

## Outcome of Single Port Laparoscopic Cholecystectomy

Ahmed M. Younis

General Surgery Department, Faculty of Medicine, Al-Azhar University

[Younis\\_surgeon@yahoo.com](mailto:Younis_surgeon@yahoo.com)

**Abstract: Hypothesis:** Single incision laparoscopic surgery (SILS) allows surgeon to perform laparoscopic procedures through a single umbilical incision, minimizing surgical trauma and hospital stay. **Patients and method:** Twenty consecutive adult patients of different ages (20 -60) with chronic calcular cholecystitis, had single port laparoscopic cholecystectomy in department of surgery, Abdul Rahman AL-Mishari Hospital (Riyadh, Kingdom Saudi Arabia). It was first time for us to use that instrument. Patients signed informed consent for procedure. All patients had prophylactic third generation cephalosporin. The main outcome measures, were operative time, complications up to 30 days, pain scores and overall satisfaction. **Results:** Single incision laparoscopic cholecystectomy took 60 minutes to perform. Most of patients were discharged on post operative day one, less post operative pain, improved patient cosmesis and satisfaction, a chest infection after surgery had prolonged the length of stay in 2 cases. **Conclusion:** SIL cholecystectomy is an attractive method to further minimize surgical trauma and can be applied in more complex cases. A large trials are needed to determine the benefits of this new technique.

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**Keywords:** Single incision laparoscopic surgery; laparoscopic procedure; umbilical incision; pain score

### 1. Introduction

Minimally invasive surgery via laparoscopic technology has revolutionized the way we practice surgery. By using such techniques, complex intra-abdominal procedures can be safely and successfully performed, with minimal trauma to the patient<sup>(1)</sup>. This leads to reduced post operative pain, wound complications, length of stay, improved patient cosmesis and satisfaction<sup>(2)</sup>. Laparoscopic techniques are considered the criterion standard for elective and emergency operations, such as appendectomy and cholecystectomy. More complex procedures, such as laparoscopic colectomy, gastrectomy,<sup>(3,4)</sup> and oesophagectomy, are becoming widely available for planned and acute admissions<sup>(5)</sup>. Single port laparoscopic cholecystectomy is an innovation that uses single access point through the umbilicus. The trans-umbilical approach has been referred to by several names, including single port laparoscopy, single port access surgery. It requires the insertion of 2 or 3 ports via single umbilical incision, with or without a specially manufactured SILS port<sup>(6)</sup>. This technique may further reduce the trauma of surgical access and has the potential benefits of reduced post operative pain and wound complications. Furthermore the scar can be completely hidden within the umbilicus ( Figure 5), leading to virtually scarless surgery. 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 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<sup>(7)</sup>.

### 2. Patients and method

Between January 2011 and February 2012 thirty patients of different ages ( 20 - 60 years ) presented to Surgery Department (Abdul-Rahman Al Mishari Hospital KSA) by chronic calcular cholecystitis were included in this study. All patients, after history taking and clinical evaluation, underwent the following investigation, complete blood count (CBC), coagulation profile, random blood sugar (RBS), liver function tests, (LFT), kidney function tests, chest X ray, electrocardiogram (ECG) and abdominal ultrasonography. Endoscopic retrograde cholangiopancreatography (ERCP) done for some select cases.

### 2. Patient positioning and access

The procedure was performed with the patient under general anesthesia, endotracheal intubation, a nasogastric tube to deflate the stomach and urethral catheterization. The patient was placed in supine position with his or her arms wrapped by his or her sides and the legs split apart and strapped firmly to the legs boards. The operating table was tilted in

reverse Trendelenburg position with tilt to the left. The surgeon stands on the left side of the patient, with the assistant opposite him during the placement of the first port. For rest of the procedure, the surgeon stands between the legs and the camera person stands to his right (near the left leg of the patient) (Figure 1) The television trolley is placed above the patient's right arm. The diathermy pedal is placed near the surgeon's right foot and all tubes and cables are fixed such that they do not interfere with the camera person.

The umbilicus was everted using a little-woods forceps and a 2-0 poly-propylene stay suture inserted

on either sides of medline or using two towel clip to evert umbilical stump (Figure 2). A 3-cm vertical skin incision was made between the stay sutures. Dissection was carried down through the linea alba and the peritoneum was opened under direct vision. A SILS port was inserted into the umbilicus incision. This is a flexible multi channel access port that can accommodate up to 3 instruments, with gas being introduced through a separate channel. Three 5-mm SILS trocars were introduced through the SILS port and 5-mm laparoscope was introduced into the abdomen.



