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RESEARCH ARTICLE

SAFETY IN SILS AND COSMESIS FOR CHOLECYSTECTOMY USING CONVENTIONAL
LAPROSCOPIC INSTRUMENTS: A PROSPECTIVE STUDY

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Abstract

Background : Laparoscopic cholecystectomy is the gold standard of gall stone diseases. Advancements in technology and equipment has allowed laparoscopic cholecystectomy to evolve from traditional 4-port cholecystectomy to 3, 2 and now to single incision. Goal is to perform surgery with fewer incisions, less cost and no visible scars without compromising the outcome of the surgery.

Objective : To study the outcome of SILC in terms of: (i) Cosmesis (ii) Safety of procedure (iii) Operating time. (iv) Postoperative pain, requirement of analgesia and hospital stay, (vi) Conversion to 4-port LC /open procedure.

Material and methods: The study was performed on USG documented cases of cholelithiasis, admitted in the Department of Surgery Govt. Medical college srinagar for elective surgeries.

Results : In our study cosmesis was assessed by using Manchester Scar Scale on 7th POD, 3 months postoperatively and 6 months postoperatively. The mean cosmesis score on 7th POD was 5.89±0.82(SD) with 96% of patients having excellent cosmesis. MSS was used to assess scar 3 months postoperatively. Mean cosmesis score was 5.96±0.88 (SD). Majority of patients (95%) had excellent cosmetic result. Cosmesis score was better 6 months postoperatively with mean score of 5.75±0.70 (SD). Majority of patients (96%) had excellent cosmetic results. Subject satisfaction level, both with the cosmetic result and with the overall procedure was noted 6 months postoperatively. This was recorded on a Likert scale, with gratifying results. The assessor of postoperative outcomes was blinded to the treatment status of the subjects. 98 patients preferred SILC (96 SILC and 2 CLC patients). 2 patients preferred CLC (Conventional Laparoscopic cholecystectomy) (those who were converted to open cholecystectomy).

Conclusion: SILC with conventional laparoscopic instruments is cost effective. cosmesis scoring and patient preference continue to favor SILC. The most important reason for patients of symptomatic cholelithiasis opting for SILC is its cosmetic benefit. Women especially the younger ones donot want to have any scar on their virgin abdomen and they choose SILC for this purpose. Transumbilical SILC using conventional instruments fulfils the same purpose without compromising the cosmesis and is a better option in developing part of world as it effectively takes care of cost. SILC was perceived as “No Scar Surgery” by most of our patients while few of our patients’ perception was “as having undergone no surgery” on their abdomen.

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Introduction

The first laparoscopic cholecystectomy recorded in medical literature was performed by Phillip Mouret in 1987 in Paris, France¹. The currently used method for laparoscopic cholecystectomy was devised by Reddick and Oslen². T.E. Udwardia performed first laparoscopic surgery in India in 1990³.

Now laparoscopic cholecystectomy is one of the most commonly undertaken procedures in general surgery with more than 5,00,000 performed annually⁴. Overall mortality after laparoscopic cholecystectomy ranges from 0-1% and rate of major complications is less than 5%⁵.

. Reducing the size or number of ports did not affect the safety of procedure, but these modifications actually reduce the pain and analgesia requirement. Ng WT described LC via a one port incision.⁶ Tagaya N et al reported a new technique of LC by two port approach using abdominal wall lifting method.⁷ Misra has developed a unique technique with extra corporeal knot to perform this two port LC. Lee KW reported a two port needlescopic cholecystectomy using 2-mm or 3-mm endograspers.⁸

Single-incision laparoscopic surgery or SILS refers to the operative technique in which a surgical procedure is carried out through one incision alternatively it is also known as laparoendoscopic single site (LESS) surgery. In 1997 Navarra et al. described a single-incision laparoscopic cholecystectomy as a plausible alternative procedure to the four port laparoscopic cholecystectomy. The use of a single umbilical incision to remove the gallbladder was an interesting innovation and, since Navarra's initial description, the single-incision laparoscopic cholecystectomy (SILC) procedure has gained momentum. The goals of single incision laparoscopic cholecystectomy(SILC) and laparo-endoscopic single site surgery (LESS cholecystectomy) are similar to the goals behind the development of NOTES: decreased pain, decreased length of hospital stay, better aesthetic results, and increased patient satisfaction among others⁹⁻¹³.

