



SINGLE INCISION LAPAROSCOPIC SURGERY POSSIBILITIES AND PITFALL

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ABSTRACT

Introduction: Single incision laparoscopic surgery (SILS) is a new method to perform "old" operations. Though SILS has been referred to many names, for the sake of this paper, any procedure done laparoscopically though one incision will be considered a SILS procedure. The brief review will discuss the history of SILS, current applications, and potential pitfall. **Aim:** To evaluate the benefit, complication, operative feasibility, analyze operative parameter and find out the kind of operations can be performed by SILS. **Material and Methods:** All patients with undergoing SILS presenting to Surgery OPD and Emergency of Maharani Laxmi Bai Medical College, Jhansi will be included in the study from June 2010 to September 2012. **Result:** Of the 424 patients selected, 136 were male and 288 were female. The mean operative time for all cases was 28 min [range 18 minutes to 102 minute]. In our study conversion rate is 1.4%. That is much less than other studies. Total six SILS procedure in our study required conversion, five to conventional laparoscopy and one was converted to open procedure. We used conventional instruments for SILS. We used three ports (one 10 mm & two 5 mm) with single incision through umbilicus. **Conclusion:** SILS has advantage of less pain, less intra operative and post operative complication, shorter hospital stay & earlier return to routine activity.

KEYWORDS : Single incision laparoscopy, Less, Complication.

INTRODUCTION

The Term laparoscopy was coined by Hans Christian – Jacobacus of Sweden in 1911[1].

Laparoscopic examination of abdominal cavity was introduced in 1901 by G. Kelling et al[2] using a cystoscope inserted under local anesthesia.

Alfred Cushieri & George Berci[3] Suggested the utility of laparoscopic exploration to minimize non therapeutic laparotomy & applied laparoscopy in the evaluation of penetrating Abdominal trauma. They also promote interventional general surgical laparoscopy, notably, lysis of intra-abdominal adhesion & laparoscopy guided cholecystectomy.

The apparent advantages of less pain, scaving hospitalization were incentive enough to pursue this noval technique despite early controversies regarding surgeon training & complication related to lack of experience with this new technique.

Single Incision Laparoscopic Surgery:

It is a new technique through which laparoscopic survey take palace through a single umbilical incision, without a need for additional laparoscopic ports SILS was described as early as 1992 by Pelosi et al who performed a single-puncture Laparoscopic Appendectomy and in 1997 by Navarra et al., who performed a laparoscopic cholecystectomy via two trans umbilical trocars and three trans abdominal gallbladder stay suture. In 1999 Piskun et al[4] – Lap chole with two trans umbilical trocars

SILS was first performed for the treatment of appendicitis at Department of Pediatric surgery, Dokuz Eylal medical School, Izmir, Turkey & First Presented at the Annual Conference of Turkish Association of Pediatric Surgeons.

In recent years, SILS has been focused upon as a bridge between NOTES (Natural Orifice Trans-luminal Endoscopic Surgery) and Traditional Laparoscopic Surgery because

NOTES is technically challenging and current instrument need to be further improved. SILS on the other hand enables the application of a wide range of already existing technology & surgeons can performs SILS without any new instruments, specific competence or training.

AIM

- To evaluate the benefit of SILS.
- To evaluate complication of SILS.
- To find out the kind of operations can be performed by SILS.
- To evaluate operative feasibility of SILS.
- To analyze operative parameter.

MATERIAL AND METHODS

All patients with undergoing SILS presenting to Surgery OPD and Emergency of Maharani Laxmi Bai Medical College, Jhansi will be included in the study from June 2010 to September 2012.

Operative method:

In Single incision laparoscopic surgery

- A single curved supra or trans-umbilical 1.5 – 1.8 cm incision is made by pulling out umbilicus by little woods forceps.
- After exposing the Fascia 12 mm port is inserted. Pneumoperitonium is created & maintained with CO₂, and then two 5mm port is inserted, through the anterior sheet of abdominal rectus muscle, each placed 1cm laterally from laparoscopic port. Further technique will differ with different type of SILS procedure.
- For example in Cholecystectomy-
- After insertion of 5mm port, put patients in Antitrandelenberg position & related to left.
- Dissection performed with electric country hook in Left trocar & an endograsper rotulator in other trocar.
- The cystic artery & duct were first exposed then separately clipped with standards 5mm clip applier and excised using an endoshear rotulator.

- The gall bladder then extracted with a standard endocatch through umbilical site. Careful control of haemostasis is achieved & penrose drain was placed in the cholecystectomy lodge through 2mm incision for the mini loop retraction.
- Finally 25 mm trocar site was closed with an absorbable suture & the umbilical restored to its physiological position.

Intra operative comparison:

Type of instrument:

1. Access port : SILS device from Covidien, gel point system from Applied medical

- R-port & Tri-port from advanced surgical concepts.
- Uni-X from P-navel.