Figure 1



Figure 2



Figure 3



Figure 4

### Instrumentation and hand positioning

Following laparoscopic examination of all quadrants, 2 graspers were inserted into the abdomen to manipulate the gall bladder. The right hand instrument entered the abdomen from the right to the left ( so that it was viewed on the left side of the screen), with the instrument tip curved to the right. The left hand instrument controlled the right sided instrument on screen, which was curved to the left.

### Surgical technique

The technique described here used standard instruments barring the long laparoscope (Figure 4)

for all cases of SILC. At the same time, the emphasis was on emulating the key "safety" steps of multiple port laparoscopic cholecystectomy ( MLC), adequate fundal and lateral traction, demonstration of the Callot's triangle and secure control of the cystic artery and cystic duct after identification and proper dissection (Figure 3).

### 3. Results

Single incision laparoscopic cholecystectomy (SILC) was completed in 60 minutes and operation time reduced up to 40 minutes by learning curve,

with minimal (< 50 ml) blood loss. The patient went to a standard ward bed after surgery and recovery from anesthesia and allowed to drink and eat from day one. Postoperative analgesia was provided by regular intravenous paracetamol 1 gm / 8 hours and by a patient controlled analgesia pump delivering intravenous pethidine hydrochloride. This was replaced by standard oral analgesia in form of acetaminophen and tramadol hydrochloride on postoperative day 2 until discharge. Postoperative recovery was delayed by a chest infection in some patient that required intravenous antibiotic treatment and chest physiotherapy. The patient was discharged on postoperative day 2 and was free of biliary obstructive symptoms. Figure 5 shows the final results of SIL cholecystectomy.



Figure 5

#### 4. Discussion

Critics of the SILS technique point to numerous factors that make it much more demanding than conventional laparoscopic surgery. Because the camera and all instruments are inserted through the same incision and the basic laparoscopic principles of triangulation are lost. Although this can be aided by the use of articulating instruments, the camera position leads to an alternation of depth perception for the surgeon, further compounding the problem. The surgeon must also get accustomed to using his or her hands (in reverse) because the right hand controls the left-sided instrument on screen and vice versa. Unlike conventional laparoscopic surgery, the assistant is unable to use an additional grasper to aid retraction because only 2 instruments in addition to laparoscope are able to pass through the SILS port. Additional retraction may be provided by the use of a series of suspending stitches as described by Chow *et al.*,<sup>7</sup> for cholecystectomy. During SILS procedures, the assistant also may interfere with the surgeon because of common access point (Figure 4). In the future, this problem may be ameliorated by the use of

longer laparoscopes so that the assistant can work with his or her hands away from the surgeon. The use of right-angled light lead connectors or in-line light leads, would also reduce the interference with the movements of primary surgeon. The advent of flexible laparoscopes will facilitate more complex SILS procedures. All these factors make SILS significantly more demanding than conventional laparoscopic surgery, requiring high level of concentration. Clearly, surgeons will need time to be adequately trained in this technique. Another limiting factor to the SILS approach may be the size of specimen to be extracted.

The SILS technique has been described for abdominal operations such as cholecystectomy<sup>14,15</sup> and appendectomy<sup>7</sup>, however, its benefits to the patients in terms of post operative recovery, pain, wound complications and cosmesis have been proven by high quality comparative study between conventional laparoscopic cholecystectomy and SILC. but, although individual reports of the use of SILS for more complex abdominal surgery, may demonstrate start the applicability of this technique, there is much work to do before SILS can be advocated to the wider surgical community. Despite these reservations, SILS remain an attractive future option to surgeons and patients to minimize surgical trauma and to optimize cosmetic outcomes.

#### Summary

We have presented a technique of SILC using standard long 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 multi-port laparoscopic cholecystectomy (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 multiple port laparoscopic cholecystectomy (MLC).

#### Corresponding authors

**Ahmed M. Younis**

General Surgery Department, Faculty of Medicine, Al-Azhar University

[Younis\\_surgeon@yahoo.com](mailto:Younis_surgeon@yahoo.com)

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