

## Original Research Article

# Single port laparoscopic cholecystectomy compared to the standard laparoscopic cholecystectomy

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## ABSTRACT

**Background:** Efforts to improve outcomes of laparoscopic cholecystectomy heralded the advent of single incision laparoscopic cholecystectomy. The objective of this study was to evaluate and compare single port laparoscopic cholecystectomy to the standard laparoscopic cholecystectomy with respect to time required for surgery, postoperative pain, morbidity and complications.

**Methods:** This comparative randomized study was conducted in M.L.B. Medical College, Jhansi among 124 patients. 74 patients were included in the three port laparoscopic cholecystectomy group and 50 in the single port laparoscopic cholecystectomy group. Informed consent was taken. All patients were operated under general anesthesia. Statistical analysis was using independent t-test and chi-square test.

**Results:** The mean operative time was slightly longer in SILC (group I) as compared to CLC/SLC (group II). Postoperative pain on VAS scale in group I after 6 hours (1st day score) was 2.44 in group I and 2.73 in group II (CLC/SLC). But on 2<sup>nd</sup> day in SILC 1.40 and in CLC/SLC it was 1.81. In SILC (group I) 4 patients out of 50 (8%) developed seroma and 2 patients out of 50 (4%) developed Biliary peritonitis due to the slipped dip. And in SLC/CLC (group II) 3 patients out of 74 (4.05%) developed seroma.

**Conclusions:** SILC can be an effective alternative to traditional CLC/SLC, with the added benefit of minimized scarring and a shorter length of stay. This technique can be performed safely for patients with a multitude of gallbladder diseases without resulting in additional complications.

**Keywords:** SILC, SLC, Gallbladder, Laparoscopic

## INTRODUCTION

Surgical standards of practice continue to evolve towards less invasive surgical approaches with fewer operative complications. Efforts to improve outcomes of laparoscopic cholecystectomy heralded the advent of single port laparoscopic cholecystectomy.<sup>1</sup> Laparoscopic cholecystectomy is considered as a gold standard for treatment of gallstone disease in the present era since its introduction in 1985.<sup>2,3</sup> Major advantages proposed for this technique are that the patient experiences much less pain as compared to traditional laparoscopic surgery and

recovers faster there is only one incision. The healed incision leaves practically no scar, thus making SILC cosmetically a superior option.<sup>4,5</sup> Major difficulties with this new technique is the sacrifice that has to be made in term of comfort and ergonomics. The ability to triangulate instruments around the target is lost. SILC is a new advanced surgery which uses the specialized equipment which is very costly. SILC can best be described as a procedure in evolution. There is no consensus on surgical technique and exclusion criteria for SILC. Conflicting reports regarding the merits and demerits of this procedure are present. Modifications of

existing laparoscopic instruments has been made to make SILC easier, however more complex modifications result in more expensive equipment.<sup>6</sup> After its introduction, standard multiport cholecystectomy was for a long time under debate and frequently contradicted, a situation in which nowadays single-port cholecystectomy finds itself in. Some studies report higher percentages of bile duct injuries, more blood loss and longer operating time when performing single port cholecystectomy.<sup>7,8</sup> In contrast, although other studies suggest that single site laparoscopic surgery is a safe and adequate procedure, single site surgery for cholecystectomy for uncomplicated cholecystolithiasis is still subject of debate.<sup>9-11</sup> The objective of this study was to evaluate the efficacy and effectiveness of single port laparoscopic cholecystectomy compared to the standard laparoscopic cholecystectomy with respect to time required for surgery, post operative pain and morbidity and complications.

## METHODS

This comparative randomized study was conducted in a M.L.B. medical college Jhansi between June 2013 to June 2014. Approval from ethical committee of Institution was obtained to conduct the study. The study was done on 124 patients. Consecutive patients who fit into the inclusion criteria (age of patient between 10 and 70 years and diagnosis of chronic cholecystitis, symptomatic cholelithiasis, gall bladder) were included in the study. 74 patients were included in the three port lap. Cholecystectomy and 50 in the single port lap cholecystectomy. Informed consent for the procedure was taken. All the patients were operated under general anaesthesia.

### Statistical analysis

Data was collected and statistically analyzed using SPSS.16. Continuous variables (means) were analyzed using independent t-test. Categorical (ordinal and nominal) variables were analyzed using  $\chi^2$  -test. Statistical significance was accepted for P values of < 0.05.

## RESULTS

Out of which 50 were included in group 1 (single incision lap chole/SILC) and 74 patients were included in Group II (3 port lap chole (TPLC)/ standard lap chole (SLC)/ conventional lap chole (CLC)).

In group single incision lap chole/SILC, majority of subjects belonged to the age group 31-40, followed by age group 21-30 years. In group 3 port lap chole/SLC, most of the subjects were in the age group in 31-40 years, as similar in group I (Table 1).

In case of the SILC 80% patients were female and 20% patients were male. In case of 3 port lap chole 71.61% patients were female and 28.38% patients were male. In

both groups number of the female patients were significantly more than male patients (Table 2).

