

# A comparative study of postoperative port-site pain after gallbladder retrieval from umbilical versus epigastric ports in laparoscopic cholecystectomy

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## ABSTRACT

**Introduction:** Gall bladder (GB) retrieval is an important cause for postoperative pain after laparoscopic cholecystectomy (LC). GB is usually extracted either from the epigastric or the umbilical port and there are limited data to decide the superiority of one over other in terms of postoperative pain. This study was designed to determine whether GB retrieval from the umbilical port was associated with less pain as compared to epigastric port in adult patients undergoing four ports elective LC. **Material and Methods:** A total of 100 patients took part in the study and were randomly allocated into 2 groups. Postoperatively, port-site pain score was assessed at 1, 6, 12, and 24 h by visual analog scale (VAS) score both for the epigastric and umbilical ports in all the patients and the collected data were analyzed by using SPSS version 22. **Result:** VAS score for postoperative pain at epigastric port at 1, 6, 12, and 24 h found to be higher as compared to umbilical port ( $6.640 \pm 1.494$  vs.  $5.500 \pm 1.176$ ,  $6.620 \pm 1.549$  vs.  $5.320 \pm 1.188$ ,  $6.100 \pm 1.549$  vs.  $4.660 \pm 1.232$ ,  $5.250 \pm 1.459$  vs.  $3.970 \pm 1.274$ , respectively) which was statistically significant ( $P$  value 0.001). But the time taken for retrieval of GB was significantly longer in the umbilical group ( $4.94 \pm 1.56$  vs.  $3.24 \pm 1.29$ ). **Conclusion:** Umbilical port is better as compared to epigastric port for GB retrieval in patient undergoing elective four port LC in terms of postoperative port-site pain but it takes relatively longer time for the extraction.

**Keywords:** Epigastric port, port-site pain, umbilical port, VAS score

## Introduction

Laparoscopic cholecystectomy (LC) is the gold standard procedure for managing patients with symptomatic gall stone diseases.<sup>[1]</sup> Postoperative pain is one of the important events after LC which may prolong patients' hospital stay.<sup>[2]</sup> Multiple factors have been found to be responsible for postoperative pain after LC, which included hemo-peritoneum, abdominal wall trauma during port insertion, use of carbon dioxide (CO<sub>2</sub>) for creating pneumoperitoneum, gall bladder (GB) retrieval, etc.<sup>[2,3]</sup>

GB is usually extracted after LC either from the epigastric or umbilical port and both ports have been encouraged for extraction of GB.<sup>[4-6]</sup> Abbas *et al.*<sup>[7]</sup> preferred subxiphoid port for GB retrieval due to the surgeon's ease and also as there was no need to change the position of the telescope. Siddiqui *et al.*<sup>[8]</sup> however showed the superiority of umbilical port in terms of postoperative port-site pain. To date, there is no level 1 evidence or meta-analysis to support the superiority of one technique over the other for GB extraction in terms of postoperative port-site pain.

## Materials and Methods

It was a comparative type of cross-sectional study conducted in Department of General Surgery, NEIGRIHMS from April 2016

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till September 2017 after being approved by Institution Ethics committee. A total of 100 consenting patients were included in the study and divided into 2 equal groups. The first 50 patients in whom GB was retrieved from epigastric port were assigned in Group A and the next 50 patients where GB was retrieved from umbilical port were included in Group B.

Consenting patients 18–70 years of age planned for standard elective four port LC for benign GB diseases (symptomatic gallstones, GB polyps) were included in the study. Patients with suspicious or proven gallbladder malignancy, bleeding diatheses, previous history of putting abdominal drains, obstructive jaundice, and acute pancreatitis or in whom port-site extension was done were excluded from the study.

Postoperative analgesia in the form of intravenous paracetamol 15 mg/kg given 8 hourly was given in both the groups. Outcome, that is, postoperative port-site pain, was assessed with visual analog scale (VAS) ranging from 0 to 10. Patients were educated about the use of VAS preoperatively (in ward before surgery). Pain was assessed in every patient at both port sites at 1, 6, 12, and 24 h postoperatively by a resident doctor who was blinded to the intervention. Additional analgesia (intramuscular diclofenac – 1.5 mg/kg and tramadol – 1 mg/kg/dose 8 hourly) was given in patients with significant pain (VAS 7 or more).

Continuous variables, that is, age, time taken for GB retrieval, pain score, and postoperative analgesia consumption, were analyzed as means ± standard deviation. Categorical variables, that is, sex and site of GB retrieval, were analyzed as proportions. Outcome, that is, port-site pain, was compared in both groups by Student’s independent *t*-test. Data analysis was done using SPSS version 22.

