

**ORIGINAL RESEARCH**

# Assessment of efficacy of three-port laparoscopic cholecystectomy in gall stone patients: An observational study

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**ABSTRACT**

**Background:** The present study was undertaken for assessing the efficacy of three-port laparoscopic cholecystectomy in gall stone patients. **Materials & methods:** 50 gallstone patients were enrolled in the present study. Demographic data of all the patients was obtained. 3-port laparoscopic cholecystectomy was carried out. A 10-mm supraumbilical port, 10-mm subxiphoid, and 5-mm subcostal port was used. Our primary outcome measure was pain score after surgery. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. **Results:** Fifty gallstone patients scheduled to undergo 3-port LC were included. Mean age of the patients was 46.9 years. Overall, wound infection was present in 8 percent of the patients. Mean VAS score evaluating the postoperative pain at on day of surgery at 6 hours, at discharge, at one-week follow-up and at two-weeks follow-up was 6.29, 3.13, 2.04 and 1.12 respectively. While evaluating statistically, significant results were obtained. Mean duration of hospital stay was found to be 1.9 days. **Conclusion:** Three port technique is a safe technique for laparoscopic cholecystectomy.

**Key words:** Three port, Laparoscopic cholecystectomy

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**INTRODUCTION**

Laparoscopic cholecystectomy is a minimally invasive surgical procedure for removal of a diseased gallbladder. This technique essentially has replaced the open technique for routine cholecystectomies since the early 1990s. At this time, laparoscopic cholecystectomy is indicated for the treatment of cholecystitis (acute/chronic), symptomatic cholelithiasis, biliary dyskinesia, acalculous cholecystitis, gallstone pancreatitis, and gallbladder masses/polyps.<sup>1-3</sup>

Perceived advantages of laparoscopic cholecystectomy, compared with the open technique, include earlier return of bowel motility, less post-operative pain, better cosmetic result and shorter hospital stay resulting in equal or lower hospital costs, as documented by various randomized control trials.<sup>4, 5</sup>

However, newer, less invasive techniques, such as natural orifice transluminal endoscopic surgery (NOTES) and single incision laparoscopic cholecystectomy (SILC), are currently being

investigated as alternatives to the traditional 4-port laparoscopic removal. Safety data and definitive benefits of these less invasive procedures are lacking.<sup>6, 7</sup> Severe inflammation and fibrosis of the gallbladder may increase the risk of bleeding and biliary tract injury during Calot's triangle dissection. Open subtotal cholecystectomy has been used safely in patients at high-risk of bile duct injury due to disruption of natural anatomy due to severe fibrosis and inflammation. With improvements in laparoscopic techniques, laparoscopic partial cholecystectomy (LPC) has become an effective and safe method of decreasing the rates of conversion to open surgery.<sup>7- 9</sup> Hence; the present study was undertaken for assessing the efficacy of three-port laparoscopic cholecystectomy in gall stone patients.

**MATERIALS & METHODS**

The present study was conducted in the department of general surgery with the aim of evaluating efficacy of three-port laparoscopic cholecystectomy in gall stone patients. A total of 50 gallstone patients were enrolled

in the present study. Inclusion criteria for the present study included: Gall stone patients within the age range of 20 to 60 years schedule to undergo elective laparoscopic cholecystectomy. All the procedures were carried out under the hands of skilled and experienced surgeons. A 10-mm supraumbilical port, 10-mm subxiphoid, and 5-mm subcostal port was used. Our primary outcome measure was pain score after surgery. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Univariate analysis was done evaluating the level of significance.

## RESULTS

Fifty gallstone patients scheduled to undergo 3-port LC were included. Mean age of the patients was 46.9 years. 40 percent of the patients belonged to the age group of 40 to 50 years. 82 percent of the patients were females while the remaining were males. Mean operative time of the surgical procedure was 62.3 minutes. Overall, wound infection was present in 8 percent of the patients. Mean VAS score evaluating the postoperative pain at on day of surgery at 6 hours, at discharge, at one-week follow-up and at two-weeks follow-up was 6.29, 3.13, 2.04 and 1.12 respectively. While evaluating statistically, significant results were obtained. Mean duration of hospital stay was found to be 1.9 days.

