

## Original Research Article

# Comparative study of standard laparoscopic cholecystectomy and single incision laparoscopic cholecystectomy: outcome and complications

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## ABSTRACT

**Background:** Laparoscopic cholecystectomy (LC) has evolved to be as gold standard treatment for gall bladder disease and is the most common laparoscopic procedure performed worldwide. In recent times, the innovative techniques of Natural orifice Transluminal Endoscopic Surgery (NOTES) and Single Incision Laparoscopic Surgery (SILS) have been applied as a step forward towards scar less surgery with added benefits of less pain and less analgesic requirement, shorter hospital stay, quick return to work.

**Methods:** A retrospective study of 50 patients admitted with gall bladder disease through outdoor for laparoscopic cholecystectomy from November 2018 to January 2019 in Maharishi Markandeshwar Institute of Medical Sciences and Research Mullana (AMBALA) were randomized into two groups of 25 each for Single Incision Laparoscopic Cholecystectomy (SILC) and standard laparoscopic cholecystectomy (LC) comparing the operative time, outcome and complications.

**Results:** 50 patients admitted to MMIMSR Mullana from November 2018 to January 2019 with gall bladder disease were divided into two groups of 25 each who underwent three port SILC and four port laparoscopic cholecystectomy (4PLC). The average intra-operative time in SILC (80.56 mins) was significantly more than standard laparoscopic cholecystectomy. The average length of stay in the hospital for SILC was 1.8 days (1-3 days), was significantly less than in standard four port laparoscopic cholecystectomy. Incidence of Intraoperative complications were more in SILC than standard LC.

**Conclusions:** SILC as the newer novel technique had better outcomes in terms of cosmesis, early discharge, shorter stay at hospital.

**Keywords:** Laparoscopic cholecystectomy, Natural orifice transluminal endoscopic surgery, Single incision laparoscopic cholecystectomy, Single incision laparoscopic surgery

## INTRODUCTION

Laparoscopic cholecystectomy (LC) has evolved to be as gold standard treatment for gall bladder disease and is the most common laparoscopic procedure performed worldwide.<sup>1</sup> Laparoscopic cholecystectomy has traditionally been performed using multiple incisions or port sites. The tendency of minimizing surgical trauma encourages the use of new approaches in laparoscopic

procedures. In recent times, the innovative techniques of Natural orifice Transluminal Endoscopic Surgery (NOTES) and Single Incision Laparoscopic Surgery (SILS) have been applied as a step forward towards scar less surgery. Navarra et al, (1997) performed the first single incision laparoscopic cholecystectomy (SILC) using two trochars through one sub umbilical incision and three abdominal stay sutures to aid gall bladder traction.<sup>2</sup> Since this time the idea of scar less surgery has gained

increases popularity. Benefits of SILS include less pain and less analgesic requirement, shorter hospital stay, quick return to work and better cosmesis.<sup>3</sup> There have been many reports describing multiple techniques however a few studies compare SILC to traditional laparoscopic techniques. This study evaluates three port SILC and traditional four port laparoscopic cholecystectomy.

## METHODS

A retrospective study of 50 patients admitted with gall bladder disease through outdoor for laparoscopic cholecystectomy from November 2018 to January 2019 in Maharishi Markandeshwar Institute of Medical Sciences and Research Mullana (AMBALA) were randomized into two groups of 25 each for Single Incision Laparoscopic Cholecystectomy (SILC) and standard laparoscopic cholecystectomy (LC) using conventional laparoscopy set. After work up and pre-anesthetic checkup, a written consent was taken from all patients after explaining the procedures with all the risks.

### Inclusion criteria

- comprises of all patients with gall bladder disease, chronic cholecystitis, symptomatic cholelithiasis, dyskinesia, gall bladder polyp, mucocele.

### Exclusion criteria

- comprises of patients with acute episodes, acute pancreatitis, choledocholithiasis/ history of jaundice, Severe co-morbid conditions or patient of previous abdominal major surgery.

### Technique

The technique used for SILC was similar by Elsey and Feliciano with slight modifications.<sup>4</sup> A single curvilinear incision was made infra umbilically with separation of fascia off linea alba. A 10 mm port instead of 5 mm was put under direct visualization after verses insertion and insufflation of abdomen using CO<sub>2</sub> to pressure of 12-14 mm of Hg was done. A 30-degree telescope (Storz) was inserted through the port and gall bladder was visualized and reverse Trendelenburg with right up position was given. Two additional 5 mm trochars were placed 1 cm superolaterally on both sides of initial camera port. A grasping instrument was placed in left trochar and dissecting through right trochar. Thus, Hartmann pouch of gall bladder was grasped and Calottes triangle was dissected, keeping critical view of safety cystic duct and artery were clipped using LT300 clips and gall bladder separated from Gall bladder fossa and abdominal drain was put in situ at gall bladder fossa site (removed after 6-8 hrs.). Gall bladder was removed from 10 mm trochar replacing camera with 5 mm laparoscope for visual aid. The traditional four port laparoscopic cholecystectomy was done as per standard incisions and port sites.