The quest for scarless surgery continues, but the goal remains elusive. The logical top contender was natural orifice surgery, but unfortunately even today it remains in infancy. In this scenario, trans-umbilical single incision laparoscopic surgery holds promise, especially as far as cosmetics is concerned, and may be the ultimate answer.

Single incision laparoscopic surgery (SILS) is a recent advance that has taken surgical community by storm. Single incision laparoscopic cholecystectomy is the most common SILS procedure to treat patients with gall stone disease.¹⁴

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 GB. Navarra et al originally described a technique using trans abdominal sutures to suspend the GB during laparoscopic cholecystectomy.¹⁵

MATERIAL AND METHODS:

1. This prospective study was carried out over a period of one and a half years in the Department of Surgery Govt. Medical college srinagar from january 2012 to june 2013. The study was performed on patients with virgin abdomen having **USG documented cholelithiasis** with normal CBD and GB wall thickness admitted for elective surgeries. After discharge patients were followed up for about 3to 6 months.

Exclusion Criteria

1. Patients with history of jaundice
2. Suspected or known case of GB malignancy
3. Cases with attack of acute cholecystitis in previous six weeks.
4. Coagulopathies.
5. USG proved cholidocholithiasis.

Cases having contraindication to laparoscopic abdominal surgery

Methodology

Preoperative Assessment

- On admission, a detailed history was taken.
- Thorough general physical examination and meticulous systemic examination was done in every patient.
- All baseline investigations were done

Operative Technique:

Single incision laparoscopic cholecystectomy

The patients were placed in the supine position on the operating table. Nasogastric tube was inserted to decompress the stomach. Under general anaesthesia pneumoperitoneum was established by blind puncture using veress needle. While elevating the abdominal wall manually, 10mm canula was inserted through the same incision used for veress needle (Fig 1), (usually subumbilical at 6° clock position). Telescope was introduced through the same cannula and peritoneoscopy was performed. Incision was extended vertically and was about 2.5 to 2.7cms. Another 10mm trocar was inserted side by side usually at 2° clock position. A fascial bridge of about 5 to 6mm remained in between two trocars. The operating surgeon conducted the procedure from the left side of the patient. The assistant holding the camera was also on the same side, while TV monitor was located on right side of the patient. The operating surgeon used the dissecting instruments with right hand through a 10mm working port. First thorough assessment of the patient for fitness for SILC was done. The gall bladder was manipulated through two to three strategically placed transabdominal traction sutures (fig 2 & 3), passed through fundus, the body, and the neck area of the gall bladder respectively. Cystic duct and cystic artery was identified and clipped. After dividing the cystic duct and artery, L-Hook/spatula was used to dissect GB from liver bed. Last attachment of GB with liver was cut carefully. GB was extracted through the working port. Proper haemostasis was achieved. Thorough normal saline (NS) irrigations and suction of the same, if required was done before the completion of the procedure.

Postoperative Care (fig 4):

Routine postoperative care was offered

Follow up

- First visit at one week after surgery.
- Second visit at second week after surgery.
- Next three visits after every four weeks followed by 6months postoperatively.

Discussion

Single-incision laparoscopic cholecystectomy is relatively new minimally invasive surgical technique in treatment of benign gallbladder diseases. SILC is essentially a laparoscopic technique, so experienced surgeons can adapt faster; there is no influence on hollow organs integrity (as in NOTES); cosmetic effect is greatly improved; there is a lesser percentage of wound infections; faster recovery and return to daily duties can be achieved, and at last, it allows conversion to conventional LC very easily. Our study also had the same aim. This prospective study was conducted on 100 patients of symptomatic cholelithiasis who presented to postgraduate department of surgery, Government Medical College, Srinagar. We are presenting our experience in performing SILC.

AGE DISTRIBUTION OF PATIENTS

In the present study the age of patients ranged from 16-66 years. Mean age of patients (in years) was 39.99 ± 13.145 (SD).

