

# Single-incision Laparoscopic Cholecystectomy vs Conventional Laparoscopic Cholecystectomy

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## ABSTRACT

Laparoscopic cholecystectomy is the gold standard procedure for gallbladder disease. Single-incision laparoscopic cholecystectomy (SILC) has emerged as an alternative to conventional four-port cholecystectomy as SILC has a better cosmetic appearance with faster recovery and early discharge. This review article was done to analyze SILC its advantages and disadvantages in the treatment of gallbladder disease.

**Keywords:** Conventional laparoscopic cholecystectomy, Four-port laparoscopic cholecystectomy, Single-incision laparoscopic cholecystectomy.

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**Conflict of interest:** None

## INTRODUCTION

Laparoscopic cholecystectomy has been the gold standard surgery for gallbladder disease in the last two decades. But improvization and innovation in minimal access surgery has led to the evolution of three-port cholecystectomy, two-port cholecystectomy, and recently, the world is mesmerized with the advent of single-incision laparoscopic surgery.

The single-incision laparoscopic cholecystectomy, henceforth referred to as Single-incision laparoscopic cholecystectomy (SILC), was first performed in 1997 by Navarra.<sup>1</sup> Since then SILC has started gaining popularity among the population. The SILC has resulted in less pain and lesser requirement of narcotics, quick return to work, and also shorter hospital stays.

## AIMS

This review article aims to evaluate which surgical procedure was associated with less operative time and

hospital stay and least postoperative pain. The following parameters were taken into consideration for evaluation.

- Mean age of patient
- Length of stay in hospital
- Operative time
- Cost of procedure
- Postoperative pain
- Complications.

## MATERIALS AND METHODS

The articles reviewed in this study were taken using Google search engine, SAGES website, PubMed, Cochrane, HighWire Press, Medscape. The search phrases used were SILS, SILC, four-port laparoscopic cholecystectomy.

## OPERATIVE TECHNIQUE

In a SILC, two working ports and one optical port were introduced through a single incision. The incision can be either infraumbilical, at the inferior crease of the umbilicus, transumbilical, or Omega shaped incision. One extracorporeal stay suture is used to achieve the standard anterolateral retraction of the gallbladder fundus. Lateral retraction of the infundibulum is accomplished with a roticulating instrument, allowing optimal exposure of the gallbladder hilum.

A 2-cm incision is needed to access the abdominal cavity. SILS™ port (Fig. 1) is introduced and carbon dioxide is insufflated into the abdomen to a pressure of 15 mm Hg. Optical port of 10 mm is introduced into the



Fig. 1: Single-incision laparoscopic cholecystectomy™ port

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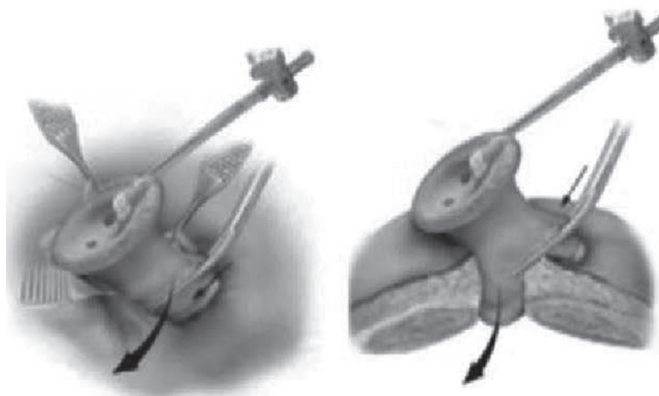


Fig. 2: Technique of insertion of SILS™ port



Fig. 3: Roticulating instruments



Fig. 4: Stryker mini alligator

central cannula and diagnostic laparoscopy is done (Fig. 2). Roticulating instruments (Fig. 3) are introduced into two 5 mm cannula. Fundus of the gallbladder is retracted using Stryker mini-alligator introduced separately (Fig. 4). The procedure is carried out in the same way as conventional laparoscopic cholecystectomy (CLC).

## RESULTS

This review article is based on the four original articles Culp et al, Karim et al, Linden et al, and Bucher et al (Table 1).

Culp et al<sup>2</sup> study group included 62 patients in SILC group and 63 patients in CLC group. The average length of stay in SILC group was 0.34 days and in CLC group was 0.98 days. Operative time in SILC was significantly higher than in CLC (65 minutes *vs* 51 minutes). The cost was also significantly higher in SILC (average \$3700) than CLC (\$3450). No operative complications were noted in either groups.

Karim et al<sup>3</sup> studied a total of 183 patients among which 76 patients were excluded from the study. Of the remaining, the numbers in the SILC group included 45 patients and those in CLC group included 62 patients. The median operative time for SILC group was 75 minutes

which was significantly more compared to CLC group which was 58 minutes. No major intraoperative complications were encountered in either group. There was no significant difference in postoperative pain score and length of hospital stay. During follow-up one patient in SILC group had superficial wound infection which was managed conservatively with oral antibiotics.

Deveci et al<sup>4</sup> comprised totally 100 patients with 50 in each of SILC and CLC. Average operating time in SILC was significantly longer (73 minutes) compared to CLC (48 minutes). Pain was higher in SILC than in CLC. Length of hospital stay was similar in both the groups. One patient in CLC had biliary leakage for 2 days postoperative because of difficult dissection of gallbladder bed which responded to conservative management. Two patients in each group were readmitted for wound infection.

In the study done by Linden et al,<sup>5</sup> 100 patients belonged to SILC group and the other 100 belonged to CLC group. Contrary to other studies, the operating time in SILC group was significantly shorter (46 minutes) compared to CLC group (62 minutes). Perioperative complications were found in 3 patients in SILC (one perioperative bleeding, two pneumothoraces) and 5 patients in CLC (perioperative bleeding). There was no significant difference in length of hospital stay in either group.

Bucher et al<sup>6</sup> studied a cohort of 150 patients who were randomized to undergo either SILS or CLC. Seventy-five patients underwent SILC and the other 75 underwent CLC. Operating time was similar in both the groups. Operating costs were higher in SILS groups. Intra- and postoperative complications were similar in both the groups. Patients experienced less pain in SILC group.

## DISCUSSION

All these studies demonstrate that SILC is welcomed with better cosmesis and decreased length of stay in

**Table 1:** Different studies comparing SILC and conventional LC

Study	Mean age		Length of stay		Operative time		Cost		Postoperative pain	
	SILC	CLC	SILC	CLC	SILC	CLC	SILC	CLC	SILC	CLC
Culp et al	45	52	0.34 day	0.98 day	65 min	51 min	\$3700	\$3450	–	–
Karim et al	46	46.3	22 hours	31 hours	75 min	58 min	–	–	0.34	0.3
Linden et al	45	46	1 day	2 days	46 min	62 min	–	–	–	–
Bucher et al	42	44	0 day	1 day	66 min	64 min	–	–	2	3
Deveci et al	50	50	1.06 days	1.04 days	73 min	48 min	–	–	–	–

the hospital. Pain is also reported less by patients who underwent SILC compared with CLC. Operative time is significantly higher in SILC and is revealed by all the above studies except Linden et al, which surprisingly had lesser operative time for SILC. But as the learning curve of the operating surgeons increases, this will improve in coming days. Postoperative and intraoperative complications were similar in both the groups.

Single-incision laparoscopic cholecystectomy is a good innovation that has a lot of scope in coming days once the learning curve of the operating surgeons improves.

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