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SINGLE INCISION LAPROSCOPIC CHOLECYSTECTOMY: INITIAL EVALUATION OF A LARGE SERIES IN KUMAOUN REGION OF UTTARAKHAND

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ABSTRACT: Single-incision laparoscopic surgery (SILS) is a recent advance that has taken the surgical community by storm. Single-incision laparoscopic cholecystectomy (SILC) is perhaps the most common SILS procedure used to treat patients with gallstone disease. There are three approaches to SILC: (a) one that uses special, purpose-made access devices or ports for introducing the laparoscope and instruments which are usually, but not always, roticulating ones; (b) passing three 5-mm trocars side-by-side through the fascia after exposing a wide area via a single umbilical incision; and (c) using two trocars at the umbilicus along with suspension sutures to retract the gallbladder. This article provides a detailed, step-by-step description of a technique of SILC using standard laparoscopic instruments. **AIM:** To evaluate the feasibility, advantages and shortcomings of Single Incision Laparoscopic Cholecystectomy using standard laparoscopic instruments. **METHOD:** We attempted SILC in 50 patients between August 2011 and May 2012 and completed it successfully in 45 (unpublished data). The procedures were performed for elective indications (N=50). **CONCLUSION:** We have presented a technique of SILC using standard laparoscopic instruments that emulates all the steps of a safe multi-port cholecystectomy. We found that the technique has a relatively short learning curve and is reproducible. Preliminary studies show that SILC carries certain benefits over MLC. However, SILC should be considered a technique under evolution and further larger studies are required before it can be accepted as a replacement to Multi port Laparoscopic Cholecystectomy.

KEYWORDS: Cholecystectomy, laparoscopy, single-port access surgery, Single-incision laparoscopic surgery

INTRODUCTION: Scarless surgery is the Holy Grail of surgery and the very raison d'être of Minimal Access Surgery was the reduction of scars and thereby pain and suffering of the patients. Since the first laparoscopic surgery was performed by Muhe in 1985 and later published by Mouret, Perrisat and Dubois in 1987 and 1988.¹⁻³

Laparoscopic surgery has expanded in leaps and bounds to become the standard procedure for many intra-abdominal surgeries. The greatest benefit is achieved in operations where the trauma of access exceeds that of the procedure, Figure 1. The quest for scar reduction beyond standard laparoscopy led to the experimentation with natural orifice surgery. The first description of the procedure known as natural orifice transluminal endoscopic surgery (NOTES) in human was reported by Dr. Rao and Reddy in 2004 which was a transgastric appendectomy.⁴

NOTES remains a research technique with only a few clinical cases having been reported due to difficulties of access and inadequate instrumentation as of date. The lack of success of NOTES

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seems to have spurred on the interest in single-incision laparoscopy SILS as an eminently doable technique in the present with minimum visible scarring rendering a 'scarless' effect.

With the conventional laparoscopy for procedures in surgery, being usually carried out through four or more ports. The increased number of ports leads to reduced cosmesis, more pain and increased risk of complications due to port site infections and hernias.^{5, 6}

One advantage of reducing the number of ports over cosmesis would be to reduce these complications. The advantages of SILS are not yet clearly defined. It has been suggested that SILS has the potential advantages of reduced post-operative pain, faster return to work, reduced port site complications and improved cosmesis.⁷

NOTES has a long way to go before it can be used in a routine clinical practice because NOTES is technically challenging and current instrument need to be further improved. SILS on the other hand allows the Surgeon the freedom of using the existing laparoscopic instruments and technology. Single Incision Laparoscopic Surgery is a very exciting new modality in field of minimal access surgery which works for further reducing the scars of standard laparoscopy and towards scarless surgery.

In recent years SILS has been seen as a bridge between natural orifice transluminal endoscopic surgery (NOTES) & traditional laparoscopic surgery.⁸

Figure 1: Decrease traumatic insult to patient with SILS

Similar to NOTES, single-incision laparoscopy aims at minimizing the number of abdominal wall incisions. The fundamental idea is to allow all of the laparoscopic instruments to enter through one skin incision. When compared with standard laparoscopy, the benefits of single-incision laparoscopy seem similar to NOTES. However, unlike NOTES, an abdominal incision is still required, frequently near the umbilicus. In addition, single-incision laparoscopy avoids the potential risk of intraperitoneal sepsis from intentional organ perforation. Finally, single-incision laparoscopic instruments are more readily adapted from standard laparoscopic equipment and are even currently available for use.