SEX DISTRIBUTION OF PATIENTS: In the present study there were 92 females (92%) and 8 males (8%). Our study had a male:female ratio of 1:11.5. Our results were also similar to **Zahid Mehmood, Anis Subhan, Nasir Ali et al**¹⁶

INTRAOPERATIVE PARAMETERS: In our study, out of 100 patients, 65 patients had USG documented multiple GB calculi where as 35 patients had solitary GB calculus. Size of solitary GB calculus ranged from 1-1.5 cms. SILC was successfully done in 96 patients. 4 patients were converted from SILC to either 4-port laparoscopic cholecystectomy or open cholecystectomy. Reasons for conversion being dense adhesions around GB, frozen Calot's triangle anatomy and procedure related complications. Out of 96 patients who underwent SILC, 4 patients required one additional / rescue port (5mm) due to adhesions and non-clear anatomy of Calot's triangle. 2 patients were converted to CLC (4 port lap. Cholecystectomy) due to above mentioned reasons, whereas 2 patients were converted to open cholecystectomy. One of the patient had CBD injury. Primary repair of CBD was done with t-tube drain in CBD which was removed 2 weeks postoperatively. Mean operative time in our patients was 42.15 ± 12.68 mins (SD) with a range of 20-120 mins. 33% of our patients had an operative time of ≤ 30 mins, whereas majority i.e. 65% of patients had operative time in the range of 31-60 minutes. **Marco Aurelio de George, Marlon Rangel, Rafael William Noda et al**¹⁵ had almost similar mean operative time of 46.2 minutes in their study.