**Table 1: Age wise distribution of subjects (SILC and 3 port lap chole/SLC).**

Age (yrs)	SILC N (%)	3 port lap chole/SLC N (%)
1-10		0 (0)
11-20	0 (0)	4 (5.41)
21-30	17 (34)	12 (16.2)
31-40	19 (38)	24 (32.4)
41-50	9 (18)	19 (25.7)
51-60	5 (10)	7 (9.46)
>60	5 (10)	6 (8.11)
<b>Total</b>	<b>50 (100)</b>	<b>74 (100)</b>

**Table 2: Sex wise distribution of SILC and (in 3port lap chole/SLC).**

Sex	SILC N (%)	3 port lap chole/SLC N (%)
<b>Male</b>	40 (80)	53 (71.62)
<b>Female</b>	10 (20)	21 (28.38)
<b>Total</b>	<b>50 (100)</b>	<b>74 (100)</b>

**Table 3: Comparison of the mean of operative time & mean of pain score of 1st and 2nd day in the SILC and 3 port lap chole/SLC.**

Variables	SILC	3 port lap chole/SLC	P value
<b>Operative time</b>	24.96	19.40	p>0.05
<b>Pain score of 1<sup>st</sup> day</b>	2.44	1.4	p>0.05
<b>Pain score of 2<sup>nd</sup> day</b>	2.73	1.8	p>0.05

Mean operative time in SILC (group I) was 24.96 minutes and in CLC/SLC (group II) was 19.40 minutes. That is mean operative time was slightly longer in SILC (group I) as compare to CLC/SLC (group II). Post-operative pain on VAS scale in group I after 6 hours (1<sup>st</sup> day score) was 2.44 in group I and 2.73 in group II (CLC/SLC). But 2<sup>nd</sup> day (after 24 hours) in SILC 1.40 and in CLC/SLC it was 1.81 (Table 3).

**Table 4: Comparison of the preoperative and postoperative complication.**

Complication	SILC N (%)	3 port lap chole/SLC N (%)	P value
<b>Vascular injury</b>	0 (0)	0 (0)	>0.05
<b>Ductal injury</b>	0 (0)	3 (4.05)	
<b>Biliary leakage</b>	2 (4)	2 (2.70)	
<b>Seroma formation</b>	4 (8)	3 (4.05)	>0.05
<b>Biliary peritonitis</b>	2 (4)	2 (2.70)	
<b>Flap necrosis &amp; others</b>	0 (0)	0 (0)	

In SILC (group I) 4 patients out of 50 (8%) developed seroma and 2 patients out of 50 (4%) developed Biliary peritonitis due to the slipped dip. And in SLC/CLC (group II) 3 patients out of 74 (4.05%) developed seroma 1 patient out of 74 go. CBD injury (which was repaired, and 2 Patients go. CHD injury (developed Biliary peritonitis). No case of flap necrosis was found in both groups (Table 4).

## DISCUSSION

The drawbacks include the longer operating time, although this is partly due to the individual surgeon's learning curve.<sup>12,13</sup> The mean operating time was 25.8 minutes, compared with 18.4 minutes in SLC.<sup>14</sup> In present study 24.96 minutes in SILC and 19.4 minutes in 3 port lap chole. Present study also shows that operative time in the SILC is longer than 3 port lap cholecystectomy. Furthermore, while we did not experience any major intraoperative complications, there are numerous literature reports of iatrogenic injuries to the main bile duct, possibly requiring conversion to open surgery and significantly affecting the patient's postoperative outcome but in our study rather than in SILC there was a CBD injury which was repaired and 2 CHD injury which developed post op biliary peritonitis were reported in 3 port lap cholecystectomy. In addition, Mehmood et al Group I, was offered conventional laparoscopic cholecystectomy and in group II, single incision laparoscopic surgery was performed. Mean operative time, pain score and infection rate were compared between two groups. Average age of patients was 37 years. Female predominance was found. Present study also shows females predominance. Moreover, Priyadarshan et al, reported in their study that 2.19% of the single-site multi-port per-umbilical laparoscopic endo-surgery cholecystectomy (SILC) developed seroma and 1.8% patients of Conventional Multi-port Laparoscopic Cholecystectomy (CMLC). Present study also shows that seroma formation is more common in SILC as compare to 3 port (multi port) lap chole. Another study undergoing single-incision cholecystectomy, 85% (53/62) went home the same day, compared with 70% (44/63) of those undergoing conventional cholecystectomy. Operative time was slightly longer for those undergoing single-incision surgery versus traditional four-incision surgery.<sup>17</sup> In present study also operative time in SILC is 24.96 minutes which is slightly longer than 19.40 minutes in CLC/SLC. Out of the 50 SILC cases 8% patients developed seroma formation as compared to 4.05% in CLC/SLC and postoperative biliary peritonitis was more in SILC as compared to CLC/SLC. And in CLC/SLC 1 patients of 74 got CBD injury (which was repaired) and 2 patients got CHD injury (developed biliary peritonitis). Other authors have pointed out the higher cost, deriving from the pre-curved or jointed instruments (often single-use) used for single-incision surgery. In present case load, the increased cost was contained by the use of traditional laparoscopic instruments.

## CONCLUSION

In conclusion, SILC can be an effective alternative to traditional CLC/SLC, with the added benefit of minimized scarring and a shorter length of stay. A longer operative time may be needed initially to adjust for a learning curve. This technique can be performed safely for patients with a multitude of gallbladder diseases without resulting in additional complications.

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