SILS-The procedure using conventional instruments:

Brief description of the procedure for cholecystectomy using conventional instruments is as follows:

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- A single curved supra, infra or trans-umbilical 1.5 – 2.0 cm incision is made by pulling out umbilicus by little woods forceps.
- After exposing the Fascia 10 mm port is inserted. Pneumo-peritoneum is created & maintained with CO₂, and then two 5mm port is inserted, through the anterior sheet of abdominal rectus muscle, each placed superio-laterally from laparoscopic port.(Mickey Mouse pattern)
- Further technique will differ with different type of SILS procedure.
- For example in Cholecystectomy-
- After insertion of 5mm port, put patients in head up right up position.
- Dissection performed with electric country hook in Left trocar & an endograsper roticulator in other trocar.
- Additional techniques for proper traction and exposure of calot's triangle like puppeteer technique was used in some cases.
- The cystic artery & duct are first exposed then separately clipped with standards 5mm clip applier and cut.
- The gall bladder then extracted with a standard Endograsper through umbilical site. Careful control of haemostasis is achieved.
- Finally 20mm trocar site was closed with an absorbable suture Vicryl no.1 & the umbilical restored to its physiological position.

SILS – The Procedure:

Umbilical incision

Achieving pneumoperitoneum

Placement of ports

Mickey mouse

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Fundal retraction by stitch

Dissection of Calots triangle

Anatomy of Calot's Triangle

Clip Ligation of Cystic artery

Clip ligation of cystic duct after cutting cystic artery

Removal of dissected Gall bladder from liver bed

Removal of gallbladder

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Open Cholecystectomy

Conventional Laparoscopy

SILS

SL. No.		SILC by (Pisanua Recia et al)	Conventional Laparoscopy	In our study
1.	No. of pt	465	427	45
2.	Site of incision	Umbilicus	Four incision as in conventional laparoscopy	Umbilicus
3.	Operative time	45.8 min	63 min	54 min
4.	Post-operative analgesia	Up to 24 hr.	Up to 24 hr.	< 24 hr.
5.	Hospital stay	3	3	3
6.	Post-operative complication	5%	5%	6%
Comparison of Single incision laparoscopic-Cholecystectomy with conventional cholecystectomy				

In study of SILC by Pisanu-A, Recia et al. Post-op 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 & than conventional laparoscopic cholecystectomy. So earlier return to routine work.

Hospital stay is equal in all three studies. Post-operative complication rate was 5% each in study of Pisanu-A & Racia et al & conventional laparoscopy. But in our study post-operative complication rate was 6%.

SUMMARY: This study was conducted to compare the result of single incision laparoscopic surgery with conventional laparoscopic surgery & open – surgery & to seek the advantages & shortcomings of single incision laparoscopic surgery, and to know the kinds of surgery which can be performed with single incision laparoscopy in the existing set up of General Surgery department of Govt. Medical College Haldwani. Single incision laparoscopic surgeries performed between august 2011 to May 2013 were included in this study.

The advantage of single incision laparoscopic surgery for patients are less post-operative pain, minimal scaring (cosmetically better), shorter – hospital stay and earlier return to normal activity.

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In the debate of single incision laparoscopic surgery & conventional laparoscopic surgery, it was concluded that SILS is safe, feasible, cosmetically – better and probably a better option to conventional laparoscopy & open surgery.

The major challenges in Single Incision Laparoscopic surgery are crowding of instruments and crossing of instruments, which require expertise, but as surgeon becomes familiar with Single Incision Laparoscopic Surgery, SILS can be performed as smoothly as conventional surgery.

The shortcoming of SILS include – costlier instruments, advance expertise and long learning curve.

Cost of the SILS can be lowered with use of conventional instruments in place of SILS port.

CONCLUSION:

1. SILS operation can be performed with conventional instruments.
2. Advance Single incision laparoscopic surgery may require special instruments eg: - SILS port, which increase the cost and requires expertise of operating surgeon.
3. SILS is cosmetically better than conventional laparoscopic surgery & open surgery.
4. SILS is safe and feasible for laparoscopic surgery procedures like cholecystectomy, appendectomy, diagnostic laparoscopy.
5. SILS has advantage of less pain, less intra operative and post-operative complication, shorter hospital stay & earlier return to routine activity.

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