

A Prospective Study To Compare Three Port Versus Four Port Laproscopic Cholecystectomy

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ABSTRACT

Background: Laproscopic Cholecystectomy Using Four Port Is Standard Operative Procedure To Remove Gall Bladder Due To Cholelithiasis With Cholecystitis But New Method As Three Port Is Being Tried To Get Advantage In Reducing Post Op Pain, Duration Of Surgery, Conversion Rate, Complications, Cost, Cosmesis And Hospital Stay. The Main Objective Of This Study Is To Evaluate Efficacy Of Laproscopic Cholecystectomy By Three Port Over Standard Four Port Technique.

Material & Methods: In This Prospective Observational Study, 100 Patients Undergoing Laproscopic Cholecystectomy Due To Chronic Cholecystitis With Cholelithiasis Diveded By A Randomized Blind Trail Equally Into Two Groups Of Three Port And Four Port Laproscopic Cholecystectomy. In Both Group, Patients Were Assessed For Duration Of Surgery, Amount Of Analgesic Required To Deal Post Operative Pain, Complications Of Surgery, Any Association With Conversion To Open Cholecystecomy, Cosmeis, Cost Effective In Terms Of Hospital Stay. In Three Port Technique, Rt Anterior Axillary Line 5mm Port To Retract Gall Bladder Fundus Was Not Used.

Results: Majority Of Patients In Both Group Were Female (Female 70%, Male 30% In Four Port And Female 60% & Male 40% In Three Port Group) And Majority In Both Group Were In Age Group Of 31-45 Yrs (60%, 55%), 18-30yrs (20%, 25%) & 46-65yrs (20%, 20%). The Mean Time Required For Surgery In Three-Port And Four-Port Group Was 66.90 And 75.45 Minutes, Respectively. Out Of 50 Patients (100%), 38 (63.3%) In Three-Port Group Had Visual Analogue Scale (VAS) Score 2 And 44 (73.3%) In Four-Port Group Had VAS Score 3. On Stastical Analysis Using SPSS Software And Applying Chi Square Test, Calculation Of P Value Done Using Fisher's Exact Test Or Unpaired T Test, $\chi^2 = 71.34$; $P = 0.001$ Assessed Where P Less Than 0.05 Was Significant. Conversion Rates To Open Cholecystectomy Were Almost Similar In Both The Groups. Intra And Post Op Complication, Cosmesis Was Same In Both Group But Cost Effectiveness As Hospital Stay Was Also Less In Three Port Group.

Conclusions: This Study Confirms That Three Port Laproscopic Cholecystectomy Takes Lesser Time And Cause Less Post Operative Pain, Less Hospital Stay Than Four Port Laproscopic Cholecystectomy, Although Complications And Cosmesis Are Same In Both Procedures.

Key Words: Cholecystitis, Cholelithiasis, Three Port Lap Cholecystectomy, Four Port Lap Cholecystectomy .

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I. INTRODUCTION:

In digestive tract diseases, Gall bladder impacted with stone or Cholelithiasis with cholecystitis is the most common and important cause of biliary tract disease, producing no symptoms, pain, dyspepsia, and other complications as choledocholithiasis, pancreatitis, gall stone ileus to gangrenous cholecystitis. Surgical management of gall stone disease is cholecystectomy. open cholecystectomy was the operation of choice for a century but today laparoscopic cholecystectomy is the gold standard treatment for gallstones and the commonest operation performed worldwide [2-3] with varied advantages of decreased pain due to avoidance of a long incision, less operative time complications due to better visualization, better cosmesis, cost effective as less hospital stay and early return to work. Therefore, any decrease in the size or number of stab incisions (ports) may provide better results added to the advantages of laparoscopic cholecystectomy as further reducing pain or duration of surgery with less complications, better cosmesis and cost effective as less hospital stay. Some surgeons argue that smaller is not necessarily better [4]. While many others proved that reducing the number and size of port incisions have more favourable results [5-9]. Various port site complications are reduced as the numbers of ports reduce. A study on 132 patients showed that three-port laparoscopic cholecystectomy method did not require conversion to four-port technique in any of the cases, whereas a study on 710 patients reported

