

The impact of gallbladder retrieval from an epigastric vs. umbilical port on trocar-site complications

A prospective randomized study



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The impact of gallbladder retrieval from an epigastric vs. umbilical port on trocar-site complications. A prospective randomized study

AIM: Port-site infection and hernias are among the most of the complications following laparoscopic cholecystectomy (LC). Although surgical technique of LC is described to obtain critical view of safety, there is still no consensus on ideal port-site for gallbladder retrieval. In this comparative study, we aimed to investigate the effects of gallbladder retrieval site on postoperative port site complications following LC.

MATERIAL AND METHODS: In this prospective randomized study, 120 patients underwent LC for symptomatic gallbladder disease. Standard 4-port LC was routinely performed. Patients were divided into two groups consecutively. The gallbladder was removed through the umbilical port-site in Group A (n=60) and the epigastric port-site in Group B (n=60). Postoperative port site complications were recorded. Visual analogue scale (VAS) for pain was also applied to the patients on the postoperative day 1, 10 and 30.

RESULTS: Demographic features were similar in both groups. Postoperative pain in terms of VAS score was significantly lower for Group B on the postoperative day 1 and 30 ($p=0.019$, and $p=0.001$ respectively). The need for enlargement and time of GB retrieval was similar between groups. There is no statistical difference in terms of port-site infection or hernia between groups.

CONCLUSIONS: The findings of this study provide epigastric port retrieval in terms of plausible reasons including significantly lower postoperative pain scores in both short- and long-term and quite lower trocar site-related complications.

Key words: Gallbladder disease, Laparoscopic cholecystectomy, Port-site complications

Introduction

Laparoscopic cholecystectomy (LC) is defined as minimal invasive treatment of gallbladder (GB) diseases, and has been approved as gold standard treatment for symptomatic gall-bladder stones ^{1,2}. LC has typical complications related to surgical intervention. Surgical site infection

and port-site hernia are mostly detected complications with rate ranging between 9% and 4%, respectively ²⁻⁵.

Enlarging the port-site for facilitating the GB retrieval increases the risk of hematoma, infection and port-site hernia ⁶. Several techniques and materials such as endobag have been defined to avoid these complications ⁷. Regarding the port-site for GB retrieval, some of the authors prefer the umbilical port-site, while others prefer the epigastric port during the LC ^{3,8,9}.

There are a limited number of publications in the literature for the question of which is better for GB retrieval ^{7,10-12} and this issue has not yet been standardized. The aim of this study was to prospectively compare postoperative outcomes of both techniques (epigastric and umbilical port-site) as different options for gallbladder retrieval during LC.

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Material and Method

Between March 2016 and November 2016, all patients undergoing LC for cholelithiasis at Sisli Hamidiye Etfal Training and Research Hospital were enrolled into the study. After approval of local Human ethical committee, this trial was also registered online with an identification number of NCT02788942 at ClinicalTrials.gov.

The inclusion criteria of this study were as follows; age between 18-80 years, diagnosis of cholelithiasis in ultrasound result that correlated with symptoms. The exclusion criteria included suspicion of malignancy in the preoperative ultrasonography, malignancy, acute cholecystitis, pregnancy, BMI ≥ 40 kg/m² and immune compromised patients. All of the patients were randomly divided into two groups in a consecutive manner. GB was retrieved through the umbilical port in Group A, and epigastric port in Group B.

Preoperative 1 gr Sefazolin Sodium (Sefazol®, Mustafa Nevzat, Istanbul, Turkey) were administered preoperatively. Standard Four-Port Laparoscopic Cholecystectomy using reusable ports was performed in all patients. One 10 mm trocar was placed to umbilicus and one another to the epigastrium. Two 5 mm ports were placed to the right subcostal region considering the gallbladder position. Endobag was only used in case of gallbladder perforation. Fascia of ports ≥ 10 mm was routinely closed using absorbable suture material. Neither local wound anesthetic nor an intraperitoneal local anesthetic was administered during or after LC. Postoperative analgesia was standardized in both the groups. Intramuscular pethidine 0.5 mg/kg body weight every 6 hour was given in initial 24 h of surgery only. Oral analgesics (paracetamol in dose of 1000 mg every 6 h) were started postoperatively once diet was started.

Patients were discharged on the postoperative day 1 only with oral analgesics when they tolerated a regular diet and were without any complication. Control examinations of the trocar-sites were performed at the outpatient clinic on the postoperative day 10 and 30 after LC procedure. A visual analog scale (VAS) was used to assess postoperative pain (0: none, 10: lots of pain) at the postoperative day 1, 10, 30 day after the LC. In addition to the amount of analgesic used and the duration of hospital stay and port-site complications (infection, bleeding, persistent pain, hernia etc..) were also recorded.