**Table 1: Age-wise distribution**

Age group (in years)	Three-port group	
	Number of patients	Percentage
18- 30	5	10
31-40	9	18
41-50	20	40
51-60	12	24
More than 60	4	8
Total	50	100

**Table 2: Gender-wise distribution**

Gender	Three-port group	
	Number of patients	Percentage
Males	9	18
Females	41	82
Total	50	100

**Table 3: Operative time**

Parameter	Three-port group
Mean operative time (minutes) $\pm$ SD	62.3
SD	10.58
Minimum	45.2
Maximum	86.3

**Table 4: Postoperative complications**

Postoperative complications		Three-port group	
		Number of patients	Percentage
Wound infection	Present	4	8
	Absent	46	92

**Table 5: VAS**

Postoperative pain score on VAS	Three-port group	p- value
On day of surgery at 6 hours	6.29	0.00 (Significant)
At discharge	3.13	
At one-week follow-up	2.04	
At two-weeks follow-up	1.12	

**Table 6: Hospital stay**

Parameter	Three-port group
Mean duration of hospital stay (days)	1.9
$\pm$ SD	0.53

## DISCUSSION

Adopting laparoscopic cholecystectomy in a treatment of symptomatic cholelithiasis introduced a new spectrum of associated intraoperative and postoperative complications. Minor complications (biliary and non-biliary) are usually treated conservatively. Major complications (biliary and vascular) are life threatening and increase mortality rate, therefore creating the need for conversion to open surgical approach in order to treat them. The frequency of complications associated with laparoscopic cholecystectomy varies from 0.5 to 6%.<sup>7, 8</sup>

Conversion to open cholecystectomy may be required in the presence of extensive adhesions which may follow multiple prior upper abdominal operations, when delineation of the anatomy is difficult, after onset of complications, or situations of instrument failure. Overall serious complication rate remains higher than that seen in open cholecystectomy, despite the increasing experience with the procedure. The perioperative complications may be trocar- or energy source-related injuries, and vascular or bile duct injuries during dissection. Interestingly, the complication rate of open cholecystectomy has increased as well, due to declining exposure to open surgery.<sup>9, 10</sup> Hence; the present study was undertaken for assessing the efficacy of three-port laparoscopic cholecystectomy in gall stone patients.

Fifty gallstone patients scheduled to undergo 3-port LC were included. Mean age of the patients was 46.9 years. 40 percent of the patients belonged to the age group of 40 to 50 years. 82 percent of the patients were females while the remaining were males. Mean operative time of the surgical procedure was 62.3 minutes. Overall, wound infection was present in 8 percent of the patients. Nip L et al compared the three- and four-port techniques in laparoscopic cholecystectomy for benign diseases of the gallbladder. The review was conducted according to a predefined protocol registered on PROSPERO. Eighteen trials were included with 2085 patients. Length of hospital stay and postoperative analgesia requirement favoured the three-port group. There were no differences in length of procedure or success rate between the two groups. The three-port technique for laparoscopic cholecystectomy is an option for appropriately trained surgeons who perform it regularly.<sup>11</sup>

Mean VAS score evaluating the postoperative pain at on day of surgery at 6 hours, at discharge, at one-week follow-up and at two-weeks follow-up was 6.29, 3.13, 2.04 and 1.12 respectively. While evaluating statistically, significant results were obtained. Mean duration of hospital stay was found to be 1.9 days. In another similar study conducted by Kumar M et al 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. Overall pain score, analgesia requirements, hospital stay, and patient satisfaction score (mean score using 10-cm unscaled VAS:  $8.2 \pm 1.7$  vs  $7.8 \pm 1.7$ ,  $P=0.24$ ) 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.<sup>12</sup> Mayir B et al evaluated 100 patient that have undergone elective laparoscopic cholecystectomy through three port (group one). These patients were compared with 50 patients that have undergone laparoscopic cholecystectomy through four port (group two). Complications, length of stay in hospital, operation time, conversion to open surgery rate were compared in two group. Results: In group one, fourth port was necessary for nine (9%) patients. Duration of operation in group one was in average 31 min and in group two, 31, 3 min. Operation time, length of stay in hospital, complication rate, conversion to open surgery rate was similar in both groups. Three port laparoscopic cholecystectomy is a safer method when performed by experienced surgeons.<sup>13</sup> Operations utilizing three ports were compared to those performed using more than three ports in another previous study conducted by Wiseman JE et al. 924 total LCs were performed by 30 surgeons in the study period. The mean operative time was 10 min shorter in the three-port group in comparison, despite a threefold higher rate of intraoperative cholangiogram in these cases. There was no significant difference in either the conversion-to-open rate, or the overall complication rate. Operative time for LC performed through three ports was significantly less than those performed through the traditional four port approach, despite utilizing intraoperative cholangiogram nearly three times as often.<sup>14</sup>

## CONCLUSION

From the above results, the authors conclude that the three-port technique is a safe technique for laparoscopic cholecystectomy.

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