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A Comparative Clinical Study on the Outcomes of 3 ports Versus 4 Port Laparoscopic Cholecystectomy among Patients Presenting with Symptomatic Gall Stones

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ABSTRACT

Background: Laparoscopic cholecystectomy (LC) is first line treatment of symptomatic gall stone diseases. We have compared standard (four port) laparoscopic cholecystectomy with three port laparoscopic cholecystectomy. Objective of this study was to compare the technical feasibility, safety and benefits of three port laparoscopic cholecystectomy over the conventional four port laparoscopic cholecystectomy. **Methods:** A comparative study conducted in Jaipur Golden Hospital from December 2015 to May 2017, included a total of 82 patients (41 in each group) who underwent laparoscopic cholecystectomy. **Results:** In both group intraoperative findings were similar. There was no post-operative mortality noted in our study. In 3 port group the time taken for operation was more compared to 4 port group. Intra op and post op complications were comparable in both groups.3 port laparoscopic cholecystectomy reduces the post op analgesia requirement and gives better cosmetic outcome. **Conclusion:** 3 port laparoscopic cholecystectomy is technically feasible, its safe, require less analgesics post operatively, due to less number of port it gives less post-operative scar so better cosmetic outcome. So we recommend 3 port laparoscopic cholecystectomy as an alternative to conventional (4 port) laparoscopic cholecystectomy.

Keywords: Laparoscopic cholecystectomy (LC), 3 port, 4 port, VAS (Visual analogue scale) score, pneumoperitoneum.

INTRODUCTION

Biliary disease constitutes the major portion of digestive tract disorder. Among this cholelithiasis being the most common, that causes general ill health and requires surgical intervention for total cure. Prevalence of cholelithiasis in India is more in females then in males.[1] Laparoscopic Cholecystectomy has been the gold standard in diagnosis and treatment of surgical cases.[2]

The use of laparoscopy has clearly replaced open cholecystectomy in the management of cholelithiasis. Laparoscopic surgeries was introduced in order to reduce the scarring, decrease the incisional pain, reduce the number of days of hospitalization and faster functional recovery.[3] Several modifications have been introduced to laparoscopic cholecystectomy in number of ports that is being used to mobilize the gall bladder. Several studies have shown that if number of port decreased or size of port reduced patient will have less post-operative pain,[4-10] and it does not affect the safety of the procedure.[11]

Traditionally Laparoscopic cholecystectomy is performed using 4 port techniques. 4th port which is used to grasp the fundus of gall bladder by pulling it upwards and outward to expose the Calot's triangle, as it played a very minor role in operation and so they decided to omit the most lateral trocar and perform the operation with 3 ports for better surgical outcome.

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Aim

To study and compare outcomes of 3 port versus 4 port laparoscopic cholecystectomy among patients presenting with calculus cholecystitis.

MATERIALS AND METHODS

This study was conducted in Department of General and Minimal Access Surgery, Jaipur golden Hospital, Rohini, New Delhi.

82 patients who are suffering from Gall stone disease are selected between December 2015 to May 2017 after prior approval and informed consent, we selected patients of both sex, age >18 years, acute or chronic gall stone disease. We excluded patients who underwent upper GI surgery recently, having coagulopathies, suspected malignancies and all those who are not fit for general anesthesia.

Materials used are – Laparoscopic instruments used in Jaipur Golden Hospital.

Methodology

All patients informed about laparoscopic cholecystectomy and visual analogue scale (VAS)

ranging from 0-10 with 0 for no pain, 1 for mild pain and 10 being most severe pain.

Selection of the surgical procedure was done randomly by lottery method into 3 port or 4 port LC. Patients were asked to empty urinary bladder before moving to operation theatre. All patients were given Injection Ceftriaxone 1gm IV before the procedure (after test dose). All were operated under general anesthesia. A nasogastric tube was inserted and contents of stomach aspirated. Veress needle was inserted through a stab incision in the supra umbilical region, pneumoperitoneum created. Umbilical and epigastric ports created under vision. In 3 port group another port of 5mm in right subcostal region mid-clavicular line was created under vision and in case of 4 port group other two ports (5mm each) in right mid-clavicular line and in right anterior axillary line. Cystic artery and duct skeletonized. Junction of cystic artery and CBD identified, and then 2 proximal and 1 distal liga clips were applied on artery and duct and divided in between the clips. Gall bladder dissected and extracted through epigastric port. Sub-hepatic drain was placed in selected cases. Hemostasis achieved and port site were closed. Operative time from onset of procedure (supraumbilical incision) to the closure of wound was noted down. Intra-operative complications such as slippage of clip of cystic artery, bleeding from cystic artery, Injury to common bile duct or hepatic artery or bowel injury was noted and compared in both groups. Non transparent surgical adhesive tape was applied to the standard four port sites at the end of surgery in both groups. All wound dressings were kept in place until the first follow up after one week, thus all patients were blinded to the type of surgery they underwent. Post op period all patients were given Diclofenac 50 mg every 8th hourly. Post-operative pain was assessed after 6 hours and 24 hours, using unscaled Visual Analogue Scale (VAS) by an independent surgeon who did not know the type of surgery that patient underwent .Length of hospital stay calculated from date of admission to date of discharge. Resumption of normal routine activity and cosmetic benefits assessed during follow up meetings after one week and thereafter up to 1 month.

