

# Single incision laparoscopic surgery (SILS): Challenges at population level based on an initial experience

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**Key Words:** Single incision; laparoscopy; cholecystectomy; SILS.

## Abstract

## Introduction

Currently, single incision laparoscopic cholecystectomy, which is being proposed as an alternative to standard four port laparoscopic cholecystectomy, has not been embraced universally as the procedure of choice for removal of the gall bladder.

## Aim

We aimed to evaluate the feasibility of SILS and report our initial experience of undertaking SILS cholecystectomy in a district hospital where laparoscopic cholecystectomy yet remains the standard, despite the limitation in resources.

## Methods

Six patients underwent SILS cholecystectomy for gall stone cholecystitis as an elective procedure. Except for previous exposure of the surgeon to SILS cholecystectomy, for the rest of the hospital team, the SILS procedure was a new experience. All procedures were performed as standard under general anaesthesia and positive pressure ventilation.

## Results

Six patients (1 male; 5 female; age range 28 to 42 years) underwent SILS over a twelve month period from 2010 to 2011. The main end points were time taken to complete the SILS cholecystectomy and conversion to

4-port laparoscopic cholecystectomy. In 5 (83%), surgery was completed using SILS and the time taken ranged from 100mins to 180mins (median 120mins). Subjective assessment revealed that SILS was a more difficult procedure compared with laparoscopic cholecystectomy, chiefly due to lack of familiarity of the team and limitation in mobility due to the lack of triangulation that is otherwise available with 4-port laparoscopic cholecystectomy.

## Conclusion

SILS is feasible in a district hospital with facilities available mostly for laparoscopic 4-port cholecystectomy. Surgical teams may perform better in their initial SILS experience if the entire team is taken through training. The cost efficacy of SILS needs to be addressed.

## Introduction

Single incision laparoscopic surgery is the current topic of debate in the world of minimal access surgery. Although it offers better cosmesis, the practical benefit of the procedure to the masses cannot be evaluated until it can be reproduced with safety and success in basic centres where a routine four port cholecystectomy can be performed. The operating surgeon must also be skilled to overcome the difference in approach to the surgery in SILS. The aim of our study was to evaluate the feasibility of performing SILS in a Government Hospital with facilities that are available for basic laparoscopy.

## Materials and method

The study was conducted in Wenlock Hospital which is

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a 750 bed district level hospital attached to Kasturba Medical Hospital (Manipal University) in Mangalore, India. Between August 2010 and July 2011 six patients underwent single incision laparoscopic cholecystectomy. The surgery was performed by single surgeon who had over five years of experience in performing a variety of laparoscopic procedures including colorectal procedures. Prior to the study cases the surgeon had performed one SILS operation in a private hospital with use of an energy source and the challenge was to reproduce the success in a basic set up in the district hospital. The hospital is equipped with a single chip (Karl Storz, Tuttlingen, Germany) camera with a xenon light source, a 30 degree telescope, Karl Storz insufflators and Karl Storz hand instruments. There is no energy source such as an ultrasonic dissector or bi-polar vessel sealing device available for use in the hospital. One male and five female patients underwent SILS Cholecystectomy. Of the six, one patient was converted to the conventional four port cholecystectomy. None of our patients was converted to open cholecystectomy. In three cases, an additional port was used toward the end of the procedure, to facilitate dissection of gall bladder from the liver bed, due to need for retraction of a floppy gall bladder. In four cases, a silicon port with multiple openings (one 10mm, two 5mm port) was used, while in two patients a 5mm port was introduced through a separate fascial defect just next to the 10mm optical port, a modification which comprised a single skin incision which incorporated multiple fascial defects. Additionally, we used a fundal traction suture in one patient, while in the remainder, Hartman's pouch alone was retracted with forceps. The cystic duct was divided between double ligatures knotted extracorporeal, as a 5mm clip applicator is not available in the hospital. In the first three cases we used conventional straight instruments where as in subsequent cases we used rigid bent instruments. The gall bladder was elevated from its bed using a

monopolar hook and additional ports were placed in three cases for better traction on the gall bladder, to facilitate quicker dissection. The side port also allowed for placement of a 14 Fr Ryles tube as a drain if required. The gall bladder was delivered via the umbilical incision in all cases. All patients recovered without complication and continue to remain on regular follow up.

## Results

The demography of the patients is shown in table 1. Four cases underwent single port laparoscopic surgery and two underwent single incision multiple port laparoscopic cholecystectomy. The outcome of procedures is as shown in table 2.

All procedures were performed by the author using traditional laparoscopic instruments in the first three cases and a fixed, bent hand instrument in subsequent cases. No energy source was used. The operative time was higher in the first three cases because the camera assistant and the surgeon could not co-ordinate movements (Figure 1). However, in subsequent cases, the surgeon adapted to the situation of limited mobility to undertake only precise required dissection that was required to perform the procedure. Blood loss was negligible in all cases. Following surgery, all patients were ambulant the same evening and were discharged within twenty four hours of surgery. Sutures were removed on the eighth post-operative day, during which, we observed that there were no wound infections. The surgeon found using single incision multiple port technique easier to perform than using single access port, especially since conventional instruments were used.