## Results

The following baseline variables were comparable between the two groups as shown in Table 1.

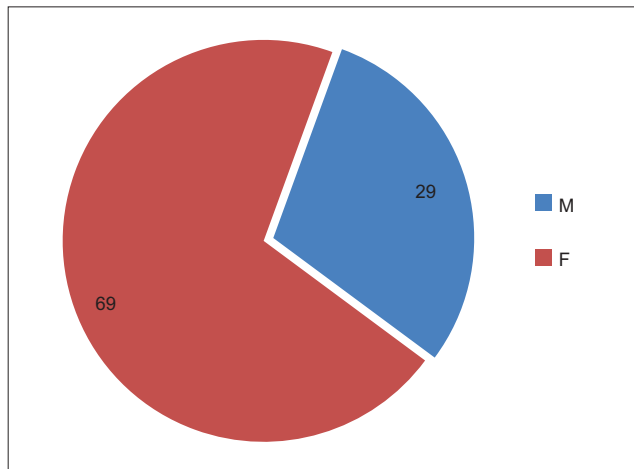


Figure 1: Pie diagram showing gender distribution of the patients

Percentage of female in the study is 69% which is statistically significant (*P* value 0.030) shown in Figure 1.

Ninety-percent of the study population was between 18 and 44 years as shown in Table 2.

In Group A, the VAS score was consistently high in the epigastric port as shown in Table 3.

VAS score in umbilical port was higher than epigastric port in Group B which was statistically significant as shown in Table 4.

But when the VAS score for pain at epigastric port site of group A was compared with the VAS score at umbilical port site in group B, it was found that there was statistically significant difference of pain score (*P*-value < 0.001) at all postoperative hours as shown in Table 5 and Figure 2. The VAS score at the epigastric port was significantly higher.

Table 1: Comparison of different baseline variables

Variables	Group A	Group B
No of patients	50	50
Average age+SD (years)	33.48±10.6	31.10±7.8
Sex		
Male	16	15
Female	34	35
Indication for surgery		
Symptomatic gall stone	46	48
Gall bladder polyps	4	2

Table 2: Shows age distribution

Range (years)	Male	Female
15-29	12	33
30-44	16	29
45-59	3	7
60-74	0	0

Table 3: VAS score for epigastric and umbilical ports at different postoperative hours in Group A

Pain score	Epigastric port	Umbilical port	<i>P</i>
At 1 h	6.640±1.494	4.300±1.142	0.001
At 6 h	6.620±1.549	3.420±1.026	0.001
At 12 h	6.100±1.549	2.890±1.318	0.001
At 24 h	5.250±1.459	2.160±1.412	0.001

Table 4: VAS score for umbilical and epigastric ports at different postoperative hours in Group B

Pain score	Umbilical port	Epigastric port	<i>P</i>
At 1 h	5.500±1.176	4.340±1.232	0.001
At 6 h	5.320±1.188	3.530±1.614	0.001
At 12 h	4.660±1.232	2.850±1.524	0.001
At 24 h	3.970±1.274	2.250±1.613	0.001

Time taken for retrieval of gallbladder from the umbilical port was significantly longer epigastric port, which was statistically significant ( $P = 0.001$ ).

All the patients were followed up to 24 h after surgery for pain assessment. Pain was persistent at both the port sites over first 12 h, which decreases thereafter. However, decrease in pain level is more significant at umbilical port site, as shown in Figure 3.

### Discussion

The age was evenly distributed in both the groups ( $33.48 \pm 10.6$  in Group A vs.  $31.10 \pm 7.8$  in Group B) similar to the results of Siddiqui *et al.* ( $42.5 \pm 10.7$  vs.  $40.6 \pm 12.6$ )<sup>[8]</sup> and Bashir *et al.* ( $47.49 \pm 9.4$  vs.  $46.84 \pm 5.60$ )<sup>[9]</sup> However, the average age in this study was lesser as compared to the other studies.

