

Single Port Endolaparoscopic Surgery (SPES) in Double Abdominal Procedures

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Abstract

Background: Single port endolaparoscopic Surgery (SPES) has gained enthusiasm in the surgical community because of the perceived better postoperative outcome, namely a single incision. We write this prospective observational study to ascertain the feasibility and safety of this technique in patients needing two operations.

Methodology: Three patients who underwent double procedures each. Case 1: Transabdominal preperitoneal hernia repair with gastric wedge resection. Case 2: Cholecystectomy with diaphragmatic hernia repair. Case 3: Oophorectomy with incisional hernia repair. Patient demographics, type of port used, operating time, complications and scar length were collected.

Results: Operating time for the first case was 250, 210 and 105 minutes respectively. Incision length varied from 2 to 3 cm. Addition of a 5 mm port and an intraoperative complication of a laceration of the liver after suturing of the gallbladder fundus was noted in the second case.

Conclusion: SPES is a feasible and safe technique for approaching double procedures. It drastically reduces the number of scars that a double procedure creates and if difficulty arises another port can always be added to ease the operation.

INTRODUCTION

Since the first laparoscopic cholecystectomy¹⁻³ more than two decades ago, laparoscopic surgery has evolved from basic procedure to most advanced surgical operations. This is a result of the better clinical outcome compared to conventional surgery. The success of many procedures like cholecystectomy, GERD surgery, obesity surgery and more has been driven because of the shorter hospital stay, better cosmesis and less pain, becoming a gold standard approach for many of them. Subsequently, Laparoscopic surgery has also evolved by minimizing the size of the wound with the use of mini-instruments called minilaparoscopic surgery or needlescopic surgery. Several studies showed that procedures with mini-instrumentations were feasible, with lesser postoperative pain and smaller scar compared to standard laparoscopic surgery⁴⁻⁸ but the worldwide acceptance of this technique was not achieved as expected.

The advent of single port endolaparoscopic surgery (SPES) in the last year seems to address this issue but more clinical studies are needed to prove these endpoints. To our knowledge there is no report yet for single port surgery being done for two abdominal procedures.

We report our experience in using SPES in patients undergoing double procedures with the aim of assessing

the feasibility and safety of doing two abdominal operations using a single entry.

MATERIALS AND METHODS

From May to November 2009, three patients underwent double abdominal procedures. Informed consent was taken explaining the possible risk of conversion to conventional laparoscopy. Data regarding patient demographics, type of operation, operating time, complications, postoperative pain score was collected.

Case 1: 56 years old male with a 5 × 4 cm gastrointestinal stromal tumor (GIST) at the posterior gastric wall near the lesser curvature and a right indirect inguinal hernia. The single port device (SILS™, Covidien, Norwalk, USA) was inserted through a 2 cm transumbilical incision. Hernia repair was first done using the transabdominal preperitoneal approach (TAPP). The peritoneal flap was created using articulated instruments (Roticulator™, Covidien, Norwalk, USA) and straight conventional graspers and scissors. A 15 × 10 cm lightweight polyester mesh (Parietene™, Covidien, Norwalk, USA) covered the myopectenial orifice and fixation with nonabsorbable tackers (Protack™, Covidien, Norwalk USA) at the Cooper's ligament. The

peritoneal flap was closed over the mesh with tackers. The GIST tumor was lifted using sutures and wedge resection was performed with linear staplers (Echelon™, Johnson and Johnson, New Jersey, USA) using 4 blue cartridges. Intraoperative endoscopy was performed to assess completion of the resection and to verify the staple line. The specimen was extracted and the umbilical incision was closed with absorbable sutures.

Case 2: 55 years old male with traumatic left diaphragmatic hernia and symptomatic gallstone disease. The single port device (Triport™, Olympus, Tokyo, Japan) was inserted via a 2 cm supraumbilical, incision. Articulated instruments and hook diathermy were used. The gallbladder fundus was retracted using sutures (puppet technique)⁶ and the cystic duct and artery were clipped with hemostatic clips (Hem-o-Lok™, Weck, N Carolina, USA). The left diaphragmatic hernia was identified and incarcerated omentum was reduced. Repair was done with 2-0 nonabsorbable sutures. An additional 5 mm port in the left subcostal was necessary to achieve the triangulation needed to assist in endosuturing. A 15 × 10 cm polyester composite mesh (Parietex™ Covidien, Norwalk, USA).

