

Three Ports versus Four Port (Standard) Laparoscopic Cholecystectomy - Comparative Study of 60 Cases of Cholelithiasis

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Abstract

Background: Laparoscopic cholecystectomy (LC) is first line treatment of symptomatic cholecystectomy. We compare standard (4 ports) laparoscopic cholecystectomy to three ports laparoscopic cholecystectomy.

Methods: From November 2011 to July 2012, total of 60 patients underwent LC, out of which 30 had standard ports LC and next 30 had three ports LC.

Results: Intra-operative findings were similar in both groups. There was no postoperative mortality observed in either group. There was no significant difference observed in two groups regarding operative time and conversion to open cholecystectomy. Both the groups were comparable in terms of complications which included bleeding, content leak from the GB, stone spillage, bile duct injury, trocar related injury. Three ports LC reduced the post-op analgesia requirement, gave better cosmesis as lesser ports were used. It also reduced the no. of assistants, hence less manpower and less expensive.

Conclusions: Three ports LC is technically feasible, safe, achieved good results, similar to those achieved with the four-port technique with less post-op analgesia, less assistance and less number of scars so better cosmetic appearance and less expensive. So we recommend as a routine procedure in elective laparoscopic cholecystectomy.

I. Introduction

Cholelithiasis is a common occurrence particularly in females. Even the incidence in males is now considered at 8.2%.⁽¹⁾ The prevalence is higher in women, more with multiple pregnancies and obesity as well as in older patients. Epidemiological studies have clearly demonstrated a linear relationship between increasing age and prevalence of cholelithiasis. Its prevalence has become more apparent since the introduction of ultrasonography.

Laparoscopic cholecystectomy is considered to be the procedure of choice for elective cholecystectomy⁽²⁾. In March 1987 Mouret in Lyon, France performed first laparoscopic cholecystectomy recorded in medical literature⁽³⁾. In India first laparoscopic cholecystectomy was performed by T.E. Udwardia in Mumbai in 1990.⁽⁴⁾ This approach magnificently provides less postoperative pain, short hospital stay, good cosmetic appearance and early recovery and return to normal activities.⁽⁵⁻⁷⁾

It is expected that any decrease in the size or number of stab incisions (ports) may provide better results added to the above mentioned advantages of laparoscopic cholecystectomy. However, some surgeons have argued that smaller is not necessarily better.⁽⁸⁾ While many others proved that reducing the number and size of port incisions have more favourable results.⁽⁹⁻¹⁴⁾

Various port site complications include: pain, port site leakage, port site herniations, port site tuberculosis, port site bleeding, bowel injury, superior & inferior epigastric vessel injury, subcutaneous emphysema, pneumothorax, port site infections, port site metastasis of GB carcinoma, port site recurrence of GB carcinoma. So by reducing the number of ports, we can reduce the above port site complications.

We studied to find out feasibility of three port lap cholecystectomy over four port lap cholecystectomy regarding post-op pain, duration of surgery, conversion rate, cost benefit, hospital stay and complications.

II. Material And Method

The study was designed to assess prospectively the post-op pain, duration of surgery, conversion rate, cost benefit, hospital stay and complications. For this we included 60 patients from November 2011 to July 2012 of which 30 patients underwent three ports LC and rest 30 underwent four ports (standard) LC.

Preoperative assessment included relevant history, clinical examination and few investigations like CBC, S.Sugar, S.Electrolytes, renal function tests, liver function tests, bleeding time, clotting time, ECG, chest Skiagram and ultra sonography of abdomen.

III. Operative Procedure

All patients were given injection ceftriaxone 1gm iv before the procedure. Patients were asked to empty urinary bladder before moving to operation theatre. All were operated under general anaesthesia. A nasogastric tube was inserted and stomach aspirated, in cases where stomach was distended. The Veress needle was inserted through a stab incision in the supra umbilical region. Once the needle tip entered the free peritoneal cavity it was connected to the pneumo-insufflator and insufflated till the pressure raised to 10 mm of Hg. The Veress needle was removed and then at the site of Veress needle puncture a 10 mm safety trocar was inserted. When the trocar reached the abdominal cavity it was removed and Telescope was introduced through the cannula. Operating table was tilted, head end up and right side up. Then 10 mm working port in the sub xiphoid (epigastric) area was inserted.

