters P, Auvray S, Cardin JL, Papillon M, Delaby J, Dabrowski A et al. (2013). Comparison between single-incision and conventional laparoscopic cholecystectomy: a prospective trial of the Club Coelio. *Surgical Endoscopy*, 27(5), 1689-1694.
- Kim SS, Donahue TR. (2018). Laparoscopic cholecystectomy. *JAMA*, 319(17), 1834.
- Lirici MM, Tierno SM, Ponzano C. (2016). Single-incision laparoscopic cholecystectomy: does it work? A systematic review. *Surgical Endoscopy*, 30(10), 4389-4399.
- Nemani A, Sankaranarayanan G, Olasky JS, Adra S, Roberts KE, Panait L et al. (2014). A comparison of NOTES transvaginal and laparoscopic cholecystectomy procedures based upon task analysis. *Surgical Endoscopy*, 28(8), 2443-2451.
- Nijhawan S, Barajas-Gamboa JS, Majid S, Jacobsen GR, Sedrak MF, Sandler BJ et al. (2013). NOTES transvaginal hybrid cholecystectomy: The United States human experience. *Surgical Endoscopy*, 27(2), 514-517.
- Peng C, Ling Y, Ma C, Ma X, Fan W, Niu W et al. (2016). Safety outcomes of NOTES cholecystectomy versus laparoscopic cholecystectomy: a systematic review and meta-analysis. *Surgical Laparoscopy Endoscopy Percutaneous Techniques*, 26(5), 347-353.
- Sanford DE. (2019). An update on technical aspects of cholecystectomy. *Surgical Clinics of North America*, 99(2), 245-258.
- Shah MY, Somasundaram U, Wilkinson T, Wasnik N. (2021). Feasibility and safety of three-port laparoscopic cholecystectomy compared to four-port laparoscopic cholecystectomy. *Cureus*, 29, 13(11), e19979.
- Strasberg SM, Brunt LM. (2010). Rationale and use of the critical view of safety in laparoscopic cholecystectomy. *Journal of the American College*, 211(1), 132-138.
- Zanghì G, Leanza V, Vecchio R, Malaguarnera M, Romano G, Rinzivillo NM et al. (2015). Single-incision laparoscopic cholecystectomy: our experience and review of literature. *Giornale di Chirurgia*, 36(6), 243-246.