

## Three Ports Versus Four Ports Laparoscopic Cholecystectomy

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Received: 15 September 2020

Revised: 30 September 2020

Accepted: 20 December 2020

Published: 15 April 2021

Diyala Medical Journal 2021;20(1): 17-21

### Abstract

**Background:** A four trocar laparoscopic cholecystectomy become the standard procedure since the first laparoscopic procedure was reported. But laparoscopic cholecystectomy has gained many steps such as reduction in port number and size.

**Objective:** To compare Clinical results from three ports versus the traditional four ports in laparoscopic cholecystectomy.

**Patients and Methods:** A prospective randomized clinical trial of 100 patients was done on those who were admitted for elective laparoscopic cholecystectomy in Baquba teaching hospital, between April 2014 and March 2015, patients were classified into two groups (A) for three ports and (B) for 4 ports. Variables such as, complications, operative time, postoperative pain, nausea, and vomiting were assessed.

**Results:** One-hundred patients were included in this study, age of them ranged from 18-70 year and a male to female ratio was 1:9. There were no significant differences in demographic data between the two groups. Postoperative pain, analgesic requirements, nausea and vomiting, and hospital stay were slightly more in group B but statistically not significant. Postoperative return to activity was shorter in group A 6.10 versus 7.00 days for group B with ( $p= 0.021$ ) which is statistically significant. There is no difference in the rate of complications.

**Conclusion:** Three ports laparoscopic cholecystectomy is feasible as an alternative for four ports without any significant complication.

**Keywords:** Laparoscopy; Cholecystectomy; Postoperative complications

## Introduction

Laparoscopic procedures aim to achieve a good therapeutic result by minimizing the traumatic and metabolic stress of intervention. Other benefits of surgical procedures include small incision sites, low risks of wound complications, decreased postoperative pain and complications, shorter time of hospital stay, a more quickly return to normal activities, and cost-saving[1].

The basic principles which are the keys to safe surgery:

1. Gain safe entry to the abdominal cavity.
2. Adequate exposure before the operation.
3. Careful dissection with hemostasis. Non-blind clipping or cauterization of bleeding sites.
4. Identification of the anatomy before structure is ligated or divided[2].

It has been agreed that the fourth trocar may not be necessary, and laparoscopic cholecystectomy can be performed safely without it [10]. Studies have reported that 3-port LC is technically possible[6].

The more ports were used, however, the higher complications that occurred; bleeding on port site, postoperative pain, lowering cosmetic effect, organ injury caused by inserting the trocar, and incisional hernia[7].

## Patients and Methods

This prospective randomized clinical trial included 100 patients aging from (18-70) years, who were admitted for elective laparoscopic cholecystectomy in the Baquba Teaching Hospital between March, 1<sup>st</sup> 2012-February, 28<sup>th</sup> 2013.

Patients were classified into two groups A for 3 ports and B for 4ports respectively. All patients were operated on under general

anesthesia, they were ASA 1 and 2, and they received the same protocol for induction and maintenance with endotracheal intubation.

Exclusion criteria were:

- Acute cholecystitis
- ASA above 2
- Patients with previous upper abdominal operations

The patients received 1 ampoule Dexamethasone 8mg for decreasing postoperative nausea and vomiting, and 1g cefotaxime as a prophylactic antibiotic with the induction of anesthesia. A stomach tube was inserted. Patients were placed supine in reverse Trendelenburg position with tilting to the left side by 30°. In group A the 3<sup>rd</sup> port was placed according to gallbladder position after visualization by telescope and it was usually located between the positions of the 3<sup>rd</sup> and 4<sup>th</sup> port in group B.

All patients received the same treatment post operatively, NPO for 6 hours, with maintenance fluid therapy and single dose Tramadol ampoule 100mg intravenously starting 4 hour post operatively.

For comparing postoperative pain we measured through a verbal pain scale, use words to describe the pain. After discharging patients from the hospital they put on oral analgesia. Patients were followed up after one-week for the severity of postoperative pain, postoperative nausea and vomiting, analgesia requirement, and patient's return to activity during.

## Statistical analysis

The Student t-test was used to evaluate the significance of each parameter and Chi-square was used to compare proportions. A

P-value of  $< 0.05$  was considered statistically significant. Statistical Package for Social Science (SPSS) Version 18 was used for statistical analysis.

## Results

A hundred patients were included in this study. Age of them ranging from 18- 70 years with mean age  $\pm$ SD  $39.67 \pm 11.049$ , ninety of them were female and 10 male with M: F ratio 1:9, shown in Figure (1). Group A for 3 ports and group B for 4 ports.