In patients of group B, two 5 mm ports in right mid clavicular line subcostal and in anterior axillary line at level of umbilicus were put. In patients of group A, a 5mm port was put in the right mid clavicular line. In patients of group B, the fundus of the gallbladder was grasped through the lateral port, and retracted above the liver margin. In patients of group A, the gall bladder fundus was retracted towards the superolaterally direction with the help of grasper.

After that, posterior dissection of Calot's triangle was done. Once posterior dissection was complete anterior dissection of Calot's triangle was done. A large window between the cystic duct and cystic artery was made. The junction of cystic duct and common bile duct was identified. Then two proximal and one distal liga clips were applied on cystic duct. Then cystic duct was cut off in between the clips. Cystic artery was either coagulated with bi-polar cautery or was divided between the two clips. Then gall bladder was removed from liver bed by using hook dissector. The gall bladder was extracted through the sub-xiphoid port. Sub hepatic drain was used in selected cases if postoperative bleeding or bile leakage was expected. Operative time from onset of procedure (supraumbilical incision) to the closure of wound was noted down.

Post operative assessment regarding temperature, pulse, BP, post operative pain & post operative analgesia requirement were noted. After surgery post operative complications were recorded on the post of day one and after day 7. The findings noted down for the patients in two subgroups were compared and results were evaluated at end of this study.

IV. Results

During our study 60 patients underwent LC, 30 were through 3 ports and rest 30 were through standard 4 ports LC and following results were drawn:

1. Gall bladder disease is found to be more common in 30 -49 years of life.
2. Females are more prone to cholelithiasis as shown in this study where the ratio of female to male was 11:1.
3. Pain is the most important symptoms which bring the patient to seek treatment.
4. Ultrasonography is the most sensitive investigation and about 66.7% patients have multiple stones in the gall bladder.
5. Operative time:

Group	Range(min)	Mean(min)	SD
3 port (Group A)	20-60	33.66	9.37
4 port(Group B)	20-50	33.33	7.23

At df=58; t=0.1527; p=0.8791 Hence Non-Significant

6. Conversion to open procedure.

	3 Port (Group A)	% age	4 Port (Group B)	% age
Conversion to Open	1	3.3	1	3.3

Conversion of 3 ports LC to 4 ports LC

3 port(Group A)	Conversion to 4 port	% age
YES	1	3.3
NO	29	

7. Both the groups were comparable in Intraoperative findings and complications.

Complication	3 port (Group A)	%age	4 port (Group B)	%age	χ^2	P
Bleed	1	3.3	1	3.3	0.0	1,NS
Content leak from GB	6	20	5	16.7	0.11	0.73,NS
Spillage of stone	3	10	2	6.7	0.21	0.64,NS
BDI	0	0	0	0	0	1,NS

Trocar related injury	0	0	0	0	0	1,NS
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8. Bile leak was a major post operative complications in 3 port (group A) LC

9. Mean Hospital stay

	Range(days)	Mean(days)	SD
3 port(Group A)	1-8	2.13	1.279
4 port(Group B)	1-4	2.07	0.691
At df= 44, p= 0.803 - Non Significant			

10. 3 port LC reduce the analgesia requirement of the patient post operatively.

11. 3 port LC has less no. of ports so better cosmetic appearance.

12. 3 port LC reduces the no. of assistant. So less manpower and less expensive.