Statistical Analysis

The results were analyzed using SPSS version 21.0 (Statistical Package for the Social Sciences Inc, IBM, Armonk, NY, USA). Numerical variables were expressed as mean $\pm$ standard deviation (SD) or median (range) based on distribution pattern, while categorical variables were presented as absolute values and percentages. Differences between continuous and categorical variables

were assessed by Student's t test for normally distributed variables and the Mann-Whitney U test for non-normally distributed variables, and Fisher's exact test or the chi-square test, respectively. A P value less than 0.05 was considered statistically significant.

Results

Flow diagram of patient recruitment was illustrated in Fig. 1. Demographic features were similar in both groups (mean age: 51.4 ± 13.2 and 49.3 ± 15.4 years in Group A and Group B, respectively ($p=0.350$) and gender (F/M); 39/21 vs. 42/18, $p=0.697$).

Postoperative surgical complications in both groups and differences were shown in Table I. Only three (2.5%) patients were observed with port site complications. There was no gender predisposition in terms of complications.

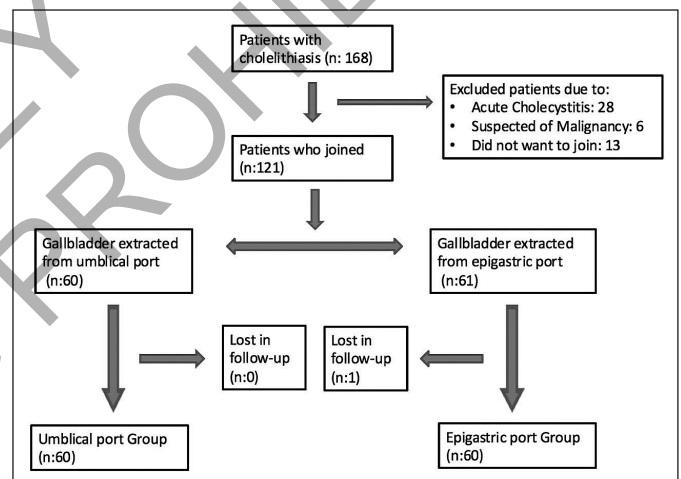


Fig. 1: Recruitment of patients included.

TABLE I - Comparative analysis of peroperative and postoperative outcome of the patients

	Group A (Umbilicus) (n=60)	Group B (Epigastric) (n=60)	p value
Need for enlargement of port site*, (n, %)	6 (10)	11 (18.3)	0.295
Port-site infection (n, %)	2 (3.3%)	-	0.063
Port-site hernia (n, %)	-	1 (1.7%)	0.520
VAS score, day 1 (mean $\pm$ SD)	5.2 $\pm$ 1.5	4.7 $\pm$ 1.2	0.019
VAS score, day 10 (mean $\pm$ SD)	2.1 $\pm$ 1.1	1.8 $\pm$ 0.9	0.081
VAS score, day 30 (mean $\pm$ SD)	0.7 $\pm$ 0.7	0.3 $\pm$ 0.5	0.001

VAS: visual analogue score, *during gallbladder retrieval

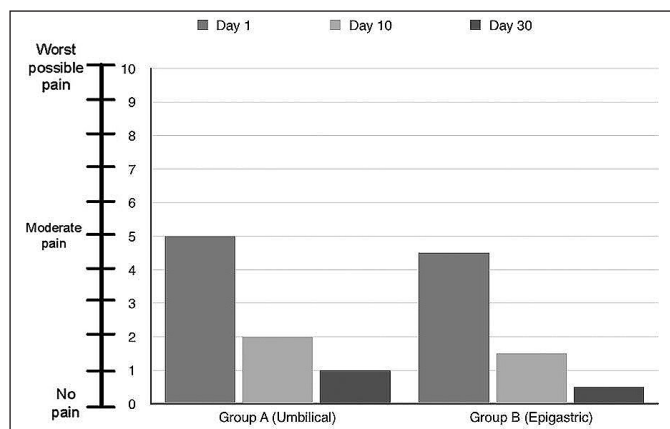


Fig. 2: VAS score distribution in groups regarding postoperative follow-up visits.

Port-site infection was quite lower without significant difference in Group B. Hernia was not primary end-point of the study, however, one patient in Group B was diagnosed with incarcerated umbilical port-site hernia on postoperative day 4 and underwent laparoscopic repair. Considering VAS score results, postoperative pain was significantly lower in Group B (Fig. 2). The need for enlargement of the port-site and time required for retrieval was similar in both groups.

Discussion

Although current guidelines recommend LC as the gold standard for cholelithiasis, consensus on which port should be used for GB retrieval is still lacking. While some authors routinely extract GB from epigastric port-site, others use umbilical port-site as routinely^{3,7,8}. Each has been represented with some advantageous and disadvantageous.