Hand instruments:-

(a) Standard instrument
(b) Articulating instrument

- Time of repair
- Intra operative complication
- Type of suture
- Type of anesthesia

RESULTS

Patient demography:

No of patient – 424

Male : Female Ratio – 1::2.11

Male – 136

Female – 288

Age –

Youngest – 12 Yr

Eldest – 88 Yr

Type of anesthesia – Spinal anesthesia

Port – Site – Umbilicus, No. – 3 (10,5,5)

Mean time of surgery – 28 min.

Min. – 18 min.

Max. – 102 min.

Conversion – 8

- To conventional laparoscopy – 7
- To open – 1

Energy source – cautery (monopolar) – 249

Cautery + harmonic – 175

Intra operative complication – 11

- 7 during SIL-Cholecystectomy
- 1 during SIL-TAPP (Total abdominal pre peritoneal mesh repair)
- 1 during SIL-Cholecystectomy + SIL-Ovarian cystectomy
- 1 during SILC + LAP Evacuation
- 1 during SILC + LAP Adhesiolysis

Suture/clip-

- Vicryl 1-0 during port closure.
- Vicryl 2-0 in SILTAPP & SIL-Appendectomy & to tie thick cystic duct.
- Vicryl 3-0 in repair of cystic duct & artery injury avulsion.
- Clips used in SILC. Average 3 clips we used.

Post operative

Use of I.V. analgesic – <24 hr

Average hospital stay – 3 days

Post operative complication – 7, 1 died.

All 7 complications occurred after SILC.

Discharge – average 3 day.

Readmission – 1 patient due to Biliary peritonitis.

DISCUSSION

In new era trends in surgery have changed to less invasive approach –

Like – Conventional laparoscopy

- SILS (Single Incision Laparoscopic Surgery)
- mNOTES (Natural Orifice Trans-luminal Endoscopic Surgery)
- Endoscopic Procedure

In recent years SILS has gained much popularity than other procedures & now SILS is possible in almost every laparoscopic procedure. SILS patients can undergo surgical procedure with just single incision (1/2 inch) through the umbilicus or extra umbilical site and this has many benefits than other procedures like

- Less Pain
- Less Blood Loss
- Faster Recovery
- Cosmetically Better Scar etc.

With lots of benefits SILS procedures also have some drawbacks – like

- It needs expertise
- Require special instruments
- Little bit more costly than conventional laparoscopy
- To overcome cost SILS can be performed with conventional instruments – this reduces the cost of procedure.

In our study we used conventional instruments for SILS. We used three ports (one 10 mm & two 5 mm) with single incision through umbilicus.

This single incision multiport surgery with conventional instruments, markedly reduces the cost of procedure just like conventional procedure.

1. Age/Sex

In our study –

- Youngest – 12 yrs Oldest – 88 yrs
- Male – 136
- Female – 288
- F:M::2.11:1

2. Site & No of Port

Single incision three ports

- One – 10mm and
- Two 5 mm port

3. Operative time

In our study mean operative time:

- In SILC – Mean time – 24 min
- In SILA – Mean time – 27 min
- In SILTAPP – Mean time – 46 min
- SILO – Mean time – 27 min

4. Hospital stay

In our study hospital stay:

Indifferent Procedures

SILC	- 3 days
SILA	- 3 days
SILTAPP	- 3 days
SILO	- 3 days

Average hospital stay in our study was 3 days that is less in

comparison with conventional laparoscopy.

5. Conversion to other procedures & conversion rate

In our study conversion rate is 1.4%. That is much less than other studies.

Total six SILS procedure in our study required conversion, five to conventional laparoscopy and one was converted to open procedure.

6. Intra operative complications

(In terms of visceral & vascular injury)

During our study

- a) Cystic duct & artery avulsion occurred in two patients which was repaired with vicryl – 3-0.
- b) Cystic duct avulsion occurred in two patients & was repaired with vicryl – 3-0.
- c) Transverse colone enterotomy occurred in one patient & was repaired with vicryl 3-0 laparoscopically.
- d) Straussberg type B injury to Rt hepatic duct occurred in one patient that was repaired with vicryl – 3-0.
- e) Bleeding occurred in 4 patients due to adhesion and cystic artery injury.

7. Energy Source

We used two type of energy source in our study –

- Monopolar cautery & HarmonicOnly cautery used in – 249 patients
- Cautery + Harmonic – 177 patients

8. Sutures / Clips

Vicryl – 2-0-

- Used in SIL-Total Abdominal Pre Peritoneal mesh repair (in 25 patients)
- Also used in SIL-Appendectomy (in 18 patients) to ligate appendix
- To ligate large cystic duct in SILCholecystectomy – 4 patient

Vicryl – 3-0 – To repair cystic duct & artery avulsion – 2patients

- To repair – cystic duct avulsion – 2 patients
- To repair transverse colone enterotomy – 1 patients
- To repair straussberg type B injury to Rt Hepatic duct
- Clips – We used clips in our study for SILC to clipped cystic duct & artery. Average three clips we used to clipped cystic duct.

9. Post Operative Complication

- In the study of Kuon Lee et al. post opp complication rate was 5.4%.
- In our study post operative complication rate was (1.63%) = total 7

- a) Two patients developed wound infection – One 1 yr back (delayed wound infection) & one on 14th post operative day
- b) One patient developed allergic reaction around SCAR on 12th post operative day.
- c) One patient developed billiary peritonitis on 18th post operative day.
- d) One patient developed ARF (acute renal failure) & AIO (acute intestinal obstruction) on 3rd post operative day & died on 10th day during dialysis.

- e) Two patients had prolonged post operative Ileus managed conservatively.

10 Pain, Recovery & Discharge

- Pain is found to be less with SILS than open procedure & conventional laparoscopy.
- As in our study requirement of I.V. analgesic was < 24 hr.
- In our study we mobilized the patients on 1st post operative day & on 2nd post operative day patients was able to perform their routine work.
- And depending on patients condition patients was discharged on 2nd & 3rd post operative day that was earlier than conventional laparoscopy & open surgery.
- In our study Average hospital stay was 3 day that is less than conventional laparoscopy.

11. Readmission during follow up

One pt in our study Readmitted on 18th post operative day with sudden pain & distention of abdomen that pt developed billiary peritonitis, patient managed conservatively & discharged on 15th day.

In study of Pisanu A et al[5]. 465 patients operated by SILC & incision was given on umbilicus. Operative time was 45.8 min that is less than cholecystectomy done with conventional procedure. In our study 368 patients was operated with SILC, incision was given on umbilicus & operating time was 24 min that was much lesser than the study of Pisanu–A Recia et al[5]. & conventional laparoscopic procedure in which operating time was 45.8 & 63 min respectively.

12. Comparison of Single incision laparoscopic-Cholecystectomy with conventional cholecystectomy

S. No.		SILC by (Pisanu Recia et al[5])	Conventional Laparoscopy	In our study
1.	No of pt	465	427	368
2.	Site of incision	Umbilicus	Four incision as in conventional laparoscopy	Umbilicus
3.	Operative time	45.8 min	63 min	24 min
4.	Post operative analgesia	Up to 24 yr	Up to 24 yr	< 24 yr
5.	Hospital stay	3	3	3
6.	Post operative complication	5%	5%	1.90%

In study of SILC by Pisanu-A, Recia et al[5]. Post opp analgesia required up to 24 Hr that is equal to conventional laparoscopy as upto 24 Hr but in our study patients required post operative analgesia < 24 hr, that is less than the study of Pisanu-A Racio et al[5] & than conventional laparoscopic cholecystectomy. So earlier return to routine work.

Hospital stay is equal to in all three study. Post operative complication rate was 5% each in study of Pisanu-A Racia et al[5] & conventional laparoscopy. But in our study post operative complication rate was much less 1.90%.

As compare on the basis of scar, SILC study by Pisanu-A Recia et al[5] & in our study scar was cosmetically better than conventional laparoscopy.

Comparison of single-incision laparoscopic surgery

Author	Year	N	Conv.	CompL	Time	Type of LESS	Comment
Piskun ⁴	1999	10	0	0	NR	Transumbilical Multiport	Used Navarra technique
Cuesta ⁶	2008	10	0	0	70	Multiport	Retrospective
Navarra ⁷	2008	20	0	0	122	Two-port	First using transumbilical two port
Rao ⁸	2008	20	3(15%)	0	40	S-Port	First using access device
Palanivelu ⁹	2008	10	4(40%)	1(10%)	168	Multiport	Used fenestrated endoscope for appendectomy
Bucher ¹⁰	2009	11	0	0	52	Access device	Also works on colonoscopy
Podolsky ¹¹	2009	5	0	0	121	Multiport ICH/Endocystiflex SM c&w SM	Carroll technique SPA SIMPLE
Kuon Lee ¹²	2009	37	5(13.5)	2(5.4)	83	Assembled access device	Monoscopic and 2 Abgatic duct stary
Rivas ¹³	2009	100	12%	0	20.8	SILE Port	ASP Supply SM
Wang ¹⁴	2009	100	6%	6%	119	Access device	Urology cases 11-month FU
Reccia ⁵	2010	100	2%	0	NR	SIMPLE	6-month FU
Curdillo ¹⁵	2010	297	8.7%	minor	71	All types	Multi-institutional
Our study	2011-12	427	1.88%	1.65%	28	single incision multiport	Trans umbilical

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