**Table (1):** Demographic features

Demographic features	Group A 3 ports	Group B 4 ports	P-value
Mean age	40.48 $\pm$ 9.414	38.86 $\pm$ 12.51	0.466
Male- to-female ratio	1:7.3	1:11.5	0.505
Co-morbidity	11 (22%)	8 (16%)	0.444
Family history of gallstone	15 (30%)	18 (36%)	0.523
History of nausea & vomiting	17 (34%)	15 (30%)	0.668
History of lower abdominal operations	13 (26%)	12 (24%)	0.235

**Table (2):** Intraoperative complications

Complications	Group A	Group B	P.value	Total
Gallbladder perforation and bile leakage	10 (20%)	13 (26%)	0.63	23
Port site bleeding	2 (4%)	3 (6%)	0.36	5

Regarding operative time, the mean operative time (with SD) was  $25.12 \pm 10.2$  min., in group A mean of operative time  $\pm$ SD was  $24.18 \pm 10.7$  min., while in group B  $26.06 \pm 9.6$  min., and ( $p=0.360$ ) which is statistically not significant as shown in Table (3). Results of postoperative analgesia requirements both parenteral and oral were slightly more in group B in comparison to group A, but statistically not significant as

shown in Table (3). Mean postoperative hospital stays  $\pm$ SD was  $23.28 \pm 6.5$  hours for group A and  $25.44 \pm 8.2$  for group B which was more but not significant as shown in Table (3).

Post-operative return to normal activity was earlier in group A ( $6.10 \pm 2.2$  versus  $7.00 \pm 1.57$ ) days for group B with  $p=0.021$  which is statistically significant as shown in Table (3).

**Table (3):** Operative and postoperative parameters

Operative and Postoperative parameters	Group- A	Group -B	P-value
Operative time	24.18 $\pm$ 10.7	26.06 $\pm$ 9.6	0.360
Analgesia requirements / parenteral	2.46 $\pm$ 0.64	2.62 $\pm$ 0.6	0.203
Analgesia requirements / oral	10.26 $\pm$ 5.5	11.74 $\pm$ 5.0	0.165
Postoperative hospital stay	23.28 $\pm$ 6.5	25.44 $\pm$ 8.2	0.152
Postoperative return to activity	6.10 $\pm$ 2.2	7.00 $\pm$ 1.57	0.021

Postoperative pain measured within 24hr and within 1week was shown in Table(4) with

$p=0.534$  which is statistically not significant.

**Table (4):** Postoperative pain within 24hr and within one-week

Postoperative pain	Within 24hr.		Within	On-week
	Group- A	Group- B	Group- A	Group- B
No pain	2(4%)	1(2%)	11(22%)	9 (18%)
Mild	24(48%)	18(36%)	28(56%)	26 (52)
Moderate	21(42%)	28(56%)	10(20%)	15 (30%)
Severe	3(6%)	3(6%)	1(2%)	0 (0%)
No.	50	50	50	50

## Discussion

At present widespread use of laparoscopic cholecystectomy world-wide. In laparoscopic surgery, less postoperative pain and early recovery are major goals to had better patient care and cost-effectiveness [8]. Studies demonstrated less postoperative pain was associated with a decrease in either size or number of ports [3]. LC is now often performed with only three ports [6]. In our study, the three-port technique was compared with the standard four-port method in a prospective randomized controlled trial, through comparing clinical outcomes of those two groups in the way of operative time, postoperative pain, analgesic requirements, postoperative nausea and vomiting, hospital stay and patients return to normal activities. The goal was to evaluate its usefulness and its safety, and to see whether it feasible to do 3 ports LC.

The results show that the demographic features of these 2 groups were near the same, and it is also similar in Trichack [6] and Kumar [8]. And this makes the results of the other variables more accurate. Regarding postoperative complication results were near to each other in both groups. We had no bile duct injury and this result similar to the results of Kumar[8]. The results of our present study show that there were slightly more in group B but without significant

differences in operating time, the same result was present in a meta-analysis of 5 studies done by Sun et al [10]. The mean operative time was shorter for group A, In Trichak study, the three-port group needs less oral analgesic tablets and injections, but the difference not statistically significant[6].

Postoperative hospital stay was more in group B but not significantly in group A. The introduction of the 3-ports technique improved length of hospital stay, adding cost-effective benefit to the procedure; possible causes for this reduction we found a strong correlation between the dosage of opiates consumed and length of hospital stay which may explain this reduction[9].

Regarding postoperative return to normal activity were earlier in group A  $6.10 \pm 2.2$  while  $7.00 \pm 1.57$  days for group B with  $p=0.021$  which is statistically significant. While in Kumar's study the results were 4.9 versus 5.8 for 3 ports and 4 ports respectively with a  $P=0.16$ , which was not significant. Pain is the most common symptom experienced by surgical patients, has historically been poorly evaluated and undertreated. For comparing postoperative pain we measured verbal pain scales, use words to describe the pain. A word such as no pain, mild pain, moderate pain, and severe pain are used to explain pain level[1].

Postoperative pain measured within 24hr. and within 1week postoperatively and compared in both groups, the results show that there was not a significant difference between these two groups, both within 24hr. and within one-week. Postoperative nausea and vomiting is a common complication and results in patient weakness and demoralization, prolonged nausea and vomiting, increase pain levels, and a prolonged hospital stay[11].

### Conclusions

We conclude that 3 ports laparoscopic cholecystectomy is feasible and safe alternative for 4 ports without any significant complication, with the additional advantages of less scar and cosmetic results.

### Recommendations

Three ports could be a standard for laparoscopic cholecystectomy if practiced by surgeons experienced in laparoscopic techniques. We hope that single port LC also will be performed in our country.

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