Covert Access Laparoscopic Cholecystectomy: Our Single Center Preliminary Results

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Introduction: Conventional laparoscopic cholecystectomy involves four trocars incisions on the upper abdomen, which may result in unfavorable cosmetic results. The minimally invasive abdominal surgery has developed to reduce the number of ports, operating with a single incision and natural orifice operation. However, these methods are still expensive, difficult to implement and with questionable aesthetic results. The suprapubic approach presents as a simpler and cheaper alternative with good aesthetic results.
This study aimed to improve the aesthetic results of laparoscopic cholecystectomy (LC) by using a bikini line ports as an alternative approach to make trocar scars invisible. The feasibility and safety of this technique were evaluated.

Patients and methods: This study involved 28 patients with symptomatic cholelithiasis who underwent LC between June 2022 and June 2023. The procedure involved inserting a first trocar (10-12 mm, optical trocar) in the lower abdomen at the bikini line to the left of the midline, insufflation with CO2 and then the other two trocars were placed at the bikini line to the right and left of the first one.

Results: Standard instruments were used to perform the surgery, and the mean operative time was 54.66 ± 14.1 min. No intraoperative or postoperative complications occurred, and the median follow-up was 24 weeks. The cosmetic results were satisfactory for all patients, as the use of only three ports in the bikini line completely hid the scars from the ports' incision.

Conclusion: Covert Laparoscopic Cholecystectomy: Is a new minimally invasive technique that proved to be feasible and safe, with no significant complications, and satisfactory cosmetic results.

Key words: Laparoscopy, cholecystectomy, covert Access-bikini cholecystectomy, suprapubic trocars.

Introduction

The world's first laparoscopic cholecystectomy was performed more than 30 years in 1987, since this time, laparoscopic cholecystectomy has become the gold standard for management of symptomatic gall bladder disease. Conventional laparoscopic technique by using the traditional 4-ports was the standard for many years and most frequently used worldwide technique. However, due to visible scars, LC may not be cosmetically satisfactory.[1,2]

There are much alternative procedures that remondend by many surgeon as single incision laparoscopic cholecystectomy (SILC) and natural orifice transluminal endoscopic surgery (NOTES), and covert laparoscopic cholecystectomy to minimize or eliminate scars, improve aesthetics, and achieve patient satisfaction.[3,4] Although NOTES has many advantges as it allows access to the peritoneal cavity through the transvaginal, transgastric, transcolonic, and transurethral routes without making abdominal incisions,[5] but it also have many disadvantages as it require a lengthy learning time, expensive prices, risky orifice closure so the broad application of this procedure in surgical practice appears to be constrained.[7,8]

In single incision laparoscopic cholecystectomy (SILC) we make single incision through umbilicus in which all 4 ports are implanted, although this approach is safer, but the procedure takes longer time because there are no angulations between the trocars. And it needs additional equipment which is necessary, and it is impossible to completely eliminate obvious abdominal scarring. In addition, Incisional hernia and wound infection risk have both been linked to SILC.[9,10]

In covert laparoscopic cholecystectomy we place the laparoscopic ports in less noticeable body regions, such as the bikini line, is known as alternative port site selection, and it may lead to even better cosmoses. Many Surgeons have expressed interest in doing LC by covert technique through using the modified bikini line method by using one umbilical trocar and three trocars implanted along the supra-pubic line because it has many benefit as it hidden scar or reduced scar , lower costs, and the ability to apply the same laparoscopic principles as standard.[11]

In study be Ersoz et al., they described a full bikini line cholecystectomy using four trocars inserted along the suprapubic line,[12] and this is considered a novel, cost-effective, and cosmetically appealing method for removing the gallbladder through bikini incisions.[13]

The aim of this study was to demonstrate that the full bikini line laparoscopic cholecystectomy using three trocars only implanted along the suprapubic line was achievable and safe, and that it could be used to obtain acceptable cosmetic results.

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Patients and methods

This is a prospective observational cohort study including 28 patients with symptomatic gall stone who underwent LC between June 2022 and june2023 at Qena University Hospital. The bikini line laparoscopic cholecystectomy was used. Three trocars were employed, each positioned at the lower abdomen in the same parallel on the bikini line. The entire treatment was carried out using standard laparoscopic equipment. The gallbladder was removed via a left suprapubic trocar site.

Inclusion criteria: Patients with symptomatic gall stones aged from 15 -65 years.

Exclusion criteria were incision scars in the upper abdomen due to previous surgery, acute cholecystitis, body mass index (BMI) ≥ 40, and age > 65 years.

Informed consent was obtained from all patients. Conversion was granted with informed consent.

All the surgeries were performed by the same surgical team.