Statistical Methods

The quantitative variables are expressed in terms of mean±sd and compared between groups using unpaired t-test and within groups across follow-ups using paired t-test. Qualitative variables are expressed as frequencies/percentages and compared between groups using Chi-square test. A p-value < 0.05 is considered statistically significant. The data is tabulated using MS Excel package while statistical analysis is performed on SPSS version 16.0 software. The incoming patients randomly assigned to both groups by lottery method just prior to surgery in two groups.

RESULTS

Table 1: Comparison between Number of Ports and Duration of Surgery (MINS)

No. of ports used→	3-port Mean	±sd	4-port Mean	±sd	p-value
Duration (mins)	74.76	±25.62	57.07	±17.53	<0.001

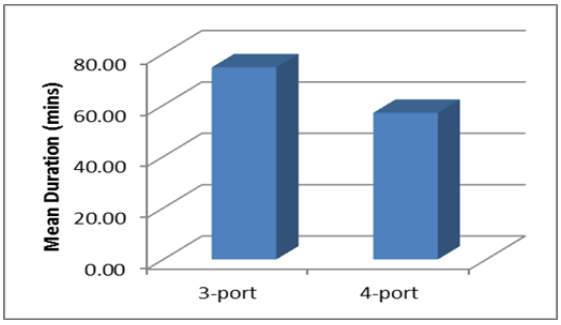

Figure 1: Mean Duration (Minutes) and Number of Ports

Table 2: Comparison between Vas at Different Durations and Number of Ports Being Used

No. of ports used→	3-port		4-port		p-value
VAS Score at ↓	Mean	±sd	Mean	±sd	
6 hours	4.90	±0.92	5.80	±0.68	<0.001
24 hours	2.78	±0.72	3.24	±0.58	0.001
p-value (6 hours versus 24 hours)	<0.001		<0.001		

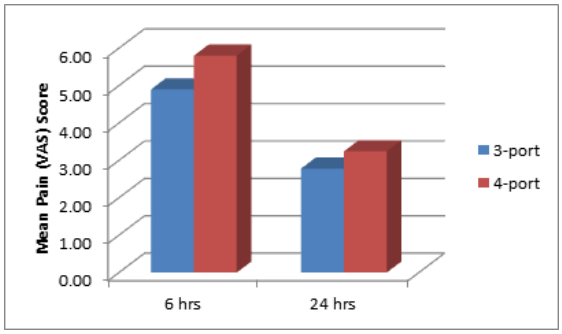

Figure 2: Mean Pain (Vas) And Number of Ports

All 82 patients were screened for inclusion and exclusion criteria, equal numbers in each group (N=41), 72% were female and 28% were male patients. Mean age of participants is 47.73SD14.6 (years). 24.39% patients were in age group 30-40 years followed by 21.95% in 40-50 and 60-70 years. 4 port technique is most commonly used between the age group of 30-40 and 50-60years, whereas 3 port was most commonly used in between 60-70 years. The mean duration in 3 port group was 74.76SD25.62 (minutes) which is significantly

greater than that of 4 port group where it is 57.07SD17.53 (minutes) (p-value < 0.001).

Intra op complications, hospital stay and return of normal activity in both groups are comparable. On comparing Post op pain in both group, there is significant reduction in the VAS score at 24 hours in comparison to 6 hours within both the groups. VAS score at 6 hours as well as 24 hours is significantly higher in 4 port group in comparison to 3 port group.

DISCUSSION

On comparing 3 ports versus 4 ports LC on various outcome measures, significant changes were seen in duration of surgery and postop pain among the groups, whereas no changes were seen in intraoperative complications, hospital stay, resumption of normal routine activity. Time taken for the operation was more in 3 port group as compared to 4 port group [Table 1 & Figure 1], 3 port laparoscopic cholecystectomy is slightly difficult to perform in long gall bladders with long peritoneal fold because the fundus of the gall bladder repeatedly fell towards the area of dissection in Calot's triangle which was consistent with previous studies done by Trichak S et al and Kumar M et al,[9,12] but in contrasts the study conducted by Vivek Pahuja et al, the duration of surgery was similar in both the groups but the result was statistically insignificant.[13]

Post op pain was less in 3 port group compared to 4 port group, which was significant at 6 hours and 24 hours. As in 3 port group skin stab wounds are less compared to 4 port group, our finding are in series with previous studies.[9,12,14-16] [Table 2 & Figure 2]. Intra-op complications, hospital stay and resumption of normal routine activity results are not significant in both groups as suggested by previous studies.[12-16] Post-operative cosmetic outcome was better in 3 port group similar to study done by Novitsky YW et al.[3]

CONCLUSION

3 Port LC is technically feasible, safe, achieves good results, similar to those achieved by standard 4 port LC with less post-operative analgesic requirement, less number of scars and better cosmetic appearance. So we recommend 3 port LC as an alternative to conventional (4 port) LC.

There is no documented outcome measure to check for cosmetic benefits and resumption of normal activity post-operative LC patients, so a scale can be design to measure these outcomes.

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