

A comparative study between two port and four port laparoscopic cholecystectomy

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Abstract

Aims: To study the feasibility and hence practical utility of Two Port Laparoscopic Cholecystectomy as compared to conventional/four port laparoscopic cholecystectomy. Also to study the indication for putting additional ports during Two Port Laparoscopic Cholecystectomy and to study selection criteria for successful two port Laparoscopic Cholecystectomy.

Key Words: laparoscopic cholecystectomy.

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INTRODUCTION

Laparoscopic cholecystectomy (LC) is still the gold standard for the removal of gall bladder. Though conventional four port laparoscopic cholecystectomy is still being used widely, laparoscopic surgeons all around the world are making modifications and using least possible ports required for it. Single Incision Laparoscopic Surgery (SILS) though require only single functional port with better cosmesis and least pain in postoperative period its longer duration of learning curve and difficulties during surgery like clashing of instruments and loss of angulation makes it less acceptable amongst laparoscopic surgeon. So using minimal possible ports for doing laparoscopic cholecystectomy is better option than SILS. Hence this study was conducted to see the feasibility of two port laparoscopic cholecystectomy over four port laparoscopic cholecystectomy.²

MATERIALS AND METHODS

Study Setting: This study was conducted in a tertiary care and teaching hospital which covers both urban as well as rural population.

Study Design: The following study was hospital based randomized control trial.

Study Population: All the patients with gall bladder stone were considered within study.

Study Period: Study was conducted from July 2014 to November 2016

Sampling and sample size: The patients included in study were admitted on OPD basis for elective laparoscopic cholecystectomy. All the patients were admitted under single surgical unit for the ease of data collection and observation and were operated by team of 2 laparoscopic surgeons to decrease the bias and confounding factors.

Inclusion Criteria: All consenting patients with symptoms or diagnosed as following

- Cholelithiasis
- Chronic Cholecystitis

Exclusion Criteria: PATIENT WITH

- Gall Bladder Carcinoma
- Acute Cholecystitis
- Other Diseases Of Gall Bladder
- Unwillingness For Surgery And Unfit Patients

Out of 53 patients, admitted with cholelithiasis, 7 patients refused to get included in this study, so remaining 46 patients were divided into two groups, Group A for

patients undergoing Two port Laparoscopic Cholecystectomy and Group B for patients undergoing Conventional four port laparoscopic Cholecystectomy.

Data Collection

All the patients were admitted electively on OPD basis, patients were informed and well explained regarding study and subjected to preoperative investigation and documentation of patients were done in specially made proforma where study variable has been collected in following manner, Baseline data like demographic data, laboratory and radiological investigation, interventional data like Intraoperative findings and any special reference and end line data collection like post operative course in ward were noted.

Statistics and other analysis

Final data was tabulated and statistics were used to compare the Two port laparoscopic cholecystectomy group with four port laparoscopic cholecystectomy group. We applied Unpaired-t Test for comparing various factors in the study and level of significance has been found.

DISCUSSION

Present study was mainly carried out to see the feasibility of two port laparoscopic cholecystectomy in tertiary care teaching institute with routine laparoscopic instrument and without any extra or added disadvantage over the conventional laparoscopic cholecystectomy, along with comparing both the procedure in different outcomes. Also to find out suitable criteria for case selection for Two port laparoscopic cholecystectomy.

A: Demographic Parameter

In present study Mean age group of study subject was found to be 43.7 years. While mean age of study subject in two port group was found to be 34.5 yr whereas mean age in conventional laparoscopic surgery was found to be 52.5 yr. This difference was by chance as randomisation was done but multiple previous studies like Safdarjung study by *SreenivaS et.al* (Year: 2014) and Egyptian study by *Ayman M Elwan et.al* (Year: 2013) found no significance in age group distribution among these study group. In present study we found no sex difference amongst study population; same observations were found in study of *Sreenivas S et.al* (Year: 2014). While in case *Ayman M Elwan et al* (Year: 2013) found M: F ratio of 1:2. So we conclude that there is no significance difference in sex ration among both the groups i.e. two port and four port laparoscopic cholecystectomy. In present study Educational status and marital status also noted which was 78.26% and 83% respectively but these factors were not contributory to the patient’s outcome.^{3,4}

