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Original Research Paper

Surgery

# A COMPARATIVE EVALUATION OF EFFICACY AND FEASIBILITY OF 3 PORT AND 4 PORT LAPAROSCOPIC CHOLECYSTECTOMY

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**ABSTRACT** Scarless surgery is the Holy Grail of surgery. Laparoscopic cholecystectomy is currently accepted approach for the management of patients with cholelithiasis. The standard method for removal of gall bladder in laparoscopic cholecystectomy is by using four ports. Although other techniques such as by using 3 ports or only single port are being practiced, their safety and efficacy has not been established. This study was done to assess the efficacy and safety of the use of only three ports for laparoscopic cholecystectomy.

**KEYWORDS** :

## INTRODUCTION

Gall stones are among the most common causes of gastrointestinal illness requiring hospitalization. Management has progressed through eras of nonsurgical management, laparotomy, minilaparotomy and now laparoscopic cholecystectomy which is now the gold standard. Laparoscopic surgery has expanded in leaps and bounds to become the standard procedure for many intra-abdominal surgeries. The greatest benefit is achieved in operations where the trauma of access exceeds that of the procedure.This study aims to investigate the technical feasibility, safety, and benefit of 3 port versus standard 4 port laparoscopic cholecystectomy in our setup.

## AIMS AND OBJECTIVES

1. To study the efficacy and feasibility of 3 port and 4 port lap cholecystectomy.
2. To compare the intraoperative and post operative complications of 3 port and 4 port lap cholecystectomy in Indian set up.

a. Operative time,
b. Days of hospital stay.
c. Days taken to return to work.
d. Cosmetic satisfaction.
e. Assessment of postoperative pain score using a 10cm unscaled visual analogue score (VAS).
f. Quantitative requirement of analgesia after surgery.

## STUDY DESIGN & DURATION

This is a randomized single blind study conducted from 1 September 2015 to 30 APRIL 2017

## SAMPLE POPULATION

After taking Hospital Ethical Committee approval and informed consent with the patients presenting with gall bladder stone diseases both acute and chronic to surgical OPD of MLBMC fulfilling the following criteria were included in the study.

## INCLUSION CRITERIA

1. Age- 10 to 85 years
2. Diagnosis of chronic/acute cholecystitis, symptomatic cholelithiasis, recurrent mild biliary pancreatitis, Gall Bladder (GB) polyp, GB Sludge, empyema, mucocele.

## EXCLUSION CRITERIA

1. Patient refusal
2. Choledocholithiasis
3. Severe Acute Calculus Pancreatitis
4. Severe co-morbid conditions (uncontrolled diabetes, hypertension, severe direct hyper bilirubinemia)
5. ASA Grade-4

## RANDOMIZATION

Total 160 patients were randomly divided by computer based randomization into the one of the following two groups (60 each).
Group1: 3 PORT LAPAROSCOPIC SURGERY
Group2: 4 PORT LAPAROSCOPIC SURGERY

## PREOPERATIVE ASSESMENT :

1. A complete history and physical examination,
2. Standard laboratory tests including liver function tests
3. Radiological examinations including abdominal ultrasound and CECT where indicated.
4. Ultrasonography confirmed the presence of gall bladder stones in all patients.
5. Patients with CBD stones are excluded.

## SURGICAL TECHNIQUES

GROUP 1 - 3 ports i.e.

a) 10 mm trocar just below the umbilicus through which the 30degree viewing videoscope was introduced
b) 10 mm trocar will be inserted 3 cm below the xiphisternum to the right of the midline
c) 5 mm trocar at the right hypochondrium in midclavicular line 3 cm below the costal margin.

GROUP 2 – Along with all the ports described in GROUP 1 , a 4$^{th}$ port 5 mm in anterior axillary line placed in transumbilical plane just superior to it was also made.

The laparoscopic cholecystectomy was carried out according to the standard technique and completion of the procedure was identical using clips/cautery for cystic artery and only clips for duct and closure of 10 mm ports with vicryl 1-0 and ethilon 2-0 and 5mm port had skin closure with ethilon 2-0.

