

## Original Research

### Comparison of efficacy of 3-port laparoscopic cholecystectomy versus standard 4-port Laparoscopic Cholecystectomy

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#### ABSTRACT

**Background:** Cholecystectomy is the treatment of choice for symptomatic gall stone disease. The most important advantage of laparoscopic cholecystectomy (LC) is that it abolishes the trauma of access as well as the transient ileus that follows open abdominal surgery. Hence; in the present study, technical feasibility, safety, and benefit of 3-port laparoscopic cholecystectomy versus standard 4-port laparoscopic cholecystectomy were compared. **Materials & methods:** A total of 30 patients scheduled to undergo LC were included in the present study. All the patients were broadly divided into two study groups with 15 patients in each group. Group A included patients who underwent 3-port laparoscopic cholecystectomy, while group B included patients who underwent 4-port laparoscopic cholecystectomy. Primary outcome measure in the present study were pain score and patient satisfaction score (PSS) after surgery. Pain score was assessed by done by using a 10-cm visual analog scale (VAS). **Results:** Non- significant results were obtained while comparing the mean duration of hospital stay among subjects of the study group and control group (P- value > 0.05). Non-significant results were obtained while comparing the mean VAS at different port sites. Mean VAS was significantly higher for the subjects of the four port group on the day of discharge and after one week of follow-up. Significant results were obtained on comparing the mean PSS on the day of discharge among the subjects of both the study groups (P- value < 0.05). Non- significant results were obtained on comparing the mean PSS after one week follow-up among the subjects of both the study groups (P- value > 0.05). **Conclusion:** The three port technique is as safe as the standard four port for laparoscopic cholecystectomy. At the same time, it is also recommended that the surgeon should not hesitate to put fourth port to ensure safe completion of Surgery

**Key words:** Laparoscopic cholecystectomy, Port.

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#### INTRODUCTION

Cholecystectomy is the treatment of choice for symptomatic gall stone disease. The most important advantage of laparoscopic cholecystectomy (LC) is that it abolishes the trauma of access as well as the transient ileus that follows open abdominal surgery. These patients are virtually free of post operative pain and can be discharged from the hospital within 1 to 2 days to resume full activity and employment, the latter within a week of operation.<sup>1-3</sup>

As the technique became a routine procedure, modifications were made in order to make it less invasive and more cosmetic. Initially, a 3-port LC (LC3P) instead of the standard 4-port LC (LC4P) approach was preferred

when the anatomy was clearly visualized at the time of the initial laparoscopic evaluation and no technical difficulties were anticipated. Later, technical advances introduced the 5-mm laparoscope and the 5-mm clip applicators, thus decreasing the port size, and later, the newer 2-mm or 3-mm instruments allowed the surgeons to make smaller incisions. The use of a working channel laparoscope made it possible to use only two ports, along with transdermal sutures and needles, for an easier manipulation of the gallbladder.<sup>4,5</sup>

More recently, the development of devices that made the introduction of the laparoscope and different instruments through the same incision feasible gave rise to 1-port LC (LC1P) also known as SILS. The incidence of biliary

complications is thought to increase if lesser invasive techniques like SILS (single incision laparoscopic surgery) or 2-port laparoscopic cholecystectomy are used and thus these techniques have not been well accepted all over the world.<sup>6-8</sup>

Hence; under the light of above obtained data, we sought to investigate the technical feasibility, safety, and benefit of 3-port laparoscopic cholecystectomy versus standard 4-port laparoscopic cholecystectomy.

**MATERIALS & METHODS**

The present study was planned in the department of general surgery of the medical institute and it included evaluation of technical feasibility, safety, and benefit of 3-port laparoscopic cholecystectomy versus standard 4-port laparoscopic cholecystectomy. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 30 patients scheduled to undergo LC were included in the present study. All the patients were broadly divided into two study groups with 15 patients in each group. Group A included patients who underwent 3-port laparoscopic cholecystectomy, while group B included patients who underwent 4-port laparoscopic cholecystectomy. Primary outcome measure in the present study were pain score and patient satisfaction score (PSS) after surgery. Pain score was assessed by done by using a 10-cm visual analog scale (VAS). All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test was used for evaluation of level of significance.

**RESULTS**

A total of 30 patients were included in the present study and were broadly divided into two study groups with 15 patients in each group. Mean duration of hospital stay among subjects of the three port group and four port groups was 1.5 and 1.3 days respectively. Non-significant results were obtained while comparing the mean duration of hospital stay among subjects of the study group and control group (P- value > 0.05). Non-significant results were obtained while comparing the mean VAS at different port sites. Mean VAS was significantly higher for the subjects of the four port group on the day of discharge and after one week of follow-up. Significant results were obtained on comparing the mean PSS on the day of discharge among the subjects of both the study groups (P- value < 0.05). Non- significant results were obtained on comparing the mean PSS after one week follow-up among the subjects of both the study groups (P- value > 0.05).

**Table 1:** Mean duration of hospital stay (days)

Parameter	Three port	Four port	p- value
Mean duration of hospital stay (days)	1.5	1.3	0.22
±SD	0.54	0.71	

**Table 2:** Mean VAS at port sites

Parameter		Three port	Four port	P- value
Day of surgery at 6 hours	Epigastric port	6.3	6.8	0.35
	Umbilical port	4.9	5.1	0.41
	Mild-clavicular port	6.1	5.9	0.87
	Mid axillary port		5.1	

**Table 3:** Mean Post-op pain score on VAS

Postoperative pain score on VAS	Three port	Four port	P- value
At discharge	4.1	5.5	0.00
At one week follow-up	3.2	4.6	0.00

**Table 4:** Mean Patient satisfaction score (PSS) for visible scars

PSS	Three port	Four port	P- value
Day of discharge	6.3	5.1	0.000
One week follow-up	8.7	8.1	0.55

**DISCUSSION**

A total of 30 patients were included in the present study and were broadly divided into two study groups with 15 patients in each group. Mean duration of hospital stay among subjects of the three port group and four port groups was 1.5 and 1.3 days respectively. 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. 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. 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.<sup>9</sup>

Non- significant results were obtained while comparing the mean duration of hospital stay among subjects of the study group and control group (P- value > 0.05). Non-significant results were obtained while comparing the mean VAS at different port sites. Mean VAS was significantly higher for the subjects of the four port group on the day of discharge and after one week of follow-up. Al-Azawi D et al compared the three-port and four-port LC in acute (AC) and chronic cholecystitis (CC). The

medical records of 495 patients who underwent LC between September 1999 and September 2003 were reviewed. Variables such as complications, operating time, conversion to open procedure, hospital stay, and analgesia requirements were compared. Two hundred and eighty-three patients underwent three-port LC and 212 patients underwent four-port LC. In total, 163 (32.9%) patients were diagnosed with AC and 332 (67.1%) with CC by histology. There was no statistical difference between the three and four-port groups in terms of complications, conversion to open procedure ( $p = 0.6$ ), and operating time ( $p = 0.4$ ). Patients who underwent three-port LC required less opiate analgesia (pethidine) than those who underwent four-port LC ( $p = 0.0001$ ). The hospital stay was found to be related to the amount of opiates consumed ( $p = 0.0001$ ) and was significantly shorter in the three-port LC group ( $p = 0.005$ ). Three-port LC is a safe procedure for AC and CC in expert hands.<sup>10</sup> Significant results were obtained on comparing the mean PSS on the day of discharge among the subjects of both the study groups ( $P$ -value  $< 0.05$ ). Non-significant results were obtained on comparing the mean PSS after one week follow-up among the subjects of both the study groups ( $P$ -value  $> 0.05$ ). Trichak S 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,  $p = 0.024$ ). The three-port technique is as safe as the standard four-port one for LC.<sup>11</sup>

## CONCLUSION

The three port technique is as safe as the standard four port for laparoscopic cholecystectomy. At the same time, it is also recommended that the surgeon should not

hesitate to put fourth port to ensure safe completion of Surgery. However; further studies are recommended.

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