Single Port Surgery
Hype or Reality

Deron J. Tessier, MD.
Staff Surgeon. Southern California Permanente Medical Group

What Is Single Incision Surgery?

What Is Single Incision Surgery?

What Is Single Incision Surgery?

What Is Single Incision Surgery?

Nothing to Disclose
What Is Single Incision Surgery?

What is Single Incision Laparoscopic Surgery vs. NOTES?

- SILS- 1 abdominal wall incision with multiple ports
- NOTES- Using a natural orifice as the area of entrance into the abdomen to perform surgical procedures

Definitions

- Single Port Surgery
- E-Notes (Embryonic Natural Orifice Transumbilical Endoscopic Surgery)
- LESS (Laparoendoscopic Single Site Surgery)
- SPA (Single Port Access)
- S3 (Single Site Surgery)
- TUES (Trans Umbilical Endoscopic Surgery)
- NOTUS (Natural Orifice Trans Umbilical Surgery)
- SAVES (Single Access Video Endoscopic Surgery)
- SILS (Single Incision Laparoscopic Surgery)

History of SILS

- Wheeless reported first 4000 cases of single incision tubal ligation in 1969
- Laparoscope with offset eyepiece and 5mm working port used to introduce instruments
- "wound healing is so satisfactory that no scar is grossly visible"

History of SILS Appendectomy

- First SILS appy by Pelosi in 1992 (25 patients)
- D’Alessio reported 116 pts that underwent transumbilical laparoscopic-assisted appendectomy (TULLA)
- 11mm Laparoscope with 5mm working port
  - Appendix grasped and brought out umbilicus
  - 19% required additional trocars
  - 4% open
  - Mean OR time 35 minutes
  - 7 day return to normal (SILS) vs 10 days (multiple) vs 14 days (open)

History of SILS Appendectomy

- In 2007 Ates described single-port appendectomy using specialized port and transabdominal suspension suture
Ates et al SILS Appendectomy

- 121 patients standard 3 port technique
- 38 patients Single port attempted
  - No significant differences in pt characteristics
  - No significant difference in LOS or OR time
  - Cosmesis far superior in SILS pts

History of SILS Cholecystectomy

- Tacchino reported 12 patients in 2009
- 12mm incision
- 2 Sutures used to suspend gallbladder and aid in exposure
- Articulating instruments used for dissection

Tacchino et al SILS Cholecystectomy

- Outcomes
  - Mean age 42 yo
  - Mean BMI 30
  - Mean OR time 55 minutes
  - No conversions
  - All but 1 pt discharged POD 2
  - 2 complications
    - Periumbilical hematoma
    - Free fluid collection

Tacchino et al SILS Cholecystectomy

- Outcomes
  - Mean age 42 yo
  - Mean BMI 30
  - Mean OR time 55 minutes
  - No conversions
  - All but 1 pt discharged POD 2
  - 2 complications
    - Periumbilical hematoma
    - Free fluid collection

History of SILS Cholecystectomy

- Rao et al introduced innovative “R-port”
  (Advanced Surgical Concepts, Wicklow, Ireland)
- “R-port” was double layered plastic cylinder with 3 valvular openings
- Angulated instruments used
- Outcomes
  - 85% success rate
  - Average OR time 40 min
  - 2 patients required 2nd “R-port” for CBD exploration

Navarre Experience

- Only randomized study comparing SILS to Conventional cholecystectomy
  - Cosmesis excellent
  - Longer operative time
  - No difference in postop pain
  - No cost savings
  - Higher incidence of umbilical herniation (used 2.5cm fascial incision)
Present Experience with SILS

- Colectomy
- Splenectomy
- Adrenalectomy
- Nephrectomy
- Pyeloplasty
- Ventral hernia
- Inguinal hernia
- Gastric bypass
- Gastric banding
- Sleeve gastrectomy

Personal Experience With SILS Cholecystectomy

- **Technique**
  - 11mm supraumbilical incision just inside umbilicus
  - Cut down to umbilical stalk
  - Veress needle at base of umbilical stalk to establish pneumoperitoneum
  - Place one 5mm in left lateral aspect of incision and survey abdomen
  - Place pt in reverse trendelenburg and rotate to left

