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# Single port laparoscopic surgery for patients with complex and recurrent Crohn's disease

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## Abstract

**Background:** