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Original Research Article.

Evaluation of Efficacy of Three-Port V/s Standard Four-Port Laparoscopic Cholecystectomy in Patients of Symptomatic Cholelithiasis: An Institutional Based Study

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ABSTRACT

Background: Laparoscopic cholecystectomy is a minimally invasive surgical procedure for removal of a diseased gallbladder. Traditional LC is performed using four-port technique. Reducing the size or number of ports did not affect the safety of the procedure and further enhanced the advantages of laparoscopic over open cholecystectomy. Hence; we carried out the present investigation to compare the efficacy of three-port v/s standard four-port laparoscopic cholecystectomy in patients of symptomatic cholelithiasis.

Materials & Methods: The present study included 40 patients who were scheduled to undergo elective laparoscopic cholecystectomy. The patients were divided into two groups with 20 patients in each group: Group A: Three-port group, Group B: Four-port group. All operations will be performed by specialist laparoscopic surgeons under general anesthesia. Assessment of the pain score by using a 10-cm visual analog scale (VAS) for each dressing site and the overall pain after 6 hours was done. All the results were compiled and analyzed by SPSS software.

Results: Common symptoms seen in patients of the present study were pain, vomiting, dyspepsia and fever. Significant results were obtained while comparing the mean duration of surgery, VAS and days of analgesic tablet required in between the two study groups.

Conclusion: It is safer to use three-port technique with equal efficacy in comparison to conventional four-port technique in patients undergoing LC.

Key words: Cholelithiasis, Four-Port, Laparoscopic Cholecystectomy, Three-Port.

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INTRODUCTION

Laparoscopic cholecystectomy is a minimally invasive surgical procedure for removal of a diseased gallbladder.[1] Laparoscopic removal is now the procedure of choice when cholecystectomy is indicated. 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.[2,3]

Traditional LC is performed using four-port technique. Reducing the size or number of ports did not affect the safety of the procedure and further enhanced the advantages of laparoscopic over open cholecystectomy. These modifications actually reduced the pain and analgesia requirement. Three trocars and even two trocars were used to perform LC, as has using mini-instruments, authors of these new techniques claimed that these techniques took a similar time to perform and caused less postoperative pain than the standard laparoscopic cholecystectomy.[4-6]

Trichac in his prospective trial addressed the safety and the advantages of the three port technique in terms of analgesia requirement, though he found no improvement in postoperative hospital stay, his work and other published series on this technique were carried out only on elective patients. In fact the procedure was practiced on cases of acute cholecystitis as well but not reported.[7,8]

Hence; we carried out the present investigation to compare the efficacy of three-port v/s standard four-port laparoscopic cholecystectomy in patients of symptomatic cholelithiasis.

MATERIALS & METHODS

The present study was conducted in the Department of Surgery, Rajshree Medical Research Institute & Hospital, Bareilly, Uttar Pradesh (India) and included 40 patients who were scheduled to undergo elective laparoscopic cholecystectomy.

The patients were divided into two groups with 20 patients in each group:

- **Group A:** Three-port group
- **Group B:** Four-port group

Patients were randomized to receive either 3-port laparoscopic cholecystectomy (3-port group) or conventional laparoscopic cholecystectomy (4-port group) in a synchronized manner. All operations will be performed by specialist laparoscopic surgeons under general anesthesia. Written and informed consent will be obtained from all the patients for the randomization and procedure.

Inclusion Criteria

- Indications for elective laparoscopic cholecystectomy.
- Patients with 18 years of age and above

Exclusion Criteria

- Empyema gall bladder.
- Patients who are not fit for laparoscopic surgery.