that 55 cases required an fourth port intraoperatively [10,11].The role of fourth port has been debatable and it has been mentioned that laparoscopic cholecystectomy can be performed safely with three-ports [12]. The fourth port which is inserted midway between costal margin and the anterior superior iliac spine over the anterior axillary line can be inserted if the need arises [13,14]. Majority of public sector hospitals avoid three-port laparoscopic cholecystectomy,in spite of various studies showing an advantage of three-port technique over traditional four-port, this may be because of safety concern arising due to lesser number of ports.Now a days two port Laproscopic Cholecystectomy,single incision Laproscopic cholecystectomy[15] and needle scopic Cholecystectomy using micro instruments are aslo practiced beside robotic cholecystectomy. We aim to find out feasibility of three port lap cholecystectomy over four port lap cholecystectomy regarding post-op pain, duration of surgery, conversion rate, hospital stay and complications. The concept of reducing the number of ports though has many advantages in terms of patient outcome such as improved wound healing and reduced morbidity, such techniques also have disadvantages such as lack of adequate exposure and overcrowding of instruments[16].

II. MATERIAL & METHODS

This prospective observational study was carried out on chronic cholecystitis with cholelithiasis patients of North DMC Medical College & HR Hospital,Delhi from January 2020 to December 2021. A total 100 pateints (both male and females) of aged between 18-65,years were divided equally by randomized blind control trial into two groups,one had three port laproscopic cholecystectomy and another was operated by standard four port laproscopic cholecystectomy..

Study Design: Prospective open label observational study.

Study Location: This was a tertiary care teaching hospital based study done on admitted patients of North DMC Medical College & HR Hospital,Delhi,requiring laproscopic cholecystectomy for chronic cholecystitis with cholelithiasis.

Study Duration: January 2020 to December 2021.

Sample Size;100 Patients.

Sample Size Calculations:The sample size was estimated on the basis of a single proportion design. The target population from which we randomly selected our sample was considered 10,000. We assumed that the confidence interval of 10% and confidence level of 95%. The sample size actually obtained for this study was in 02 groups selected by blind randomized trial in two groups equally. one had three port laproscopic cholecystectomy and another was operated by standard four port laproscopic cholecystectomy.

Subject & Selection Method; 100 patients of patients of North DMC Medical College & HR Hospital,Delhi from January 2020 to December 2021 who were admitted and operated for chronic cholecystitis with cholelithias requiring laproscopic cholecystectomy for cure and further divided blindly,randomally and equally in two groups where one had three port another had four port technique used in laproscopic cholecystectomy .These patients were diagnosed in opd by clinical examination,and different biochemical tests

Inclusion Criteria:

- 1.Patients suffering from chronic cholecystitis with cholelithiasis .
- 2.Anaesthetically fit patients for laproscopic cholecystectomy.
- 3.Patients of cholelithiasis only having no other associated diseases.
4. Symptomatic Patients of cholelithiasis only with no major complications of Gall stone.
- 5.Patients of both sex,age > 18 yrs.,less than 65 yrs.

Exclusion criteria:

- 1.Acute Cholecystitis,Choledocholithiasis,
- 2.Porceilin gall bladder,Carcinoma of gall bladder,
3. Perforated gall bladder,Gangrenous cholecystitis.
- 4.Previous abdominal surgeries
- 5.Anaesthetically unfit for laparoscopic surgeries.

Procedure & Methodology: All patients of chronic cholecystitis with cholelithiasis diagnosed and confirmed by biochemical and radiologically investigatios were evaluate by pre anaesthetic checkup regarding git for

undergoing laproscopic cholecystectomy under general anaesthesia. A written consent explaining the detail of laproscopic cholecystectomy taken and patients were divided in two groups randomly, blindly and equally in two groups, one had three port laproscopic cholecystectomy and in another, four port laproscopic cholecystectomy was done. In both groups, patients were assessed for duration of surgery, amount of analgesic required to deal post operative pain by calculating VAS score, complications of surgery, any association with conversion to open cholecystectomy, cosmetic effect due to less scar formation, cost effective in terms of hospital stay. In three port technique, Rt Anterior Axillary line 5mm port to retract gall bladder fundus was not used, which may be a reason of less duration of surgery and less postoperative pain but in long fundus gall bladder such failure of retraction may lead to more time consume in dissection at callot triangle.