Ethical approval: The study was approved by the Institutional Ethics Committee.

Operative technique

The patients were administered general anesthesia and positioned supine. Povidone iodine applied topically disinfected the area effectively. Urinary catheterization was performed for intraoperative bladder decompression. As preoperative prophylaxis, a single intravenous infusion of 2.0 g of ceftriaxone was administered at the induction of anesthesia. During the operation, a nasogastric tube (Ryle) was inserted. The surgeon was positioned on the right side, while the assistant stood on the left side and held the laparoscope's controls.

After the patients were positioned in a 30-degree Trendelenburg posture, the peritoneal cavity was accessed through a 10 mm incision to the left of the midline, 2 cm above the symphysis pubis, and a 10-12 mm optical trocar was inserted into the peritoneal cavity using a direct method. Using a 10 mm rigid 30-degree laparoscope, this port was used for Pneumoperitoneum insufflation, monitoring, and visualisation. In order to create a pneumoperitoneum with a 14 mm Hg pressure, carbon dioxide was insufflated. Approximately 8 to 10 cm to the right of the initial trocar, a second 10-12 mm dissecting port was positioned in the midline, and a 5 mm retraction port was positioned 8 to 10 cm to the right of the second trocar above the right inguinal area. At the bikini line in the lower abdomen, all the trocars were finally inserted. There was no risk of negative consequences because the middle port picture quality was the same as that obtained during a standard laparoscopic cholecystectomy. **(Figs. 1,2).**

Fig 1: Shows 3 suprapubic ports.

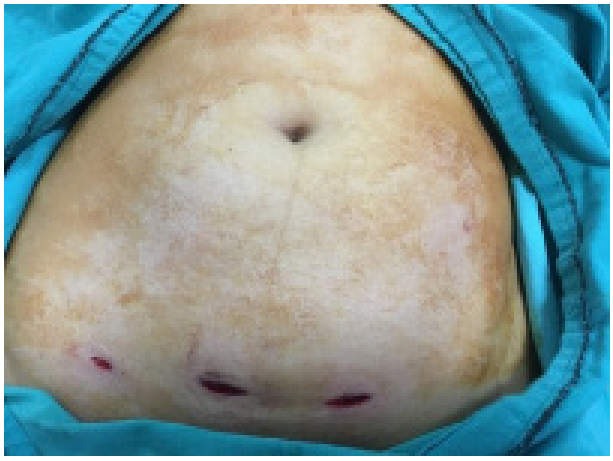

Fig 2: After removal of trocars.

Patients were placed in the reverse Trendelenburg position and slightly left lateral decubitus posture to facilitate exposure. The right suprapubic port was used to grasp the Hartman's pouch, while the left suprapubic trocar was used to dissect and clip the cystic artery and duct. The following phases of operation strictly followed the principles of conventional LC and were all identical to them. Except for obese patients, who needed longer bariatric laparoscopic instruments, all procedures were performed using standard laparoscopic instruments.

The left suprapubic trocar was used to remove the gallbladder. The 10-mm incision did not require dilation. To lower the volume of the GB and enable

extraction, we occasionally used suction of the gall bladder contents. Through a little hole in the neck, we insert stone forceps to remove any stones that may be stuck at the bottom of the GB. The 10-mm fascial defects were closed with a 2-0 vicryl suture. Skin wounds were stitched using 3-0 monofilament sub-cuticular suture. The stitches were removed a week after the procedure.

Outcome measure:

A-Primary outcome measure: Success, defined as removal of gallbladder by the intended approach.

B-Secondary outcomes measure:

1. Operative time in minutes.
2. Difficulty of the surgery.
3. Complications.
4. **Hospital stay:** The hospital stay was calculated as the number of days in the hospital after surgery until the patient was deemed fit for discharge by the operating surgeon.
5. **Pain score:** The pain score was calculated on a visual analog scale ranging from 1 to 10 at 24 h, 1 week, and 6 weeks postoperatively.

Results

During the study period from June 2022 to June 2023, 28 patients with gall bladder disease (Chronic calcular cholecystitis) operated by covert laparoscopic cholecystectomy were presented to general surgery department at Qena university hospitals, South Valley University.

Mean ages of patients were 39.6 ± 19 years and range from 20-55 years and Sex of patients 20 female and 8 males. Mean body mass index was 27.871 ± 6.043 kg/m2 and range with a range of 19 to 39 kg/m2, **(Table 1).**

All gallbladders were removed successfully without bleeding. Average blood loss was 15, 8 ml with a range from 15-28 ml. Mean operative time was 54.6 ± 19 minutes and ranged from 35 to 95 minutes. The length of hospital stay was 1-3 days.