## VARIABLES ASSESED

1. Operation time
2. Conversion rate
3. Need of drain

4. Intra operative complications
5. Postoperative complications
6. Return to work time
7. Cosmesis

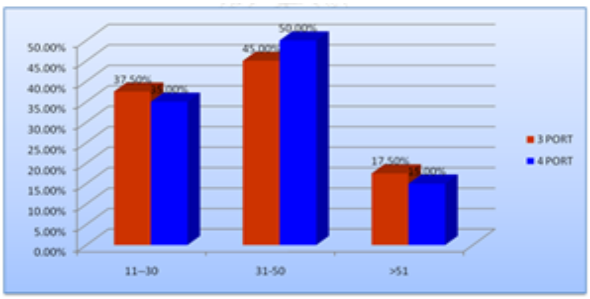
## DATA COLLECTION

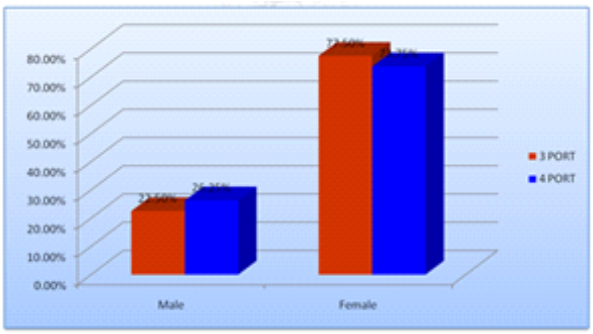
Data was kept in computer data files and a hand written proforma was also filled. The details of preoperative assessment, intraoperative observation, postoperative course and postoperative follow up with reference to following points were recorded in a proforma and analyzed by Unpaired *t* test

## RESULTS

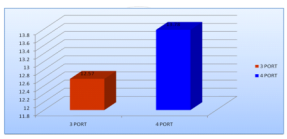
1. Demographic Data

The groups were comparable in terms of age and male : female ratio ( p value <0.05)



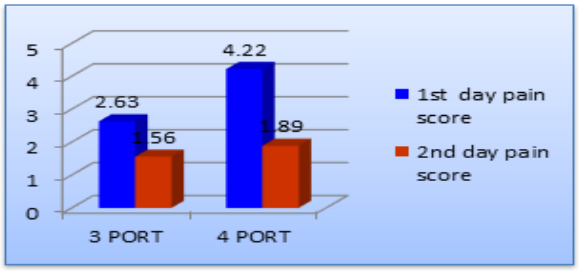




2.Relationship between patient with operative time in the 3 PORT and 4 PORT.



| Variables | 3 PORT (Mean±S.D.) | 4 PORT (Mean±S.D.) | p value |
|---|---|---|---|
| Time Up to Removal of GB (in min.) | 12.57±7.4 | 13.78±8.5 | Not significant |

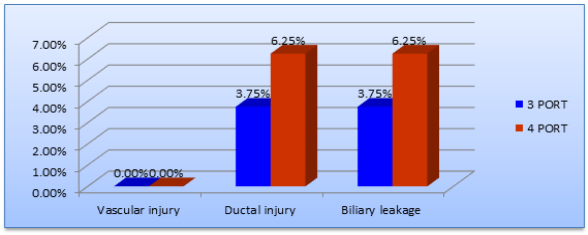
3.Comparison of the mean of pain score of 1st and 2nd day in the 3 PORT & 4 PORT




4**Comparison of the per operative complications**

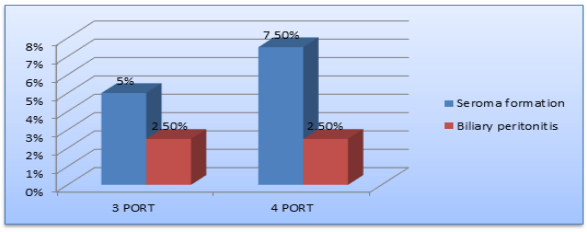
| Complication | 3 PORT (80) | 4 PORT (80) | P value |
|---|---|---|---|
| Vascular injury | 0 (0.00%) | 0 (0.00%) | <0.0001 |
| Ductal injury | 3 (3.75%) | 2 (2.50) | <0.0001 |
| Biliary leakage | 3 (3.75%) | 2 (2.50%) | <0.0001 |

| Variables | 3 PORT (Mean±S.D.) | 4 PORT (Mean±S.D.) | p value |
|---|---|---|---|
| 1st day pain score | 2.63±0.51 | 4.22±0.75 | <0.0001 |
| 2nd day pain score | 1.56±0.49 | 1.89±0.59 | <0.0001 |



