

## ORIGINAL RESEARCH

# Three-Port Versus Standard Four-Port Laparoscopic Cholecystectomy

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### **ABSTRACT**

**Background:** This study was conducted to compare Three-Port Versus Standard Four-Port Laparoscopic Cholecystectomy. **Material and methods:** 100 patients, ages 18 to 75, who were recommended for elective LC were prospectively enrolled for this study. Following a suitable level of general anesthesia, patients were randomized to undergo either 3-port (3-port group) or traditional LC (4-port group). Outcome was evaluated and compared. SPSS software was used for evaluation of results. **Results:** In this study, there were total 100 subjects who were divided into two groups of 50 each. Group 1 comprised of subjects undergoing 3-port cholecystectomy while the 2<sup>nd</sup> group comprised of subjects receiving 4-port cholecystectomy. The operating time was longer in group 2 (61.89 hours) as compared to the 1<sup>st</sup> group (45.26 hours). The analgesic tablet was required for 4 days in group 1 and for 5 days in group 2. The post operative stay was slightly longer in group 2. **Conclusion:** Comparing a 3-port laparoscopic cholecystectomy to a 4-port laparoscopic procedure, the former produced better clinical results.

**Keywords:** Laparoscopic cholecystectomy, Port site

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### **INTRODUCTION**

Gallstones are common, with an estimated prevalence of 10 to 15 per cent in the UK adult population<sup>1</sup>. While most people with gallstones remain asymptomatic, around 1 to 2 per cent per year will develop symptoms for which the definitive treatment is cholecystectomy<sup>2</sup>. The four-port technique is currently the standard technique for performing laparoscopic cholecystectomy. Newer techniques exist, including the three-port technique using conventional laparoscopic equipment. However, the lateral-most port used for retracting the gallbladder fundus over the surface of the liver is absent. Instead, the gallbladder infundibulum is held via the right upper quadrant port (mid-clavicular line), and this on its own is used to facilitate views of Calot's triangle.<sup>3,4</sup> Standard four-port laparoscopic cholecystectomy (LC) is considered to be a gold standard technique for cholecystectomy.<sup>5,6</sup> Various modifications have been done in the four-port laparoscopic cholecystectomy like decreasing the number and size of the ports to reduce the postoperative pain and better cosmetic results.<sup>7-10</sup> The use of the fourth port has been questioned by many surgeons and several studies in the literature have reported that three-port LC can be

performed safely as it is a feasible technique with comparable outcomes.<sup>11-13</sup> These modifications have shown reduced postoperative pain and less use of analgesics. Some surgeons have reported the use of two ports and mini-instruments for doing LC.<sup>14,15</sup> Hence, this study was conducted to compare Three-Port Versus Standard Four-Port Laparoscopic Cholecystectomy.

### **MATERIAL AND METHODS**

100 patients, ages 18 to 75, who were recommended for elective LC were prospectively enrolled for this study. Individuals with acute cholecystitis with empyema gallbladder as well as those deemed unsuitable for laparoscopic surgery due to anesthesia-related concerns were excluded from consideration. Following a suitable level of general anesthesia, patients were randomized to undergo either 3-port (3-port group) or traditional LC (4-port group). With zero-degree operating telescopes, they implemented the single surgeon approach in the 4-port LC. An 11-mm infraumbilical port, a 10-mm subxyphoid port, and a 5-mm subcostal port were utilized in the 3-port LC. The 10-mm subxyphoid port was used for dissection, whereas the 5-mm subcostal port was used

for the lengthy gripping forceps to retract the gallbladder. In both groups, the cystic duct and cystic artery were cut using a 10-mm multiple clip applicator. The working telescope was repositioned, and the gallbladder was recovered via the umbilical port. To determine the significance of each parameter, the Student t test was employed.

**RESULTS**

In this study, there were total 100 subjects who were divided into two groups of 50 each. Group 1 comprised of subjects undergoing 3-port cholecystectomy while the 2<sup>nd</sup> group comprised of subjects receiving 4-port cholecystectomy. Acute

Cholecystitis was present in 6 subjects of group 1 and 4 subjects of group 2. Chronic Cholecystitis was evident in 44 subjects of group 1 and 46 subjects of the 2<sup>nd</sup> group. The operating time was longer in group 2 (61.89 hours) as compared to the 1<sup>st</sup> group (45.26 hours). The analgesic tablet was required for 4 days in group 1 and for 5 days in group 2. The post operative stay was slightly longer in group 2. There was not a significant difference between the success rates of the two techniques. The satisfaction score was higher for group 1 (8.9) as compared to group 2 (7.0). The first group showed less surgical scarring, and no elevated risk of bile duct damage. Additionally, it caused less pain at the port site.