B: Clinical Assessment

As present study also trying to find out patient suitability for the procedure of two port laparoscopic

cholecystectomy from observed results it has found that patients selection is important for better outcome and reducing Intraoperative complications. Patient with cholelithiasis with no other evidence of acute disease are better candidates for two port laparoscopic cholecystectomy procedure. Also from observing demographic data, young patient gives better operative outcome in Two port Laparoscopic cholecystectomy group, we would like to propose that young patient are better suited for the two port lap cholecystectomy with better procedural outcome along with lesser complication. In present study mean BMI (kg/m²) of group A patients is 20.43 as compared to 22 in group B patients. Similarly in study by *Sreenivas S et.al* (Year: 2014), BMI of Two port Group was 21.9 and in four port group it was 22.1. So we conclude that patient with less BMI are better candidate for two port laparoscopic cholecystectomy with better outcome and less operative difficulties. In *Ayman M Elwan et al* (Year: 2013) Mean BMI of Two port and four ports were comparative to our study.^{3,4} In our study, Group A - 4 patients (17.39%) and Group B- 6 patients (26.08%) were found to have gall bladder wall thickness ≥4mm on Ultrasonography, in Group A increased gall bladder wall thickness leads to difficulties during suture retrieval while in Group B as one port was specifically dedicated for grasping gall bladder increased thickness of wall had no any effect in this patients.

Table 1: preoperative data and comparison

	Group A	Group B	P value
BMI	20.43±1.590	22.00±2.714	0.0214*
GB WALL THICKNESS	3.161±0.4560	3.396±0.5950	0.1403(NS)
ASSOCIATED PANCREATIC PATHOLOGY	1.087±0.2881	1.435±0.5059	0.0064**
ASSOCIATED LIVER PATHOLOGY	1.087±0.2881	1.391±0.4990	0.0149*

NS as non significant

So from above observation we can say that increased gall bladder wall thickness may have increased Intraoperative difficulties during two port laparoscopic cholecystectomy. Similarly associated liver pathology (P value-0.149) or pancreatic pathology (P value-0.0064) was observed. Comparing this finding with final outcome in both group we encountered more operative difficulties in group A, like difficult handling of gallbladder or difficult dissection due to surrounding adhesion as liver and pancreatic pathology are already present, compared to Group B. From this observation we would like to propose that patient without increased Gallbladder wall thickness (i.e. <4mm) or without liver and pancreatic/CBD pathology are better candidates for two port laparoscopic cholecystectomy. However in other studies like *Sreenivas S et.al*, preoperative

ultrasonography in every patient was performed just as confirmatory tool for finding out cholelithiasis and excluding any other pathology, but no correlation has been established between preoperative ultrasonography and patient selectiveness for surgery.^{3,4}

C: Intraoperative Finding

In current study operative difficulties were encountered in few patients, and on comparing both group, difficulty score is comparable. Accessibility of port was easy in 98% patients but Intraoperative dissection due to factor like adhesion or difficult anatomy was encountered in around 39% overall patient. Other Intraoperative factor like bleeding, bile spillage and stone spillage and viscus injury which are common during laparoscopic surgeries, are encountered less in this study. In our study Intraoperative significant blood loss, either from liver bed or due some vessel injury, in group A was 13.05% while in group B it was 26.09 %, with P value -0.1596(not significant).

Table 2: Intraop complication

	Group A	Group B	P value
Intraop bleeding	1.130±0.3444	1.304±0.4705	0.1596(NS)
Bile spillage	1.087±0.2881	1.478±0.5108	0.0025(HS)
Stone spillage	1.043±0.2085	1.043±0.2085	1.0000(NS)
Intraop viscus perforation	1.000±0.0000	1.000±0.0000	--

HS: Highly Significant; NS: Non Significant

Comparing it with Safdarjung study by *SreenivaS et.al*. Intraoperative complication like bleeding from liver bed four ports laparoscopic cholecystectomy (4.16%), two port mini laparoscopic cholecystectomy (5.45%) were not significantly different between both groups. Also same findings were noted in study done by *Say June Kim, M.D et.al* from Korea. While incidence of Intra-op stone spillage were comparative in both groups. In our study Bile spillage during operative procedure due accidental injury to bile duct or slippage of clip was more in group B (47.83%) as compared to group A (8.7%), P value-0.0025** this was due to occurrence of CBD injury in patient with sickle cell disease with dense adhesion, accidental bile duct injury occurred while dissection but as this was four port surgery it was handled immediately without any need of conversion. If this scenario had happen in Two port group it could have been difficult to handle and may required extra port for handling the situation. While in Safdarjung study by *Sreeniva S et.al* bile spillage in Four port LC is (27.08%), Two port LC (20%) were not significantly different between both groups.^{65,66,89-93} Conversion of surgery i.e. from two ports to three or four port and Conversion to open surgeries were observed due to the above mentioned complication or due difficult anatomy is noted in many time, In our study out of 23 patients in group A, 5(21.73%) patient

