

A Comparative Study of Feasibility of Three Port Laparoscopic Cholecystectomy Over Four Port Laparoscopic Cholecystectomy

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Abstract: *Background: Improvement of Laparoscopic Cholecystectomy (LC) technique in terms of reduction in size and number of ports is being tried to improve patient satisfaction and outcome. Present study was conducted to evaluate and compare the safety outcome and advantages of three-port and four-port LC. Methods: This prospective study included 90 patients presenting with symptomatic gall stone disease or gall bladder polyp more than 1cm at base. Patients with jaundice and choledocholithiasis were excluded. Patients were divided into two groups: A and B, who underwent three-port and four-port LC respectively. Outcomes of the two groups were assessed and compared in terms of duration of surgery, intra-operative and post-operative variables including rate and nature of complications, conversion rates, post-operative pain, duration of hospital stay, return to work and cosmetic outcome. Results: Statistically significant difference was found between the two groups in terms of Visual Analogue Score for pain at 6 and 24 hours, analgesic requirement, duration of hospital stay and return to work; all being less in the threeport LC group. Cosmetic outcome as perceived by patients was also better in the three-port group. Results of other variables were comparable in the two groups. Conclusions: Three-port procedure is safe and appears to be more cost effective than four-port LC. If LC is performed by an experienced surgeon, it can be started with three ports, if required, a fourth port can be inserted.*

Keywords: Four-port, Laparoscopic cholecystectomy, Three-port

1. Introduction

Diseases of the Gallbladder constitute a majority of digestive tract disorders. Among these, gall stone disease is the most common biliary pathology. It has been noted that people living in the Indo-Gangetic belt are highly susceptible to the formation of gall stones, so much so that cholecystectomy is the single most commonly performed surgical procedure in this part of the world. The first laparoscopic cholecystectomy (LC) was performed in 1987 by Phillip Mouret and later established by Dubois and Perissat in 1990^{1,2}. 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.³⁻⁷ It has been argued that the fourth trocar may not be necessary, and laparoscopic cholecystectomy can be performed safely without using it. Cooperative manipulation of the surgical instruments is very important for this procedure, for exposing Calot's triangle and dissecting the gallbladder from the gallbladder bed when using the 3-port techniques. Several studies have reported that 3-port laparoscopic cholecystectomy is technically possible.^{3,8,9} Further, in the era of laparoscopic surgery, less postoperative pain and early recovery are major goals to achieve better patient care and cost effectiveness. Several studies have demonstrated that less postoperative pain is associated with a reduction in either size or number of ports.^{4,8-10}

2. Materials and Method

Present study was a prospective comparative study conducted in Department of Surgery, S.N. Medical College, Agra. Duration of study was 2 year (August 2018- August

2020). Approval was obtained from institutional ethical committee for present study.

Inclusion Criteria

- All patients with symptomatic gall stone disease (Cholelithiasis, acute & chronic cholecystitis).
- Patients presenting with a calculous cholecystitis.
- Age > 18 years
- American Society for Anaesthesiology (ASA) class I and class II patients.

Exclusion Criteria:

- Choledocholithiasis
- Carcinoma of gall bladder
- Perforated gall bladder
- Previous abdominal surgeries

Written informed consent was taken from relatives of patients for participation in present study. Demographic, clinical details collected from history & clinical records available. All patients were managed as per standard operative protocols of department. The patients were randomized into two groups. Group A was managed using Three port Laparoscopic cholecystectomy and Group B was managed using Standard four port Laparoscopic cholecystectomy. Statistical analysis was done.

3. Results

40% of the operated patients were males and 60% females in three port group and 36% of the operated patients were males and 64% females in four port group.

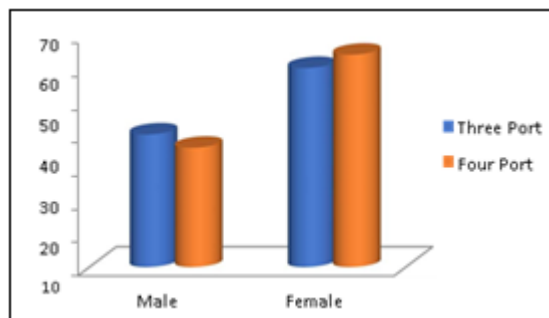
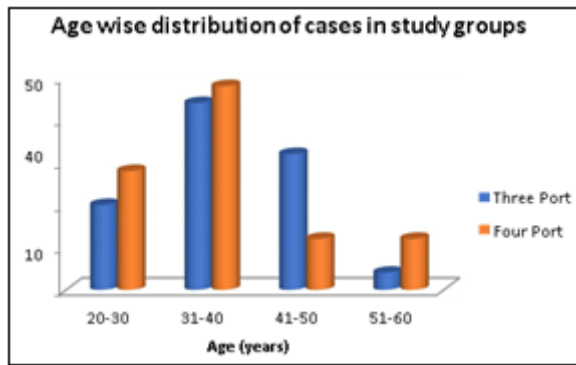


Figure: Sex wise distribution of cases in study groups

Significant difference in the conversion rate was found in the two groups. 3 patients in the Three Port were converted to the four port group due to various reasons.

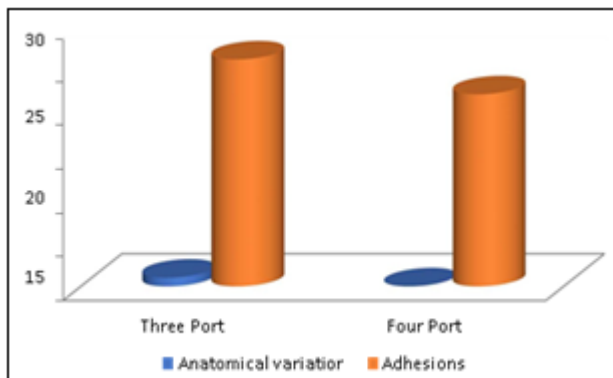


Figure: Intraoperative findings of anatomical variations, adhesions

Out of these 3 patients, technical difficulty was encountered in two patients intra operatively and in one patient, anatomical variation in form of long and low inserting duct was noticed due to which these cases were converted to four port technique.

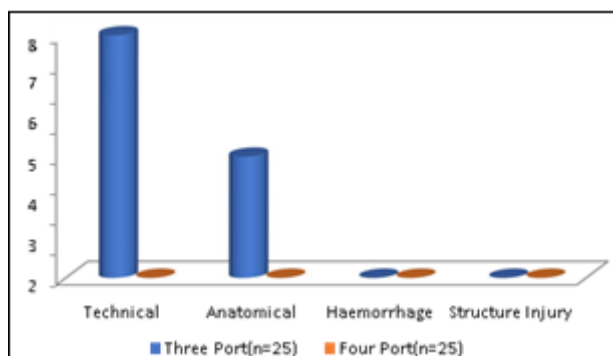


Figure: Reason for conversion in study groups

No statistically significance rise in surgical complications occurred in the patients operated by Three Port technique as compared to four port surgery. One of the patients who underwent Three Port cholecystectomy had Liver injury while one patient who underwent four port cholecystectomy had vessel injury and liver injury.

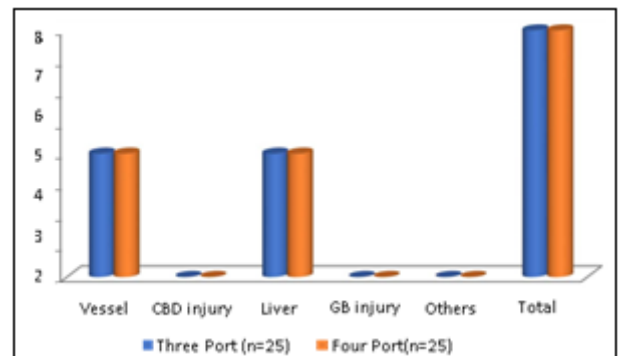


Figure: Comparison of complication in study groups

Median time required to complete cholecystectomy by Three Port technique was significantly lower than that required for four port cholecystectomy.

Duration of postoperative pain experienced more in four port group than three port. Average duration of postoperative pain as deduced from requirement of analgesic was 6-24 hours.

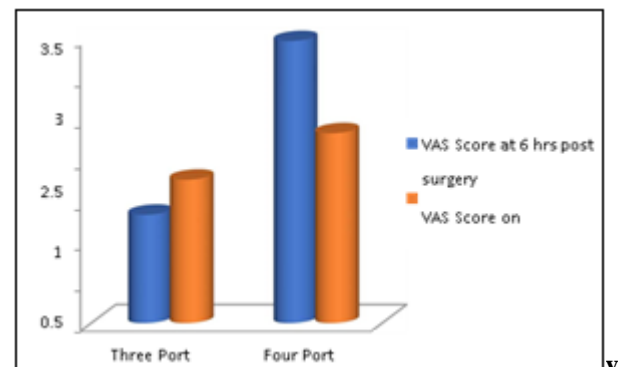


Fig: Comparison of postoperative pain score in study groups at 6 hrs after surgery and on postoperative day 1

Postoperative complaints of nausea occurred in more in four port cholecystectomy and vomiting occurred in almost equal number of patients in the two groups. 2 patients who underwent Three Port Cholecystectomy and 3 patients who underwent Four port Cholecystectomy experienced shoulder pain. Other complaints like urinary retention, headache occurred in 1 case who underwent Three Port Cholecystectomy and 1 case who underwent Four port Cholecystectomy.