Case 3: 77 years old female with a left ovarian cyst and a right incisional hernia from a previous appendectomy. The single port device (SILS™, Covidien, Norwalk, USA), port was inserted in a 2 cm incision in the left lower abdominal quadrant. The uterus was lifted using an intrauterine retractor and left oophorectomy was completed using bipolar scissors. Subsequent adhesiolysis was done and the omentum was freed and reduced into the abdominal cavity. The hernial defect was closed with nonabsorbable transfascial sutures and covered with a 10 × 15 cm antiadhesive mesh (C-Qur™, Atrium Medical, Hudson, USA). Mesh fixation with transfascial sutures and titanium tackers (Protack™, Covidien, Norwalk, USA) was done.

RESULTS

Procedure	Operating time (minutes)	Intraoperative complications	Port used	Additional 5 mm port	Size of incision (cm)	Size of scar (cm)
TAPP + Gastric wedge resection	250	None	SILS™	Nil	2	2.5
Cholecystectomy + Diaphragmatic hernia repair	210	small laceration of the liver	Triport™	1	2	2.5
Oophorectomy + Incisional hernia repair	105	None	SILS™	Nil	2	2.5

DISCUSSION

Single port endolaparoscopy (SPES) further minimized the invasiveness of the surgical procedure by limiting the trauma from several incisions to a single incision. Different endolaparoscopic procedures using this approach were seen to be feasible and safe,⁹⁻¹² there still is no proven advantage of this technique over conventional endolaparoscopy. We believe that decreasing the number of incisions and increasing the number of procedures done will be the great advantage of single port surgery.

We made use of two devices locally available: the SILS™ device (Covidien, Norwalk, USA) and the Triport™ (Olympus, Tokyo, Japan). In 2 cases, the SILS™ device was used. This is an hour glass shaped port made of an elastic polymer that is squeezed to fit a 2 cm incision into the abdominal cavity. It comes with low profile 5 mm and a 12 mm trocars which are inserted into the port. The Triport™ was used in one case. This access device has 3 gelatin coated working ports, namely one 12 mm and two 5 mm ports and an insufflation and gas release port. The adjustable double layer transparent plastic sheath is adjusted to the thickness of the abdominal wall (up to 10 cm).¹³⁻¹⁵

Comparing the ports, we found that the Triport™ was easier to insert in a 2 cm incision and is versatile on different abdominal wall thickness. The drawback is its more propensity for gas leak around the incision site, the difficulty in inserting instruments through the gelpport cap and the friction encountered with instrument movement in and out of the port. This was remedied with a small incision over the gelpport caps and lubrication of instrument with lubricating jelly. The SILS™ port on the other hand has a more airtight seal and greater ease of instrument insertion and movement. Its drawback is that it requires a certain effort to insert in a 2 cm incision and it was not suited for abdominal wall thickness greater than 5 cm. Introduction of the 12 mm trocar was very difficult and it made the port expand, affecting the inflow of gas. This was remedied but removing two 5 mm trocars while using the 12 mm trocar.

In our experience, the most important aspect in performing single port surgery for double procedures is the placement of the port. The port must be situated in a position that provides maximal access to both procedures by providing an optimal view of the surgical working field, maintaining adequate instrument triangulation and give a suitable ergonomic position for the surgeon. The first case was approached through the umbilicus as both the hernia repair and the gastric wedge resection was accessed by a simple change in the surgeon's position. A supraumbilical incision was done for the second case as we wanted our instruments to reach left hemidiaphragm and still maintain adequate access to the gallbladder. For the third case, placing the port in the the left lower quadrant along the midclavicular line provided maintained the triangulation of instruments for manipulating the left ovary at the same time does not compromise the working area for the right lower quadrant incisional hernia.

Choosing which procedure to do first is another factor to take into consideration. In the first and third case, the first procedure was chosen based on the technical ease of the operation as compared with the second procedure. For the second case, cholecystectomy was done first because any spillage of bile that occurred would affect the decision to place a mesh on the diaphragmatic defect.

With regards to the instruments, articulating instruments provided the triangulation needed in terms of retraction. In cholecystectomy, the Roticulator™ grasper was useful in retraction of the Hartmann's pouch of the gallbladder while the fundus was retracted with sutures.¹⁶ Regarding optics, a rigid 5 mm 30° scope (Endoeye™, Olympus, Tokyo, Japan) was our preference because the light cable is situated at the end of the camera head and not on top which eliminates clashing of instruments.

The complication encountered was a small laceration on the liver that was experienced while suturing the fundus of the gallbladder for retraction and was controlled with cauterization. An additional 5 mm port was placed due to the increased triangulation needed to suture the diaphragmatic defect.

CONCLUSION

SPES is a feasible and safe technique for approaching double procedures. It drastically reduces the number of scars that

a double procedure creates and if difficulty arises another port can always be added to ease the operation.

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