Assessment of the pain score by using a 10-cm visual analog scale (VAS) for each dressing site and the overall pain after 6 hours was done. All the results were compiled and analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

Table 1: Demographic and clinical data

Parameter		Group A	Group B
Number of subjects		20	20
Mean age (years)		43.1	44.5
Gender	**Males**	8	7
	Females	12	13
Symptoms	**Pain**	17	16
	Vomiting	8	7
	Dyspepsia	5	6
	Fever	3	4

Table 2: Patient outcome among the subjects of the two study groups

Outcome of patients	Group A	Group B	P- value
Time of surgery (minutes)	48.3	62.4	0.01*
Days of analgesic Tab required	3.5	4.2	0.01*
Success rate (%)	90	95	0.54
VAS score (1- 10)	2.3	3	0.03*

*: Significant

RESULTS

A total of 40 subjects were included in the present study, among which 20 belonged to group A and the remaining 20 belonged to group B. Mean age of the subjects of group A and group B was 43.1 and 44.5 years respectively. There were 8 males and 12 females in group A, while there were 7 males and 13 females in group B. Common symptoms seen in patients of the present study were pain, vomiting, dyspepsia and fever. Mean time of surgery of the subjects of group A and group B was 48.3 minutes and 62.4 minutes respectively. Success rate of the subject of the group A and group B was 90 and 95 percent respectively. VAS score among subjects of group A and group B was 2.3 and 3 respectively. Significant results were obtained while comparing the mean duration of surgery, VAS and days of analgesic tablet required in between the two study groups.

DISCUSSION

In the present study, a total of 40 subjects were included in the present study, among which 20 belonged to group A and the remaining 20 belonged to group B. Mean age of the subjects of group A and group B was 43.1 and 44.5 years respectively. There were 8 males and 12 females in group A, while there were 7 males and 13 females in group B. 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. 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 for the 4-port group (P=0.04) and less pain at port sites. Overall pain score, analgesia requirements, hospital stay, and patient satisfaction score 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.[9]

In the present study common symptoms seen in patients of the present study were pain, vomiting, dyspepsia and fever. Mean time of surgery of the subjects of group A and group B was 48.3 minutes and 62.4 minutes respectively. Success rate of the subject of the group A and group B was 90 and 95 percent respectively. Al-Azawi D et al compared the three-port and four-port LC in acute (AC) and chronic cholecystitis (CC). 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. Three-port LC is a safe procedure for AC and CC in expert hands. The procedure offers considerable advantages over the traditional four-port technique in the reduction of analgesia requirements and length of hospital stay.[10]

In the present study, VAS score among subjects of group A and group B was 2.3 and 3 respectively. Significant results were obtained while comparing the mean duration of surgery, VAS and days of analgesic tablet required in between the two study groups. Li L et al conducted a network meta-analysis (NMA) to compare different kinds of laparoscopic cholecystectomy [LC] (single port [SPLC], two ports [2PLC], three ports [3PLC], and four ports laparoscopic cholecystectomy [4PLC], and four ports mini-laparoscopic cholecystectomy [mini-4PLC]). PubMed, the Cochrane library, EMBASE, and ISI Web of Knowledge were searched to find randomized controlled trials [RCTs]. Direct pair-wise meta-analysis (DMA), indirect treatment comparison meta-analysis (ITC) and NMA were conducted to compare different kinds of LC. They included 43 RCTs. The risk of bias of included studies was high. DMA showed that SPLC was associated with more postoperative complications, longer operative time, and higher cosmetic score than 4PLC, longer operative time and higher cosmetic score than 3PLC, more postoperative complications than mini-4PLC. Mini-4PLC was associated with longer operative time than 4PLC. ITC showed that 3PLC was associated with shorter operative time than mini-4PLC, and lower postoperative pain level than 2PLC. 2PLC was associated with fewer postoperative complications and longer hospital stay than SPLC. NMA showed that SPLC was associated with more postoperative complications than mini-4PLC, and longer operative time than 4PLC. The rank probability plot suggested 4PLC might be the worst due to the highest level of postoperative pain, longest hospital stay, and lowest level of cosmetic score.[11]

CONCLUSION

Under the lights of above obtained data, the authors conclude that it is safer to use three-port technique with equal efficacy in comparison to conventional four-port technique in patients undergoing LC. However; further research is recommended.

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