There was predominance of female population in this study (69%) comparable to the series by Shakya *et al.* (75% female),<sup>[9]</sup> Siddiqui *et al.* (76% female),<sup>[8]</sup> Bashir *et al.* (56% female),<sup>[10]</sup> and Ahmad *et al.* (60% female).<sup>[11]</sup>

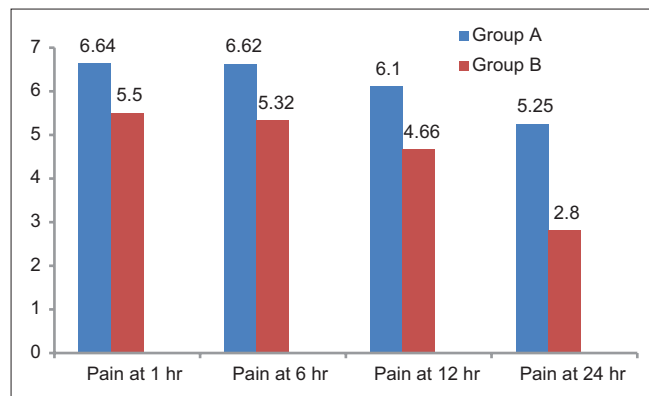
Postoperative VAS score for pain was assessed at the port sites in both the groups in our study. The average pain score

**Table 5: VAS score for specified port-site pain at different postoperative hours between the groups**

Pain score	Group-A (epigastric port)	Group-B (umbilical port)	P
At 1 h	6.64±1.494	5.500±1.176	0.001
At 6 h	6.620±1.549	5.320±1.188	0.001
At 12 h	6.100±1.549	4.660±1.232	0.001
At 24 h	5.250±1.459	3.970±1.274	0.001

**Table 6: Difference in time taken for GB retrieval between two groups**

Variable	Group-A (epigastric port)	Group-B (umbilical port)	P
Time (min) taken for retrieval of GB	3.24±1.29	4.94±1.56	0.001



**Figure 2: Comparison of VAS score at different postoperative hours**

at epigastric port site was consistently higher as compared to umbilical port site in group A, whereas in Group B, the VAS score was higher in the umbilical port when compared with the epigastric port which was statistically significant at all assessment hours ( $P$ -value = 0.001).

When the VAS of epigastric port in Group A was compared with VAS of umbilical port in Group B, it was found that the pain score was consistently higher in the epigastric port in Group A which was statistically significant. Similar results were obtained by Siddiqui *et al.*<sup>[8]</sup> and Shakya *et al.*,<sup>[9]</sup> where they concluded that umbilical port was better for GB retrieval in terms of postoperative pain.

Contrary to the present study, Bashir *et al.*<sup>[10]</sup> and Ahmad *et al.*<sup>[11]</sup> recommended both umbilical and subxiphoid ports to be equally effective for gallbladder extraction in terms of postoperative pain and to be surgeon specific.

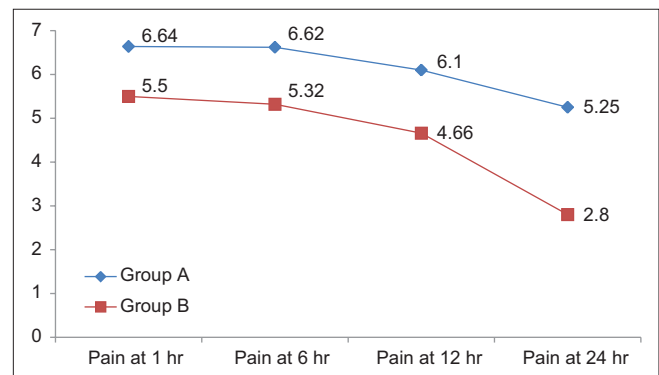
Abbas *et al.*<sup>[7]</sup> preferred the subxiphoid port for GB retrieval due to ease for the surgeon as in there is no need to change the position of telescope and readjustment of position of the surgeon.

Singh *et al.*<sup>[12]</sup> concluded that patients in whom GB were retrieved with endobag had lesser port-site pain than those without endobag (4% vs. 8%). In our series, GB was retrieved in endobags in all the patients and still patients in the epigastric group had more port-site pain than those in the umbilical group.

In this study, the time taken for retrieval of GB was longer in the umbilical port as compared to the epigastric port ( $4.94 \pm 1.56$  vs.  $3.24 \pm 1.29$ ) which was statistically significant ( $P$  value = 0.001) (as shown in Table 6). Similar results were shown by Siddiqui *et al.*,<sup>[8]</sup> where they had assessed retrieval difficulty. The mean difficulty level at umbilical port was higher than epigastric port in their series. None of the study population had port-site infection in this study.

### Conclusion

This study shows that umbilical port is better for the extraction of the GB after LC in terms of postoperative pain; but it takes



**Figure 3: The trend of level of pain at both port sites**

relatively longer time when compared with the epigastric port. This information will educate the primary care physicians to counsel their patients requiring LC about the causes for postoperative pain and also allow the patients to choose the port site through which their GB should be extracted after LC.

### Limitations of the study

The limitation of the study is lesser number of sample size and improper randomization of the patients. A proper randomized controlled trial with larger patient population will further validate the superiority of one port over the other in terms of postoperative pain after LC.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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