Complications Intra operative & Post operative Assessment : Bleeding during surgery [17] was graded as: Minimal - if pulse rate remains <100/min without any blood pressure changes. Moderate - if tachycardia occurs >100/min without any blood pressure changes. Severe – if tachycardia occurs >100/min with a greater than 10 mmHg of drop in blood pressure. The operating surgeon described the access to peritoneal cavity as easy or difficult [18]. Complications directly related to the surgical technique were graded according to Clavien's classification

Duration of Surgery:

The time required for surgery was noted from time of insertion of umbilical port to removal of all ports and skin closure. If converted to open method, the cause of conversion, step at which converted and time after which conversion was done, were noted. Ryle's tube was removed immediately after surgery in all cases. Patients were kept nil by mouth till return of the bowel sounds. All patients were ambulated as early as possible. Drains when kept were removed if output was <10 cc. with no bile leak. Stitches were removed on 10th post-operative day.

Hospital Stay: Defined as the duration from operative day till suture removal.

Statistical Analysis: Data was analyzed using SPSS version 20 (SPSS Inc., Chicago, IL). Chi-square and Fisher exact tests or unpaired t tests were performed to test for differences in proportions of categorical variables between two groups. The level $P < 0.05$ was considered as the cut off value or significance.

III. RESULTS :

In this study of 100 Patients of chronic cholecystitis with cholelithiasis of Age Group 18- 65 Yrs, divided equally by blind randomization in two groups showed that Majority of patients in both group were female (Female 70%, Male 30% in four port and female 60% & male 40% in three port group) and majority in both group were in age group of 31-45 yrs (60%, 55%), 18-30yrs(20%, 25%) & 46-65yrs (20%, 20%). The mean time required for surgery in three-port and four-port group was 66.90 and 75.45 minutes, respectively. Out of 50 patients (100%), 38 (63.3%) in three-port group had Visual Analogue Scale (VAS) score 2 and 44 (73.3%) in four-port group had VAS score 3. On Statistical Analysis using SPSS software and applying chi square test, calculation of p value done using Fisher's exact test or unpaired T test, $\chi^2 = 71.34$; $p = 0.001$ assessed where p less than 0.05 was significant. Conversion rates to open cholecystectomy were almost similar in both the groups. Intra and post op complication, cosmesis and cost effectiveness as Hospital stay was also similar in both groups.

STATISTICAL ANALYSIS :

Tab 1: Age Corelation of Disease

Age Group	04 Port	03 Port	Total
18-30	20% 10	25% 12	22
31-45	60% 30	55% 28	58
46-65	20% 10	20% 10	20

p value was > 0.5 so difference in age group was not statistically significant

Tab 2: Gender Wise Corelation

Gender	04 Port	03 Port	Total
Male	30% 15	40% 20	35
Female	70% 35	60% 30	65
Total	100% 50	100% 50	100

p value was > 0.5 so difference in gender group was not statistically significant

Tab:3 Time Undertaken for Lap Cholecystectomy

Time in Mins	04 Port	03 Port	No of Patients
30-40 Mins	00 0%	00 0%	00
41-50	03 06%	03 06%	06
51-60	10 20%	12 24%	22
61-70	12 24%	18 36%	30
71-80	15 30%	12 24%	27
81-90	10 20%	05 10%	15
91-100	00 0%	00 0%	00
Total	50	50	100

Mean time in Mins,03 port = 66.90 & 04 port surgery=75.45 p value was 0.006 so difference in duration of surgery was statistically significant.

Tab 4: Post OP Analgesic Requirement

Post OP Hrs	04 Port	03 port	No of patients
1-12	01 02%	00 00%	01
13-24	10 20%	06 12%	16
25-36	06 12%	28 56%	34
37-48	30 60%	15 30%	45
49-72	03 06%	01 02%	04
Total	50	50	100

Mean analgesic requirement for 03 port was 35.42 hours & for 04 port was 43.20 hours.P-value = 0.0002.so it is statistically significant association.