## RESULTS

50 patients admitted to MMIMSR Mullana from November 2018 to January 2019 with gall bladder disease were divided into two groups of 25 each who underwent three port SILC and four port laparoscopic cholecystectomy (4PLC). The average age for patients for SILC and standard laparoscopic cholecystectomy was 41.1 and 46.6 years respectively with no significant difference (Table 1).

**Table 1: Epidemiology.**

Demography	Single incision (n=25) (SILC)	Standard lap(4PLC) cholecystectomy (n=25)
Age	41.16±1.6 (21-62 years)	46.64±15.2 (24-71 years)
Gender (m: f)	14:11	12: 13

The average intra-operative time in SILC (80.56 mins) was significantly more than standard laparoscopic cholecystectomy (57.44 mins) (p<0.001) (Table 2).

**Table 2: Operative time.**

Operative time	Single incision (n=25)	Standard lap cholecystectomy (n=25)	p value
Intra-OP time(mins)	80.56±13.9	57.44±13.7	<0.001

**Table 3: Mean length of stay.**

Stay duration	Single incision (n=25) (SILC)	Standard lap cholecystectomy (n=25)
Mean stay (days)	1.8±0.6 (1-3days)	2.4±0.80 (1-4days)

The average length of stay in the hospital for SILC was 1.8 days (1-3 days), was significantly less than in standard four port laparoscopic cholecystectomy (2.4 days) (Table 3).

Incidence of intraoperative complications were more in SILC than standard LC though there is no significant difference. Among 25 cases 3(12%) had intraoperative complications in the form of bleeding from gallbladder bed in 1 case (overcome by electrocautery), gall bladder puncture (1), which was managed by conversion to standard LC, and bile leak (1) due to slippage of clip intraoperatively managed by conversion to standard LC and reapplication of Liga clip was done.

While among standard laparoscopic cholecystectomy 2 cases had bleeding from the liver bed during separation of gall bladder which was overcome by electrocautery (Table 4).

**Table 4: Intra-OP complications.**

Complication rate	Single incision (n=25)	Standard lap cholecystectomy (n=25)
Complications	3(12%)	2(8%)

The conversion to standard LC was seen in 2 cases (8%) while there was no case seen converted to open cholecystectomy or readmitted after discharge (Table 5).

**Table 5: Conversion and re-admission rate.**

Number of conversions and re-admissions	Single incision (n=25)	Standard lap cholecystectomy (n=25)
Conversion	2	0
Readmissions	0	0

## DISCUSSION

SILS depicts the new beginning of laparoscopic surgery offering the patients with reduced postoperative pain, quick return to work, less port-related complications, with better cosmesis.

In this study there was no major difference in the age and gender distribution for patients undergoing laparoscopic cholecystectomy be either ways. Though there was statistically significant difference noted in intraoperative time in SILC (80.56 mins) compared to standard laparoscopic cholecystectomy (57.4mins), It is similar to study done by Greaves and Nicholson in which intraoperative time for SILC was longer by 14 minutes.<sup>5</sup> This difference is certainly due to technical difficulty, decreased vision, inadequate retraction, poor visualization of calottes triangle and limitation of movement during SILC making it technically difficult procedure compared to conventional.

Patients undergoing SILC tend to have shorter stay and early discharge at hospital, with mean stay of 1.8 days with majority being discharged within 1 day compared to standard LC. This was similar to study done by Joseph et al, who had mean stay of 12.5 hours for patients undergoing SILC.<sup>6</sup> Similar findings were noted in study done by Lee et al.<sup>7</sup>

In view of complication rate no statistically significant difference rate was observed similar to study done by Markar SR et al.<sup>8</sup> Although complications tend to be more in SILC than standard LC in the form of bleeding, biliary injury/ bile leak, visceral injury, cystic or hepatic duct injury.<sup>9</sup> This tends to be due to technical difficulty, clashing of instruments, improper retraction of gall bladder and inadequate triangulation. However, none was converted to open procedure or readmitted. It was overcome by converting to standard LC similar to study done by Roberts KE et al, and Ersin S et al, in which

additional ports were needed to overcome bleeding or visualization problem.<sup>10,11</sup>

**Thus, SILC offers benefits over standard LC in view of**

- Shorter hospital stays and faster return to work.
- Improved cosmesis.
- Reduced post-operative pain.
- Reduced port-site infection.
- Lesser complications.

**Major disadvantages associated with the technique are**

- The safety concerns due to decreased visualization and exposure.
- Lack of triangulation and clashing of instruments.
- Surgeons experience of the procedure.

## CONCLUSION

SILC as the newer novel technique had better outcomes in terms of cosmesis, early discharge, shorter stay at hospital, lesser scar marks over standard technique, it still requires surgical experience due to its persistent steep learning curve.

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