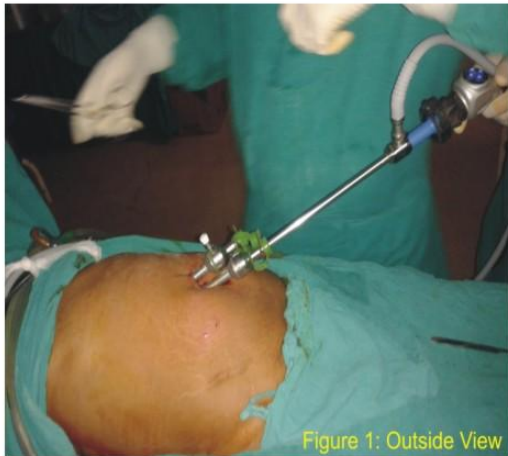


Figure 1: Outside View

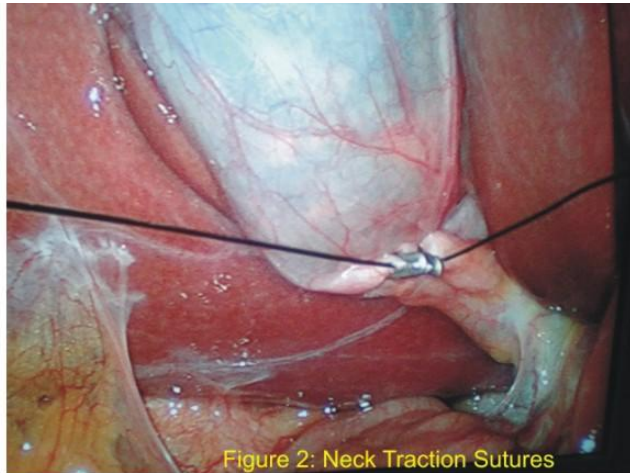


Figure 2: Neck Traction Sutures

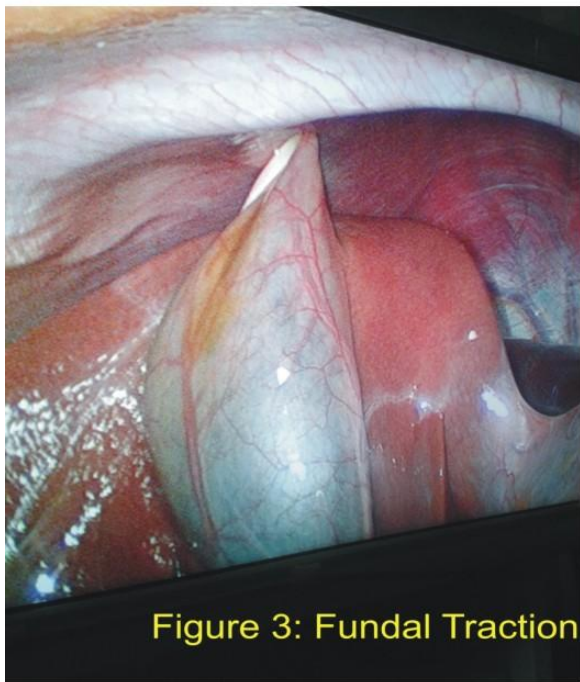


Figure 3: Fundal Traction



Figure 4: Immediate Postoperative View



Figure 5: Postoperative view at Six Months

POSTOPERATIVE PARAMETERS :In our study there were no major postoperative complications till last follow up.

HOSPITAL STAY: Mean hospital stay in our patients was 1.32 ± 0.680 (SD) days.

POSTOPERATIVE PAIN (VAS): The postoperative pain was assessed by Visual Analogue Scale (VAS). The scores were calculated at 1, 12 and 24 hours postoperatively. The pain scores were significantly lower in our patients. The mean visual analogue score for pain 12 hours postoperatively was 2.98 ± 1.32 and at 24 hours VAS score was 2.12 ± 0.98 (SD). 60% of our patients had VAS score of 0-2 (at 12 hours postoperative) which shows that the procedure is less painful and requires no or minimal analgesics.

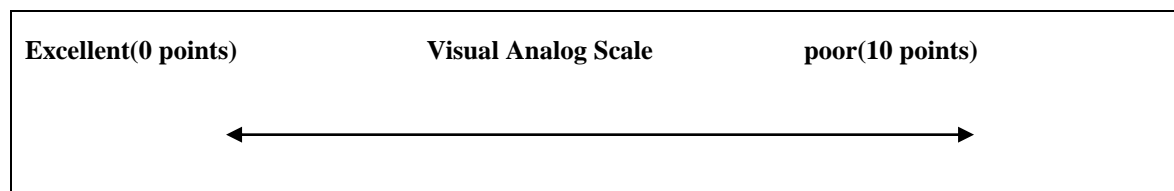
DOSE OF ANALGESIA REQUIRED: Analgesia used in our study was intramuscular injection of Diclofenac sodium (75mg) which was given on demand in our study. The mean analgesia dose requirement in our study was 0.75 ± 1.17 (SD). In our study no dose (0 dose) of intramuscular injection of diclofenac sodium (75mg) was given in 61 patients. 32 patients required 1-2 doses of intramuscular injection of diclofenac sodium (75mg). It is said that in CLC(4 port laparoscopic cholecystectomy), epigastric port is the main contributor to pain as are the two 5mm subcoastal ports. Therefore reduction in number of ports does also reduce the pain score as well as the analgesic requirement which is evident in our study.

COSMESIS AND PATIENT SATISFACTION

Scarring affects patients following trauma, burns, and surgical procedures. Several modalities have been devised to quantify scars for the purposes of determining response to treatment and for evaluating outcomes. Scar assessments can be objective or subjective. Objective assessments provide a quantitative measurement of the scar, whereas subjective assessments are observer dependent. Quantitative assessment of scars requires devices to measure their physical attributes. Subjective methods to assess scar provide a qualitative measurement of scar by a patient or clinician. Semiquantitative methods to assess scars have been Scar scales devised to quantify scar appearance in response to treatment. There are currently at least 5 scar scales that were originally designed to assess subjective parameters in an objective way: The Vancouver Scar Scale (VSS), Manchester Scar Scale (MSS), Patient and Observer Scar Assessment Scale (POSAS), Visual Analog Scale (VAS), and Stony Brook Scar Evaluation Scale (SBSES). These observer-dependent scales consider factors such as scar height or thickness, pliability, surface area, texture, pigmentation, and vascularity.¹⁷ The measurements range across a continuum of values. Thus, the scales are best used to determine change within an individual rather than between individuals developed by using scales to make subjective methods more objective.