required conversion of primary procedure in the form of use of extra port, conversion was mainly required for Intraoperative complication like bleeding and bile spillage, and due to dense adhesions in one patient. While Group B patient did not require conversion i.e. no open cholecystectomy has been done. While in Safdarjung study by *Sreeniva S et.al*. One patient from two port mini LC group required open cholecystectomy (0.18%), and three patients needed conversion to four ports LC (5.45%). The conversion to open cholecystectomy was required for a CBD injury, while the conversions to four ports LC were due to difficult anatomy and adhesions around the GB fossa. In the Four port LC group, two patients were converted to open cholecystectomy (4.16%) for dense adhesions around the gallbladder Duration required for completion of procedure is comparable for both the groups.^{3,4,5}

D: Other Post Operative Factor

In present study mean time required for surgery in group A patients was 54.91min and in group B 55.52min, So from this study Duration required for surgeries in both the groups were comparable with overall mean time required was 55.29 min. While in Safdarjung study by *SreenivaS et.al*. the mean operative time between the two groups were not statistically significant (Four port LC - 49.90 min; Two port mini LC - 51.30, P = 0.727) While in Egyptian Study by *Ayman M Elwan et.al* the mean operative time was 36.28 min for group A and 39.14 min for group which were comparable. So from above all observations the time required for both the procedure was comparable. In present study, comparing pain score between both groups during their hospital stay it was found that pain score was less in group A as compared to group B, pain was significantly lower after 12 hrs post procedure and after 24 hours the pain score was comparable in both groups. In Safdarjung study by *SreenivaS et.al* the average pain scores at 2,4,6,8,12 and 24 hours on post-operative day 1 was significantly lower in two port mini LC than in four port LC. However, after first 24 hours, there was no difference in the pain. Similarly in Egyptian Study by *Ayman M Elwan et.al* as regards group A, the severity of postoperative pain was mild in 11 patients (31.42%), moderate in 19 patients (54.28%), and severe in five patients (14.28%). As regards group B, the severity of postoperative pain was mild in 22 patients (62.85%), moderate in 12 patients (34.28%), and severe in one patient (2.85%). So from our study we conclude that pain in case of two port laparoscopic surgery was less as compared to four port laparoscopic cholecystectomy.

In our study along with better post procedure cosmetic score. Post operative mobilisation and initiation of oral feed was equal in both procedures. In Safdarjung study by

SreenivaS et.al cosmetic score was much better for two port laparoscopic cholecystectomy as compared to four port laparoscopic cholecystectomy also The patients' return to daily activities at home was faster by almost one day and was statistically significant in two port laparoscopic cholecystectomy. Similarly in Egyptian Study by *Ayman M Elwan et.al* cosmetic appearance and patient satisfaction for the scar were optimal (excellent) in 31 patients (88.57%) and suboptimal (good) in four patients (11.42%); however, as regards group A, they were excellent in 22 patients (62.85%) and good in 13 patients (37.14%). In our study Post operative hospital stay was same in both the group. In present study use of conventional instrument has been done. Along with use of mini grasper which is 2mm diameter. Suture retrieval technique is more demanding but decreased in number of port leads to decrease in post operative pain in the patient.^{3,4,6}

SUMMARY AND CONCLUSION

So present study concludes that Two Port Laparoscopic Cholecystectomy in a government Tertiary care hospital is feasible and can be easily practiced. This technique can be used with the help of routine laparoscopic instrument and without any extra investment. Two Port Laparoscopic Cholecystectomy have Reduced port site pain, improved cosmesis value as compared to Conventional laparoscopic cholecystectomy. It has comparable operative time required and similar or rather reduced post operative analgesia requirement as compared to conventional four port laparoscopic cholecystectomy. The complications rates are similar and comparable in Two Port as well as conventional/four port laparoscopic cholecystectomy. Radiological finding like simple cholelithiasis, GB wall thickness (<4mm), no e/o any peri-gallbladder collection

on USG etc. are better candidates for successful Two port laparoscopic cholecystectomy. Preoperative clinical findings like presence of acute episode, h/o recurrent or multiple episode of cholecystitis, h/o previous major abdominal surgery are not suitable for Two port laparoscopic cholecystectomy. So patient selection criteria for Two Port Laparoscopic Cholecystectomy are very important and with proper case selection we can have equally good or better outcome in patients with this technique. Hence Two port laparoscopic cholecystectomy can be easily practiced by reasonably trained laparoscopic surgeon with same set of instrument with good outcome.

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