13. There was no mortality in both the groups.

V. Discussion

Cholecystectomy is the commonest operation of biliary tract and 2nd most common operative procedure performed today.⁽¹⁵⁾ The technique of open cholecystectomy was first performed by a German surgeon Carl Langenbuch through cadaveric dissection on July 15, 1882 when he successfully removed gall bladder of a 43 year old man who was suffering from the disease for 16 years.⁽¹⁶⁾ After that, the concept of decrease in surgical incisions to have less postoperative pain and more cosmetic appearance have been adopted.⁽¹⁷⁾ In this concern Another alternative is performance of surgery through a small incision less than 5 cm long in subcostal area. This was called Minilap cholecystectomy. The main advantage of this procedure over conventional open cholecystectomy is that the patient is discharged early. Also the analgesic requirement is less.⁽¹⁸⁾

Singh et al in 1996 published an article on Minilap cholecystectomy. They adopted Minilap. Cholecystectomy in 610 cases and advocated that Minilap Cholecystectomy is a much better procedure for the patients and also for the surgeon for good result and quick recovery. If properly accomplished it does not add to any excessive complications and avoid all the problems a patient is likely to face due to big incision.⁽¹⁹⁾ Furthermore, micro-cholecystectomy with smaller incision is reported to be more superior to the above two approaches. These good results supposed to be due to decrease surgical trauma of the muscle cutting incisions.^(20,21)

With the increasing experience in advanced laparoscopic techniques. Laparoscopic cholecystectomy is performed by:

- ◆ four ports of entry into the abdomen (standard procedure)
- ◆ three ports of entry into the abdomen
- ◆ two ports of entry into the abdomen
- ◆ single port of entry into the abdomen (SILS)
- ◆ natural orifice transluminal endoscopic surgery (NOTES)

Laparoscopic cholecystectomy is considered to be the procedure of choice for elective cholecystectomy⁽²²⁾. There have been a number of modifications in the technique of LC. The use of the fourth trocar which is generally used for fundic retraction in the American technique seemed unnecessary by some surgeons⁽²³⁾ others used sutures to retract the gall bladder^(14,24) Many researchers proved that reducing the number and size of port incisions have more favorable results.⁽⁹⁻¹⁴⁾

The results comparing both groups in our study were similar to standard literature in terms of age, sex, USG findings, operating time, conversion to open LC, need for 4th port in 3 ports LC, complications and mean hospital stay.

The mean operative time of 3 port LC was 33.66 min and for 4 ports LC is 33.33 min and it was statistically insignificant. Study conducted by Al-Azawi et al (2007) the mean operative time for three port is 46.1 min and for 4 port LC 48.9 min which was non significant.⁽²⁵⁾

Conversion rate to open cholecystectomy was 3.3%. Adhesion and bleeding was the major cause of conversion. And on applying relevant statistical test it is found to be insignificant. Al-Azawi et al (2007) reported that three-port technique did not change the rate of conversion when compared to the four-port technique.⁽²⁵⁾

Conversion of 3 ports LC to 4 ports LC was done in one patient i.e. 3.3%. Major cause of the conversion is dense adhesions. This is comparable to A I Nafeh et al (2005) who reported that conversion rate of 3 port to four port LC is 3.3%.⁽²⁶⁾

Mean Hospital stay in 3 port LC was 2.13 days. Which when compared with 4 port LC found to be statistically insignificant difference between them.

The post-op pain and analgesic use was less in 3 ports LC as measured by visual analogue scale (VAS). Less no. of scars in 3 ports LC gives better cosmesis. Supported by many studies like endo et al 2001⁽²⁴⁾, trichak 2003⁽²³⁾, AI Nafeh et al 2005⁽²⁶⁾, kumar et al 2007⁽²⁷⁾, mushtaq chalkoo et al 2010⁽²⁸⁾. And also decrease in no. of assistants decreased manpower and cost. Supported by mustaq chalkoo et al 2010⁽²⁹⁾

VI. Conclusion

We found that 3 port LC is technically feasible, safe, achieved good results, similar to those achieved with the four-port technique with less post-op analgesic requirement, less assistance, less number of scars and better cosmetic appearance. So we recommend as a routine procedure in elective laparoscopic cholecystectomy.

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