## Discussion

SILS is the newest entrant in minimal access surgery. Although gynecologists have performed procedures like tubal ligation using a single incision laparoscopic technique for long, the new found enthusiasm among

Table 1 – Patient demography

Serial No.	Age(Years)	Sex	BMI	Symptoms#	GB wall*	Stone *Size/No.	Outcome
1	42	Female	22	Yes	Not thickened	Multiple, up to 6mm	SILS
2	35	Female	26	Yes	Thickened	Single, 12mm	SILS
3	38	Male	24	Yes	Not thickened	Multiple, up to 8mm	SILS
4	42	Female	26	Yes	Thickened	Multiple, up to 5mm	Convert to 4 port lap chole
5	33	Female	22	No	Not thickened	Single, 18mm	SILS
6	28	Female	23	No	Not thickened	GB Polyp	SILS

# Symptoms of right hypochondrial (RHQ) pain, biliary colic and previous similar episodes.

\*Pre-operative ultrasound findings.

Table 2 – Technique and outcome

Serial No.	Technique	Operative time (in min)	Callot's triangle dissection	Additional ports	Drain	Outcome
1	SPLS	180	Easy	Nil	Nil	Success
2	SPLS	150	Easy	Yes	Yes	Success
3	SPLS	120	Difficult	Yes	Yes	Success
4	SILS	Not applicable	Difficult	Yes	Yes	Convert to 4 port
5	SILS	100	Easy	Nil	Nil	Success
6	SILS	100	Easy	Nil	Nil	Success

general surgeons is recent [1,2]. Like every change in surgery it too is bound to be met with criticism. Navarre *et al.* in 1997, and later Piskun *et al.* in 1999, described single access surgery for the gall bladder but it failed to generate enthusiasm among surgeons [3,4]. This technique was used in our series for the first three cases, while the next three cases were performed by the

technique refined by Curcillo and King in 2007 [5, 6]. The usefulness of a procedure depends on several factors such as availability of equipment, ease of performing and reproducibility – both of which depend on ergonomics of the surgical team and surgical expertise, patient safety and surgical cost effectiveness. In our experience, we determined that single incision

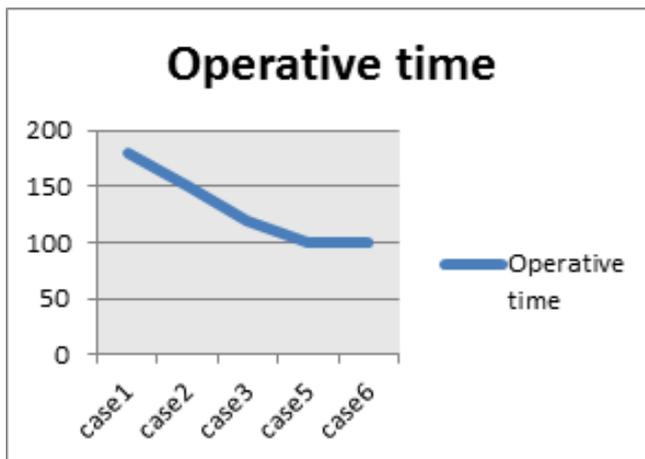


Figure 1 – Total operative time (minutes) of SILS cholecystectomy

surgery is technically more demanding due to an unfamiliar working angle (parallel axis of instruments and telescope), lack of triangulation, the tendency for crowding of instruments at the access site, especially with the use of standard hand instruments and a standard 33 cm telescope. Additionally, a major limitation was the inability of the assistant to keep up with his surgeon.

When a new technique or device is launched there will always be a limited number of people who are capable of using it. Only surgeons with adequate experience and sufficient zeal to embrace newer modalities will be able to make the transition to the newer procedure. There is a lag interval between the emergence of technology and new procedures in specialised centres to it being available to the general public. Such time is usually spent in development of products and refinement of technique, and currently, several new instruments and devices are available for performing single incision surgery each having their proponents [7]. There are several reviews to show that SILS can be performed safely and in a manner that is equivalent to conventional laparoscopic cholecystectomy but the reviews fail to sufficiently discuss the cost of the procedure to patients and the health system [8-11]. The acid test is if a technique can be cost effective to the general public with the same safety profile as the current available modality. Cosmesis may not be a criterion in people at large when

SILS is compared to traditional laparoscopic surgery. In comparative procedures, when the pain factor, recovery time and time to work are similar, it will be cost, which we have not addressed in our study, and availability, that ultimately determines the choice of procedure. However, in practical terms, single incision surgery is yet to be made available at similar cost as conventional laparoscopy. It is the author's perception that even though SILS is an attractive option in selected cases, it cannot be used at community level where a four port cholecystectomy is gold standard.

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