- Place a second trocar in right lateral aspect of incision
- 0 silk suture placed laparoscopically into fundus of gallbladder and suspended to anterior abdominal wall
Personal Experience With SILS Cholecystectomy

**Technique**
- Second 0 silk suture brought from medial through infundibulum twice and then out lateral abdominal wall
- Assistant “marionettes” the infundibulum to allow dissection of cystic structures
Personal Experience With SILS Cholecystectomy

**Technique**
- Critical view obtained and cystic duct and structures clipped and cut using 5mm clip applier (if needed the right 5mm trocar can be upgraded to a 10mm port for 10mm clips)
- If cholangiogram needed a 14 guage angiocath coming from the right lateral abdomen along the course of the cystic duct is used to direct the catheter into the cystic duct

---

- Gallbladder taken off gallbladder bed
- Suspension suture removed and “marionette” sutures cut at skin level after centering gallbladder in abdomen
- Both marionette sutures grasped with a Maryland dissector and pulled out through the umbilical incision which may require lengthening the fascial incision
Personal Outcomes

- 50 pts over from 3/2/09-2/20/10
  - 43 females, 7 males
  - Mean age 44.7 years (range 20-83)
  - Mean BMI 30.1 (range 16-47)
  - 44 biliary colic, 4 acute cholecystitis, 1 polyp, 1 biliary dyskinesia
  - 12 pts had intra-op cholangiogram

Outcomes
- Mean OR time 50.4 minutes (range 31-108)
- Mean time for cholangiogram group 57.75 min (range 40-91)
  vs 48 min for non-cholangiogram group
- 10 "conversions"
  - 4 pts had extra 5mm placed for endo-loop
  - 5 conventional due to adhesions (3) and acute chole (2)
  - 1 pt converted to standard for abnormal anatomy then open for bleeding
- Mean EBL 28ml
Current Products Available

- Triport (Advanced Surgical Concepts, Wicklow Ireland)
  - Used for incisions from 2.5cm to 6.5cm
  - Surgeon needs 3 instruments

- SILS Port (Covidien, INC. Norwalk CT, USA)

- Gelpoint (Applied Medical, Rancho Santa Margarita, CA)

- Autonomy Lapro-Angle (Cambridge Endo, Framingham, Mass)
Current Products Available

- Roticulator (Covidien, Norwalk, CT.)

- Realhand (Novare Surgical Systems)

- Endoeye (Olympus, Center Valley, PA)

SILS Benefits

- Cosmetic
- Less pain???
- Shorter recovery???

SILS Limitations And Tips

- “Crowding of instruments”
  - Use articulating instruments
  - Use Ports and instruments of different lengths (bariatric length instruments)
  - Use all 5mm ports and only upgrade to 10mm if necessary and towards end of procedure
  - Use sutures through the organ to assist retraction (bile leakage)

- Visualization
  - Use flexible scope
  - Use angled scope
  - Use scope with 90° angle (also helps with crowding)
  - Use bariatric scope (50cm)
SILS Limitations and Tips

- Loss of pneumoperitoneum due to trocar slippage
  - Put lube around port
  - Suture ports in place
- Potential increase in hernia formation due to large fascial defect for organ removal
  - Minimize extent of fascial incision
  - Exposure!
- Low threshold to add extra ports!
- Cost!!

Future of SILS

- Bridge to NOTES or NOTES is a bridge to SILS?
- Hybrid techniques with SILS and NOTES?
- Hybrid techniques using SILS and a robot?
- Newer retracting platforms (magnetically placed retractors)

Future of SILS

- Laparoscopic market expected to grow by 49% over next 4 years
- In 2009 $2.9 billion in device market
- In 2013 $4.2 billion
- SILS expected to increase
Conclusion

- SILS offers a cosmetic benefit and in some studies suggests improved postoperative pain.
- SILS is here to stay as patients will begin demanding “less invasive” procedures.
- Technology will advance to make SILS more available to the general surgeon.