Surgery was completed by three ports in all patients (71.4%). A gallbladder was removed with an endobag in two patients (7.14%) because of a large stone (>2 cm), for which the median incision in the left to symphysis pubis was enlarged and gallbladder was removed from the same incision. Specimen was retrieved through supra pubic port under vision.

All patients felt well after the operation and resumed free oral intake 6 h after the procedure. The suprapubic scars were covered by the hairline, and the patients were satisfied with the cosmetic results.

There were no intraoperative complications or unexpected events. No additional ports were used. All the patients were discharged 48h after the operation and returned to work within 7 postoperative days. All patients reported excellent clinical recovery without any complications at the one-month follow-up evaluation in the outpatient clinic. There were no visible scars on the abdomen.

During the 30-day visits, all patients are doing well, and no port site infection, hernia or any other postoperative complications were discovered. The median follow-up period was 24 weeks. During follow-up visits, all patients reported satisfactory cosmetic results.

Table 1: Primary and secondary outcomes of covert laparoscopic cholecystectomy

Parameter	No of patients =28 patients
Age	
Range (Years)	20-55
Mean ± SD	39.6 ± 19 years
Sex	
Male	20/28 (71.4%)
Female	8/28 (28.6%)
The mean body mass index range	(27.871 ± 6.043 19 to 39 kg/m2
Operative time	
Range	35 to 95 minutes
Mean	54.6 minutes
Blood loss	
Mean	15.8 ml
Range	15-28 ml
Conversion rate	0%
Length of hospital stay	1.8 days (1-3days)
Complications	0%

Discussion

For many years, cholecystectomy candidate patients have chosen the traditional laparoscopic cholecystectomy, which requires four trocar incisions in the upper abdomen. However, this treatment may have unfavourable cosmetic outcomes. In order to operate with a single incision and use a natural orifice, minimally invasive abdominal surgery has evolved. These techniques nonetheless cost a lot of money, are challenging to use, and produce aesthetically dubious outcomes.[14]

To obtain cosmetic results, scars have been diminished or eliminated using different methods such as altering trocar site insertion to be in a hidden area, lowering port sizes and/or numbers, or changing entry access. And as a result, SILC, and NOTES have all been developed. The fact that these operations need specialised tools such port systems in SILC, long instruments, specialised optics, and flexible endoscope in NOTES. Compared to traditional LC, this has an additional expense.[2,15]

According to a study by Ersoz et al., a full bikini line cholecystectomy was performed utilising four trocars inserted along the suprapubic line.[12] The absence of angulations and ergonomics when all four ports are on the same line, according to some authors, hinders this method.[11,12,15]

In our study and in many studies, as study by Bachmann et al, Sales et el., Zhang et al., Verma et al and Gulayadin et al., A left suprapubic port (Sometimes umbilical) and the other three hairline ports were used to create a modified bikini line approach. This modification allows for safe access to the abdominal cavity as well as the selection and insertion of additional trocars while under vision. Another benefit of this approach is that the distance and angulations between instruments are preserved, and this led to achieving control of surgical field is even in difficult situations and patients with a high BMI.[13,15-18]

In this study, the full bikini line laparoscopic cholecystectomy with three ports only, was shown to be a feasible and safe treatment. There was never a conversion to open surgery. Over the course of the study, no unusual intraoperative or postoperative events were noted. Long instruments or additional ports weren't necessary except for obese patients. These results are in line with other research.[10,15,16,17,19]

In contrast to research by,[11,13,19,20] which reported conversion to open surgery, intraoperative challenges, an extra port insertion in the upper abdomen, and long instruments, our study did not find any complications either during the procedure or following it. To reduce the pot size, 5-mm ports could be used in place of the left 10-mm connector. But because we lacked a 5-mm camera and other essential tools, we were limited in our research to what was available in our department. This modification might be used in upcoming series.

The operating time (Which ranged from 35 to 95 minutes) was longer in the early cases and under uncomfortable circumstances but was shorter over time. It is comparable to earlier research.[13,19,21]

In both sexes, covert (Bikini line) laparoscopic cholecystectomy had imperceptible scars and favourable cosmetic outcomes.[16,17,19,22] Patients with a BMI of 40 or more were not allowed to participate in the study. This method has certain drawbacks, particularly when used on individuals with higher BMIs where exposure is likely to be challenging. Patients with difficult cholecystectomy, perforated GB, or those who are exceptionally tall are not good candidates for this procedure. Similar to the learning curve of conventional laparoscopic cholecystectomy (LC), there was only a modest learning curve required when trained laparoscopic surgeons switched to this approach. For operative time it was like conventional LC, although it was more cosmesis and slightly differ from it.