**Table 1: Demographic Data**

Variable	Group 1 (3 ports)	Group 2 (4 ports)
Number of subjects	50	50
Mean age (years)	40.65	42.87
Acute Cholecystitis	06	04
Chronic Cholecystitis	44	46

**Table 2: Patient Outcomes**

Variable	Group 1 (3 ports)	Group 2 (4 ports)
Number of subjects	50	50
Operating Time (Hours)	45.26	61.89
Days of Analgesic Tab Requirement	4	5
Post-op Stay (days)	1.45	1.77
Days to Return to Normal Activity	5.2	6.9
Success rate	96.4%	97%
Satisfaction Score (7 days)	8.9	7.0

**DISCUSSION**

Four-port laparoscopic cholecystectomy is the gold standard procedure for LC. The aim of the laparoscopy procedure includes decreased pain, improved cosmetic results and decreased duration of hospital stay compared to laparotomy. Over a period of time, LC has been modified and developed in many ways including reduction in size and number of ports for the benefit of the patients as reported in the literature.<sup>16-18</sup> The first laparoscopic cholecystectomy (LC) was performed in 1987 by Phillip Mouret and later established by Dubois and Perissat in 1990.<sup>19,20</sup> Since then, it has met with wide-spread acceptance as a standard procedure. Standard laparoscopic cholecystectomy is done by using 4 trocars. The fourth (lateral) trocar is used to grasp the fundus of the gallbladder so as to expose Calot's triangle. With increasing surgeon experience, laparoscopic cholecystectomy has undergone many refinements including reduction in port size.<sup>21-23</sup> Hence, this study was conducted to compare Three-Port Versus Standard Four-Port Laparoscopic Cholecystectomy. In this study, there were total 100 subjects who were divided into two groups of 50 each. Group 1 comprised of subjects undergoing 3-port cholecystectomy while the 2<sup>nd</sup> group comprised of subjects receiving 4-port cholecystectomy. Acute Cholecystitis was present in 6 subjects of group 1 and

4 subjects of group 2. Chronic Cholecystitis was evident in 44 subjects of group 1 and 46 subjects of the 2<sup>nd</sup> group. The operating time was longer in group 2 (61.89 hours) as compared to the 1<sup>st</sup> group (45.26 hours). The analgesic tablet was required for 4 days in group 1 and for 5 days in group 2. The post operative stay was slightly longer in group 2. There was not a significant difference between the success rates of the two techniques. The satisfaction score was higher for group 1 (8.9) as compared to group 2 (7.0). The first group showed less surgical scarring, and no elevated risk of bile duct damage. Additionally, it caused less pain at the port site. Trichak S et al compared the three-port vs the four-port technique. Between 1998 and 2000, 200 consecutive patients undergoing elective LC for gallstone disease were randomized to be treated via either the three- or four-port technique. There was no difference between the two groups in age, sex, or weight. In terms of outcome, there was no difference between the two groups in success rate, operating time, number of oral analgesic tablets (paracetamol), visual analogue score, or postoperative hospital stay; however, the three-port group required fewer analgesic injections (nalbuphine) (0.4 vs 0.77, p = 0.024). It was concluded that the three-port technique is as safe as the standard four-port one for LC. The main advantages of the three-port technique are that it causes less pain, is less expensive, and

leaves fewer scars.<sup>24</sup>In another study conducted by Kumar M et al, authors compared the clinical outcomes of 3-port laparoscopic cholecystectomy versus conventional 4-port laparoscopic cholecystectomy. Seventy-five consecutive patients who underwent elective laparoscopic cholecystectomy were randomized to undergo either the 3-port or the 4-port technique. Four surgical tapes were applied to standard 4-port sites in both groups at the end of the operation. All dressings were kept intact until the first follow-up 1 week after surgery. Postoperative pain at the 4 sites was assessed on the first day after surgery by using a 10-cm unscaled visual analog scale (VAS). Other outcome measures included analgesia requirements, length of the operation, postoperative stay, and patient satisfaction score on surgery and scars. Demographic data were comparable for both groups. Patients in the 3-port group had shorter mean operative time (47.3+/-29.8 min vs 60.8+/-32.3 min) for the 4-port group (P=0.04) and less pain at port sites (mean score using 10-cm unscaled VAS: 2.19+/-1.06 vs 2.91+/-1.20 (P=0.02). Overall pain score, analgesia requirements, hospital stay, and patient satisfaction score (mean score using 10-cm unscaled VAS: 8.2+/-1.7 vs 7.8+/-1.7, P=0.24) on surgery and scars were similar between the 2 groups. Three-port laparoscopic cholecystectomy resulted in less individual port-site pain and similar clinical outcomes with fewer surgical scars and without any increased risk of bile duct injury compared with 4-port laparoscopic cholecystectomy. Thus, it can be recommended as a safe alternative procedure in elective laparoscopic cholecystectomy.<sup>25</sup>

## CONCLUSION

Comparing a 3-port laparoscopic cholecystectomy to a 4-port laparoscopic procedure, the former produced comparable clinical results, less surgical scarring, and no elevated risk of bile duct damage. Additionally, the former caused less pain at the port site.

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