Postoperative pain after LC is complex in nature and does not resemble the pain types experienced following other laparoscopic procedures^{2,7,13}, suggesting that effective analgesic treatment should be multimodal. Therefore, detailed prospective studies in individual laparoscopic procedures such as cholecystectomy, gynecologic procedures, hernia repair, and fundoplication have shown procedure-related individual pain patterns requiring procedure-specific analgesic treatment regimens^{7,14}. In LC, overall pain is a conglomerate of three different and clinically separate components: incisional pain (somatic pain), visceral pain (deep intraabdominal pain), and shoulder pain (presumably referred visceral pain)⁷. Characteristically, overall pain after LC carries a high interindividual variability in intensity and duration and is largely unpredictable⁷. Pain is most intense on the day of surgery and on the following day and subsequently declines to low levels within 3-4 days. However, pain may remain severe in approx-

imately 13% of patients throughout the first week after LC⁷. On the contrary, another randomized comparative study considering epigastric and umbilical port-site for gallbladder retrieval, postoperative pain in the first day, less pain was observed in umbilical group without significant difference¹⁰. Bashir et al provided shorter retrieval time but similar pain scores including postoperative one month¹¹. This study also noted significantly shorter GB retrieval time. When comparing our findings to literature data described above, we found that epigastric port-site yielded better VAS scores on postoperative 1st and 30th days compared to GB retrieval from umbilical site. At this point, LC is one of the most standardized surgical procedures that general surgeons perform on a routine basis resulting globally decreased complication rates during the past decade. Therefore, VAS score results apparently quite attractive in favor of epigastric group.

Port-site hernia and wound infection are frequent complications after LC^{3,15}. It has been reported that perforation rates during LC are up to 36%¹⁶. While 75% of these perforations occur during the dissection, 25% occur during the GB retrieval. Contamination of port-site with bile or gall-stone is the basis for development of port-site infection^{13,17}. Sepsis related with umbilical port-site infection after LC is mentioned as 5% in some studies¹⁸. It is argued that the most appropriate method to prevent port-site infections is to retrieve GB in an endobag^{19,20}. However, there are publications advocating that endobag use does not reduce wound infection².

There have been few studies in the literature comparing the GB retrieval from umbilical or other port-sites during LC^{7,10-12}. Sohu et al reported a wound infection rate of 1.6% in the patients who underwent LC using epigastric port-site for GB retrieval, whereas no port-site hernia was observed⁸. Memon et al. also reported lower port-site infection rate in epigastric group compared to umbilical group (1.5 % vs 5.11%, respectively). Also, they showed favorable outcome in epigastric group in terms of port-site hernia (0.1% vs. 3.6%)⁷. In our study, there was no statistical difference for port-site infection rates between groups, although port-site infection was observed more frequently in Group A. Only one port-site hernia was observed in Group A and it was repaired laparoscopically.

This study has limitation of the small patient population which has to be pointed out. Larger series are needed to compare these rare complications.

Conclusions

As data about which port should be used for GB retrieval during LC is scarce, most randomized studies have documented the benefits of epigastric port-site retrieval of gallbladder. Notwithstanding the lack of agreement, we believe our findings compare well with literature and

provide epigastric port retrieval in terms of plausible reasons including significantly lower postoperative pain scores in both short- and long-term and quite lower trocar site-related complications.

Riassunto

L'infezione ed i laparoceli a livello dell'introduzione dei trocar sono le complicazioni più frequenti dopo colecistectomia laparoscopica (LC). Nonostante che la tecnica chirurgica della LC sia descritta per ottenere ogni sicurezza, non c'è ancora consenso riguardo alla sede ideale di estrazione del pezzo operatorio. Con questo studio di confronto si è voluto indagare le conseguenze postoperatorie a livello della sede scelta per l'estrazione della colecisti.

Si tratta di uno studio prospettico riguardante 120 pazienti sottoposti a LC per colecistopatia sintomatica, con la tecnica standard dei quattro trocar.

I pazienti sono stati distribuiti consecutivamente in due gruppi: nel gruppo A (n=60) la colecisti è stata sportata dal sito ombelicale, e nel Gruppo B (n=60) dal sito epigastrico, registrando le complicanze postoperatorie a livello dei rispettivi siti.

Per la valutazione del dolore è stata utilizzata la tabella di visualizzazione analogica (VAS), esibita ai pazienti nel 1°, 10° e 30° giorno postoperatorio.

Le caratteristiche demografiche sono analoghe nei due gruppi. La presenza del dolore (VAS) è risultata significativamente inferiore nel Gruppo B nel 1° e 30° giorno postoperatorio ($p=0.019$, and $p=0.001$ respectively). La necessità di allargamento del sito e la durata delle manovre di estrazione della colecisti sono risultate simili nei due gruppi, né si sono rilevate differenze statisticamente significative tra i due gruppi riguardo all'infezione locale o l'insorgenza di laparoceli.

Questi risultati indicano preferenza per il sito epigastrico soprattutto per la minore incidenza del dolore postoperatorio sia a breve che a lungo termine, e relativamente minori complicanze postoperatorie.

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