Tab 5: Post Surgery Hospital Stay

Hospital Stay In Days	04 Port	03 Port	No of Patients
< 2	00 00%	00 00%	00
3-5	32 64%	35 70%	67
6-8	15 30%	15 30%	30
9-11	02 04%	00 00%	02
12-14	01 02%	00 00%	01
Total	50	50	100

Mean duration of post surgery stay for 03 port was 4.66 & 5.30 days for 04 port P-value = 0.0267 obtained using Inverted t test is statistically significant association.

IV. Discussion:

Gall stone disease or cholelithiasis is most frequent seen abdominal disorder presenting as pain abdomen or as a cause upper gi discomfort or dyspepsia in emergency or routine opd chekup. Open cholecystectomy was the golden standard surgery to cure this disease for centuries but after development of endoscopes, better magnified visualization with laproscopes, Laproscopic cholecystectomy is now the operation of choice as it makes few port or opening in stomach causing less pain, less complications, stay in hospital, post op morbidities due to long cut and scar of open cholecystectomy and early return to work. In standard Laproscopic cholecystectomy four ports for insertion of camera, retraction of gall bladder and two for dissection of gall bladder is made but if one port for retraction of gall bladder at anterior axillary line is omitted on Rt side of abdomen then even lap cholecystectomy can be performed easily and by this study we are evaluating that by omitting this port, we can save duration of surgical time, post operative pain and hospital stay of patients with less complications of intra or post operative complications. Therefore, any decrease in the size or number of stab incisions (ports) may provide better results added to the advantages of laparoscopic cholecystectomy as further reducing pain or duration of surgery with less complications, better cosmesis and cost effective as less hospital stay. Some surgeons argue that smaller is not necessarily better. While many others proved that reducing the number and size of port incisions have more favourable results. Various port site complications are reduced as the numbers of ports reduce. A study on 132 patients showed that three-port laparoscopic cholecystectomy method did not require conversion to four-port technique in any of the cases, whereas a study on 710 patients reported that 55 cases required a fourth port intraoperatively. The role of fourth port has been debatable and it has been mentioned that laparoscopic cholecystectomy can be performed safely with three-ports. The fourth port which is inserted midway between costal margin and the anterior superior iliac spine over the anterior axillary line can be inserted if the need arises. Majority of public sector hospitals avoid three-port laparoscopic cholecystectomy, in spite of various studies showing an advantage of three-port technique over traditional four-port, this may be because of safety concern arising due to lesser number of ports. Now a days two port Laproscopic Cholecystectomy, single incision Laproscopic cholecystectomy and needle scopic Cholecystectomy using micro instruments are also practiced beside robotic cholecystectomy. In long fundus gall

bladder, dissection of Gall bladder at Callot's triangle is often difficult if this fourth port is avoided, so some time this port has to be added if we are performing three port laproscopic cholecystectomy if long and large gall bladder with long fundus is found after inspecting peritoneal cavity. We did not have any bile duct injury in any of these groups. Some surgeons have expressed concerns about the safety of the 3-port technique, arguing that it may lead to a higher percentage of the bile duct injuries.

However, bile duct injury can be avoided if the gallbladder is gripped at the infundibulum, retracted laterally, and dissected at the infundibulum-cystic duct junction rather than cystic duct common bile duct junction. We have shown in our result that the VAS score of pain is less in three port surgery and these patients required less analgesic than the four port surgical group. Hospital stay of the three port group was also less although no significant change in intra and post op complications was seen. Our findings thus suggest that the three port laproscopic cholecystectomy technique was not difficult to master and could be safely performed by trained personnel. Conversion to standard four port laproscopic procedure should be undertaken wherever necessary as the most important aspect of any surgical procedure is its safety and complications.

V. CONCLUSIONS:

Our prospective randomized controlled study has shown that three port laproscopic surgery is superior to four port laproscopic cholecystectomy as it decreases postop pain and requires less analgesia, takes less time for completion of surgery and also post op hospital stay is also less in comparison to four port laproscopic cholecystectomy but cosmesis and intra and post op complications are same. So should be tried by fairly trained Surgeons only and should convert to four port whenever dissection is difficult.

Conflict of Interest: None initiated.

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