Conclusion

The three ports only full bikini line laparoscopic cholecystectomy is technically achievable, safe, and effective in selected patients and can be performed safely using standard long laparoscopic equipment and there is no requirement for a learning curve or extra-laparoscopic equipment. The main advantage of this procedure is that there are no visible abdominal scars. More research is required before the process can be recommended as an alternative to standard LC.

Conflict of interest

None to declare.

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References

1. Hauters, P., et al: Comparison between single-incision and conventional laparoscopic cholecystectomy: A prospective trial of the Club Coelio. ***Surg Endosc.*** 2013; 27: 1689-1694.
2. Comitalo JB: Laparoscopic cholecystectomy and newer techniques of gallbladder removal. ***JSLS.*** 2012; 16(3): 406.

3. Zorron R, et al: NOTES transvaginal cholecystectomy: Preliminary clinical application. ***Surg Endosc.*** 2008; 22: 542-547.

4. Schlager A, et al: Providing more through less: Current methods of retraction in SIMIS and NOTES cholecystectomy. ***Surg Endosc.*** 2010; 24: 1542-1546.

5. Gettman MT, et al: Transvaginal laparoscopic nephrectomy: Development and feasibility in the porcine model. ***Urology.*** 2002; 59(3): 446-450.

6. Fong DG, et al: Transcolonic endoscopic abdominal exploration: A notes survival study in a porcine model. ***Gastrointest Endosc.*** 2007; 65(2): 312-318.

7. Kalloo AN, et al: Flexible transgastric peritoneoscopy: A novel approach to diagnostic and therapeutic interventions in the peritoneal cavity. ***Gastrointest Endosc.*** 2004; 60(1): 114-117.

8. Hall TC, et al: Single-incision laparoscopic cholecystectomy: A systematic review. ***Arch Surg.*** 2012; 147(7): 657-666.

9. Luna RA, et al: A prospective, randomized comparison of pain, inflammatory response, and short-term outcomes between single port and laparoscopic cholecystectomy. ***Surg Endosc.*** 2013; 27: 1254-1259.

10. la Cruz-Munoz, N, Koniaris LJ: Alternative port site selection (APSS) for improved cosmesis in laparoscopic surgery. ***J Gastrointest Surg.*** 2010; 14: 2004-2008.

11. Silva MV, Almeida T et al: Laparoscopic cholecystectomy with suprapubic approach. ***Arq Bras Cir Dig.*** 2013; 26: 179-183.

12. Ersoz F, et al: Laparoscopic cholecystectomy on the bikini line for invisible scar. ***Surg Laparosc Endosc Percutan Tech.*** 2011; 21(1): e7-e10.

13. Verma GJ: Bikini laparoscopic cholecystectomy: A replica of notes cholecystectomy. ***HPB.*** 2019; 21: S185.

14. Bignell M, et al: Assessment of cosmetic outcome after laparoscopic cholecystectomy among women 4 years after laparoscopic cholecystectomy: Is there a problem? ***Surg Endosc.*** 2011; 25: 2574-2577.

15. Sales LAS, Pinto, et al: Suprapubic laparoscopic cholecystectomy: Technique and preliminary results. ***Arq Bras Cir Dig.*** 2014; 27: 22-25.

16. Bachmann K, Izbicki, et al. Suprasymphysäre laparoskopische Cholezystektomie ohne sichtbare Narben. ***Dir Chirurg.*** 2009; 11(80): 1066-1068.

17. Zhang L, Sah B, et al: A prospective, randomized, controlled, trial comparing occult-scar incision laparoscopic cholecystectomy and classic three-port laparoscopic cholecystectomy. ***Surg Endosc.*** 2014; 28: 1131-1135.

18. Gulaydin NJ: Laparoscopic cholecystectomy by the modified bikini line approach as a simple and safe technique. ***Rev Assoc Med Bras.*** 2021; 67: 1172-1176.

19. Le Roy B, Fetche, et al: Feasibility prospective study of laparoscopic cholecystectomy with suprapubic approach. ***J Visc Surg.*** 2016; 153(5): 327-331.

20. Akoglu Bostanci M, et al: Three-port, two located on the Pfannenstiel line, laparoscopic cholecystectomy comparison with traditional laparoscopic cholecystectomy. ***Am Surg.*** 2017; 83(3): 260-264.

21. Federmann G, Hessler CJ: Hidden laparoscopic access (HiLA) cholecystectomy–first results. ***European Surgery.*** 2011; 1(43): 34-38.

22. Čala Z, et al: Cosmetic laparoscopic cholecystectomy. ***J Laparoendosc Adv Surg Tech A.*** 2006; 16(6): 577-581.