Single incision laparoscopic surgery in Canadian children

Colin Botkin, MD*
Richard Keijzer, MD, MSc, PhD†
Kris Milbrandt, MD†

From the departments of *General Surgery and †Pediatric General Surgery, University of Manitoba, Winnipeg, Man.

Accepted for publication
Nov. 6, 2013

Correspondence to:
C. Botkin
271-30 Stadium Rd.
Toronto ON R3I 0X7
colinbotkin@gmail.com

DOI: 10.1503/cjs.013613

Summary

As minimally invasive surgery progresses, there have been attempts to modify the technique to minimize both the number and visibility of incisions. These newer techniques are known by multiple acronyms, including single incision laparoscopic surgery (SILS). The SILS technique has gained popularity in the United States, particularly owing to its perceived improved cosmesis. The SILS technique has been primarily used in adults, and the number of pediatric publications on the topic is underwhelming. We have begun to evaluate SILS at our centre to determine its applicability in both a Canadian and pediatric practice, and this commentary discusses our initial application of the procedure.

Minimally invasive surgery (MIS) has progressed rapidly since Hume first performed a laparoscopic cholecystectomy in 1985.[1] The laparoscopic cholecystectomy has subsequently become the standard of care. Minimally invasive surgery has continued to advance, and there have been attempts to modify the technique to minimize both the number and visibility of the incisions. These newer techniques are known by multiple acronyms, including single incision laparoscopic surgery (SILS), laparoendoscopic single site (LESS) and single incision pediatric endoscopic surgery (SIPES). Navarra and colleagues[2] first described a minimal access technique in 1995 as a novel method of performing a cholecystectomy.

The SILS technique has gained particular acceptance in the United States, as it has been primarily consumer-driven for its perceived improved cosmesis. However, there have been few prospective trials that, in addition to improved cosmesis, have demonstrated decreased pain and earlier return to work in pateints who underwent SILS, though there is some conflict in the literature. The SILS technique has been primarily used in adults, as demonstrated in the underwhelming number of pediatric publications on the topic. We have begun to evaluate SILS at our centre to determine its applicability in both a Canadian and pediatric practice. In total, we have performed 30 operations at the Children's Hospital in Winnipeg, Man. During the period of September 2010 to August 2012, we performed a mixture of procedures, ranging from cholecystectomies and appendectomies to limited ileocolic resections for Crohn strictures. All operations were performed by 1 of 2 experienced pediatric surgeons, 1 of whom had previous training in the SILS technique. As this was the initial experience at our institution, we evaluated a variety of ports and techniques, including the Tri-port (Olympus), the X-cone (Karl Storz) and the AnchorPort (SurgiQuest).

Operative technique was similar regardless of the port used. We began with open peritoneal access via an umbilical incision, after which the port or ports were introduced. To perform the cholecystectomies, we used a 2 mm grasping port (MiniLap, Stryker) to facilitate manipulation of the gallbladder fundus. The cystic artery and duct were clipped with conventional laparoscopic clips. The remaining instruments used were standard laparoscopic instruments. The

appendiceal base was controlled with endoloops as in conventional laparoscopy.

There were no conversions to conventional laparoscopy in our patients undergoing cholecystectomies. All appendectomies were attempted using the SILS technique, though we did require the use of an additional port for retraction in 2 patients (11.1%). Two ileocecal resections were performed for strictures secondary to Crohn disease, 1 of which was successfully performed using the SILS technique, the other required conversion to conventional laparoscopy. Final anastomosis was performed in an extracorporeal manner. Overall the cases were uncomplicated in their execution and recovery.

The incremental increase in cost of the equipment ranged from CAD$175–800 per case. The cost was greatest for the cholecystectomies, as we often used a separate 2 mm grasper in the right flank. Each port system had both benefits and disadvantages. We used the Tri-port for 10 patients and found it relatively easy to use, with the added advantage of the incorporated wound protector. The cost of the port, however, was prohibitive. The X-cone port is reusable and therefore will eventually confer a price advantage, but anecdotally, this port was associated with increased pain owing to its relatively large size in relation to the pediatric abdomen. The last port evaluated was the AnchorPort, which had the distinct advantage of a markedly lower price point.

The MiniLap instrument enabled a more conventional approach for the cholecystectomies with the advantage of being a device and port combined in a single instrument, leaving only a small puncture wound in the right upper quadrant of the abdomen. Technically this could be considered not a pure SILS approach; however, use of this port through the umbilicus has been described by others. A suspensory stitch with a Keith needle has also been described, but we have not used this technique. The MiniLap instrument did come with added expense (CAD$200), as it is a disposable instrument.

With increasing experience with SILS, there has been a concomitant increase in the breadth of surgical procedures being performed with this technique. Multiple surgical specialties have begun to adopt this new technique, and we are seeing great progression in both the operative techniques, as well as specialization of the equipment to better perform these tasks.

An incremental cost increase can have a significant impact, especially in the context of a single insurer system. The use of reusable instruments, such as the X-cone, may provide eventual cost stabilization, whereas use of the AnchorPort system, including an optical introduction port is only marginally more expensive than the use of a single standard disposable port. However, even this cost can be overcome by the use of 3 reusable 5 mm ports in the same configuration, especially when compared with the use of disposable ports in conventional laparoscopy.

The benefit of this procedure, in our opinion, has been primarily in the realm of cosmesis, and anecdotally, our patients have been very pleased with the results. The patients who we anticipate may benefit most are those wtih Crohn disease, as they are likely at higher risk for further abdominal surgery and, as such, any reduction in incision length may provide benefit in the future.

We have found the SILS technique useful, though the added cost must be weighed carefully against the perceived benefits. Appropriate patient selection will remain an important part of the decision to proceed with a SILS procedure. At present, while awaiting the results of prospective studies comparing SILS to conventional laparoscopy, we plan to continue to use conventional laparoscopic techniques for most of our patients, reserving SILS for patients in whom we can achieve an optimal cosmetic result.

References

1. Reynolds W. The first laparoscopic cholecystectomy. *JSLS* 2001; 5:89-94.

2. Navarra G, Pozza E, Occhionorelli S, et al. One-wound laparoscopic cholecystectomy. *Br J Surg* 1997;84:695.