The Manchester Scar Scale, proposed by Beausang et al¹⁸ in 1998, includes an overall VAS (0-10 points) that is added to the individual attribute scores. It assesses and rates 5 scar parameters: scar color (perfect, slight, obvious, or gross mismatch to surrounding skin), matte or shiny, relationship to surrounding skin i.e contour (range from flush to keloid), texture (range normal to hard), distortion (none to severe).^{19,20} Scores from the 2 scales are added together to give an overall score for the scar, with higher scores representing clinically worse scars (5 best to 28 worst).

Manchester Scar Scale



Colour	Perfect	1
	Slight mismatch	2
	Obvious mismatch	3
	Gross mismatch	4
Matte vs shiny	Matte	1
	Shiny	2
Contour	Flush with surr skin	1
	Slightly proud	2
	Hypertrophic	3
	Keloid	4
Distortion	None	1

	Mild	2
	Moderate	3
	Severe	4
Texture	Normal	1
	Just palpable	2
	Firm	3
	Hard	4

In our study cosmesis was assessed by using Manchester Scar Scale on 7th POD, 3 months postoperatively and 6 months postoperatively. The mean cosmesis score 7th POD was 5.89 ± 0.82 (SD) with 96% of patients having excellent cosmesis. (MSS) was used to assess scar 3 months postoperatively. Mean cosmesis score was 5.96 ± 0.88 (SD). Majority of patients (95%) had excellent cosmetic result. Cosmesis score was better 6 months postoperatively with mean score of 5.75 ± 0.70 (SD). Majority of patients (96%) had excellent cosmetic results. Subject satisfaction level, both with the cosmetic result and with the overall procedure was noted 6 months postoperatively. This was recorded on a Likert scale, with **very unsatisfied, unsatisfied, neutral, satisfied, and very satisfied** as the available options. The assessor of postoperative outcomes was blinded to the treatment status of the subjects. 98 patients preferred SILC (96 SILC and 2 CLC patients). 2 patients preferred CLC (those who were converted to open cholecystectomy).

COST EFFECTIVENESS

Cost is the main limiting factor to opt for laparoscopic procedures in a vast majority of patients. Four ports are used in conventional laparoscopic cholecystectomy, while only two ports are used in SILC with conventional laparoscopic instruments and ports, as one port costs around 5000 Indian rupees. Furthermore single incision laparoscopic cholecystectomy requires less cosmopore dressings as compared to four port laparoscopic cholecystectomy, as there are 3 less scars than four port laparoscopic cholecystectomy. Thus the attempt at performing the procedures with fewer number of ports and scars reduced the burden of cost. This technique offers more benefits in terms of cost effectiveness.

SUMMARY

The study was performed on USG documented cases of cholelithiasis admitted in the Department of Surgery SMHS Hospital for elective surgeries. This study was carried over a period of one and a half years and was a prospective one. The study was randomized. A total of 100 patients of both sexes with confirmed diagnosis were included in the study. All the procedures were completed successfully without any mortality or major morbidity. Mean operative time (mins) in our study was 42.15 ± 12.68 (SD). Majority of our patients were discharged home on 1st POD (76%) with a mean hospital stay of 1.32 ± 0.680 days. Our patients experienced less pain with a mean pain score of 2.98 ± 1.32 (VAS) at 12hrs postoperatively with less requirement of analgesics. 61% of our patients required no analgesics in any form. We achieved excellent cosmetic results in our patients with a mean cosmesis score of 5.75 ± 0.70 (MSS) 6 months postoperatively.

CONCLUSION

SILC is safe, feasible and reproducible procedure with conventional laparoscopic instruments. The primary outcomes seem comparable with those for conventional laparoscopic procedure. Excellent exposure of the critical view was obtained in nearly all the cases. SILC is technically difficult and demands a learning curve. The operating times are reasonable and can be lessened with experience. SILC with conventional laparoscopic instruments is cost effective. cosmesis scoring and patient preference continue to favor SILC. The most important reason for patients of symptomatic cholelithiasis opting for SILC is its cosmetic benefit. Women especially the younger ones donot want to have any scar on their virgin abdomen and they choose SILC for this purpose. Transumbilical SILC using conventional instruments fulfils the same purpose without compromising the cosmesis and is a better option in developing part of world as it effectively takes care of cost. SILC was perceived as “No Scar Surgery” (fig 5) by most of our patients while few of our patients’ perception was “as having undergone no surgery” on their abdomen

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