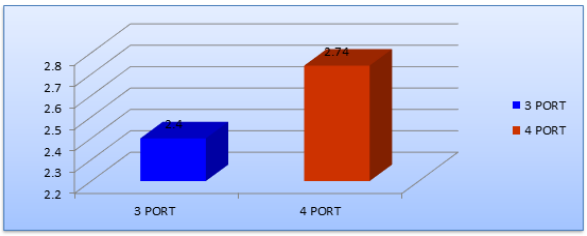

**Comparison of the post operative complication**

| Complication | 3 PORT (80) | 4 PORT (80) | Pvalue |
|---|---|---|---|
| Seroma formation | 4 (5.00%) | 6 (7.5%) | <0.0001 |
| Biliary peritonitis | 2 (2.5%) | 2(2.5%) | <0.0001 |



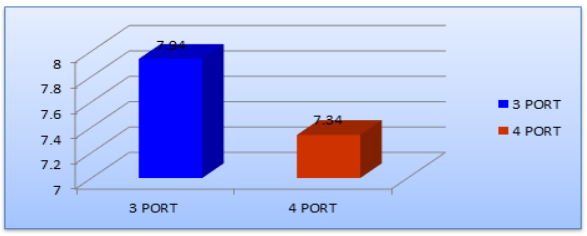

**Comparison of the hospital stay 3 PORT & 4 PORT (Mean Hospital Stay).**

| 3 PORT (Mean±S.D.) | 4 PORT (Mean±S.D.) | p value |
|---|---|---|
| 2.40±1.01 | 2.74+1.23 | <0.3470 |



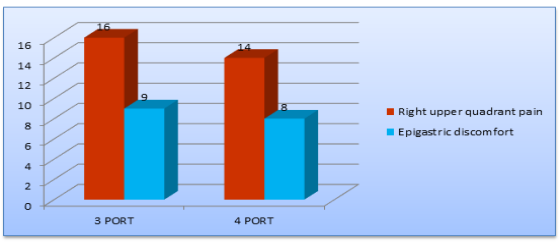

**Comparison of the Cosmesis in 3 PORT & 4 PORT (Mean cosmesis).based on subjective satisfaction score**

| 3 PORT (Mean±S.D.) | 4 PORT (Mean±S.D.) | p value |
|---|---|---|
| 7.94±0.74 | 7.34+0.80 | <0.0241 |



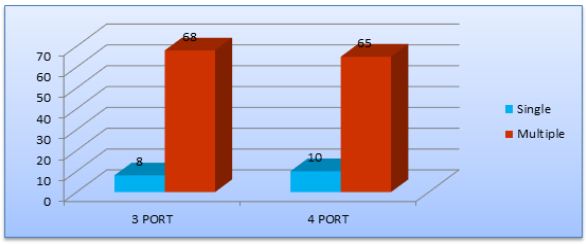

**Comparison of symptoms distribution in 3 PORT and 4 PORT**

| Symptoms | 3 PORT | 4 PORT |
|---|---|---|
| Right upper quadrant pain | 16 | 14 |
| Epigastric discomfort | 9 | 8 |



**Comparison of incidence of single/multiple stone in 3 PORT and 4 PORT**

| Gall bladder stone | 3 PORT | 4 PORT |
|---|---|---|
| Single | 8 | 10 |
| Multiple | 68 | 65 |




## DISCUSSION

In our study the most common age group was 31-50years in three port group and four port group (p > 0.05), which is almost similar to Manoj Kumar et al who found the mean age to be 38.7±13.7 in 3port and 39.13 ± 14.1 in 4 port group .Female to male ratio in our study was 3.75:1 in 3 port and 3:1 in 4 port groups, which is almost similar to Dhafir Al-Azawi et al who reported the female male sex ratio to be 4:1 in both the groups.