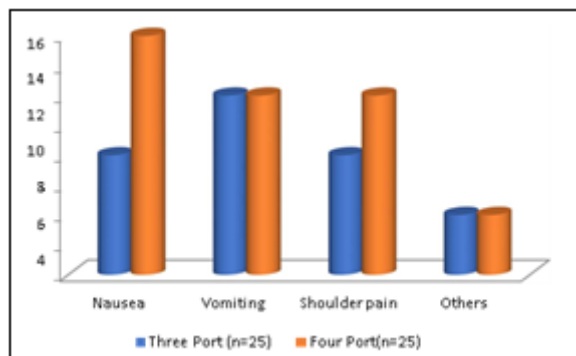


Figure: Postoperative complaints in study groups

Patients operated by Three Port technique had a postoperative hospital stay of mean 2.12 days, less as operated by four port technique.

4. Discussion

Out of 25 patients operated by Three Port surgery 10 were males and 15 were females. In the four port group distribution was 9 males and 16 females. Majority patients were in 31-40 age group. The mean age of patients in Three Port group was 46.4 ± 8.53 years and in Four Port group was 45.24 ± 10.34 years. In our study the distribution was also female preponderance. The intra operative observations of anatomy were made. Peri gall bladder adhesions were present in 26% patients in Three Port and 22% patients in four port group. One patient had anatomical variation in the form of long and low inserting cystic duct. The conversion rate for Three Port cholecystectomy was 12%. In a study conducted by P.P Rao et al (2008) 20 Three Port surgery using Triport a conversion rate of 15% was seen in another study done by Sang Kuon Lee et al (2009) 21 a conversion rate of 13% was observed. While the conversion rate of Three Port surgery in our study was significantly higher than that of four port surgery it matches fairly with the conversion rates in other studies.

Conclusion

In our study the following conclusions were made

- 1) Technical difficulty and anatomic variation leading causes of conversion from Three Port to four port cholecystectomy
- 2) No statistically significant in intraoperative and post operative complications occurred in the Three Port surgery as compared to four port surgery.
- 3) Time required for Three Port surgery is significantly lower than four port cholecystectomy.
- 4) Degree of postoperative pain is less in 3 port group as compared to 4 port.
- 5) Length of postoperative hospital stay for Three Port cholecystectomy is less as for four port cholecystectomy.
- 6) The sample size in our study is small to make solid conclusion. The procedure can be selectively and judiciously performed by surgeons trained in regular laparoscopic surgery. Also the threshold for conversion should be low in learning phase.

References

- [1] Dubois F, Icard P, Berthelot G, Levard H. Coelioscopic cholecystectomy: preliminary report of 36 cases. *Ann Surg.* 1990; 211:60–62.
- [2] Litynski GS. Profiles in laparoscopy: Mouret, Dubois, and Perissat: the laparoscopic breakthrough in Europe (1987–1988). *JSL.* 1999;3(2):163–167.
- [3] Trichak S. Three-port vs standard four-port laparoscopic cholecystectomy. *Surg Endosc.* 2003;17(9):1434–1436.
- [4] Poon CM, Chan KW, Lee DW, et al. Two-port versus four port laparoscopic cholecystectomy. *Surg Endosc.* 2003;17(10): 1624–1627.
- [5] Sarli L, Iusco D, Gobbi S, Porrini C, Ferro M, Roncoroni L. Randomized clinical trial of laparoscopic cholecystectomy performed with mini-instruments. *Br J Surg.* 2003;90(11):1345–1348.
- [6] Tagaya N, Kita J, Takagi K, et al. Experience with three-port laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg.* 1998;5(3):309–311.
- [7] Endo S, Souda S, Nezu R, et al. A new method of laparoscopic cholecystectomy using three trocars combined with suture retraction of gallbladder. *J Laparoendosc Adv Surg Tech A.* 2001;11(2):85–88.
- [8] Slim K, Pezet D, Stencl J Jr., et al. Laparoscopic cholecystectomy: an original three-trocar technique. *World J Surg.* 1995; 19(3):394–397.
- [9] Bisgaard T, Klarskov B, Trap R, Kehlet H, Rosenberg J. Pain after microlaparoscopic cholecystectomy. A randomized doubleblind controlled study. *Surg Endosc.* 2000;14(4):340–344.
- [10] Leggett PL, Bissell CD, Churchman-Winn R, Ahn C. Threeport microlaparoscopic cholecystectomy in 159 patients. *Surg Endosc.* 2001;15(3):293–296.