In our study pain RHC (on/off) was present in 16(20%) patients in three port groups and 14(17.5) patients in four port group. This was more after fatty meals. Epigastric discomfort was present in 9 (11.2%) patients in three port group and 8 (10%) patients in four port group.Our results were comparable with the study of Manoj Kumar et al.

Additional port was required in 1 patients in three port group. In this patient the GB was too long and would often come in the field of surgery and because of dense adhesions it was difficult to define Calot's triangle, as keeping GB at stretch by clamp holding fundus, the dissection became easier. However there was no need of additional port in any patient in four port group (p=0.495).

Subhepatic drain was placed in 3(3.75) patients in three port group and 2(2.5) patients in four port group because of difficult dissection in view of adhesions and gallbladder perforation during surgery leading to spillage of bile and stones.

1 patients was converted to open in three port group and no patient in four port group. Total 8 patients ,4 from each group had difficulty in dissection of gall bladder bed, resulting in bleeding from liver bed, the bleeding was controlled by using diathermy and pressure gauge and post-operative period was uneventful.. Nafeh A I et al and Slim K et al also reported similar results in their studies.
There was no death in either group, and there were a total of 10 minor complications in the study group (6 in 3- port and 4 in 4- port groups) and was statistically insignificant. 7 patients two from each group develops fever >100F probably due to thrombophilebitis in both groups

2 patients in 4 port group developed port site seroma in epigastric port only, because the enlargement of the epigastric port was needed in view of large stone size and 4 at umbilical site developed seroma formation.

None of the patient in our study group has jaundice, port site bleeding, port site hematoma, port site hernia.

The mean operative time in three port 12.47±7.53 minutes and in four port group 13.78±8.92 minutes (p > 0.05). Similar results were reported by Nafeh A I et al . The operative field was quite clear and comparable to that in standard four port cases. In some cases of three port group, the liver and gall bladder hindered the operative field and consumed slightly more time (average 5-10 minutes).

In our study there is no significant difference in hospital stay in 3 PORT as compared to 4 PORT (3 PORT 2.40+1.01 vs 4 PORT 2.74+1.23, p=0.3470).Laparoscopic cholecystectomy is a day care surgery and the patient can be discharged in a day. But in our study the time was beyond 48 hrs as the patient population catered was from a rural background so the discharge was postponed for their satisfaction. In study by M Kumar et al, mean postoperative stay in the hospital was 1.19 vs 1.44 (P=0.39) in the 3- and 4-port groups.

The VAS scores were significantly lower in the three port group as compared to the four port group on day one and two. The mean visual analogue score for pain on postoperative days was 2.63± 0.51 0n day one, 1.56± 0.49 on day two in the three port group and 4.22+o.75 on day 1, 1.89± o.59 on day2 in four port group(P < 0.05). Manoj Kumar et al reported that the VAS score was significantly low in three port group. The average analgesia required was 0.73 doses in three port group and 1.36 doses in four port group (one dose= 75mg of diclofenac sodium given i/m), the difference was statistically significant (P 0.05). These results were comparable with the results reported by Dion Y M et al.

Cosmesis was assessed by the subjective satisfaction score based on size of the surgical scars and the number of scars. Patients in both the groups were operated laparoscopically, however in three port group there was one less scar than four port group. Average(range) scar size was 4 mm scar (3.5–5.5 mm) at 5 mm port and 11 mm scar (9–11 mm) at the epigastric port area, the umbilical scar was not seen. It was noted that port site scars were hardly visible after healing. Overall patients in both the groups were highly satisfied over the cosmetic outcomes of their surgery. The three-port technique is as safe as the standard four-port laparoscopic cholecystectomy in experienced hands.

## CONCLUSION

- We concluded that the use of three ports in LC did not significantly affect the
- Procedure's safety,
- Conversion rate,
- Operating time when used in AC and CC.

The introduction of the three-port technique, which is still in routine practice in our institute, somehow has the following advantages

- Need of fewer painkillers
- Shorter hospital stays
- Fewer scars
- Cost effective

So 3 port lap cholecystectomy can be advised to be better than the 4 port technique but definitely in experienced hands.

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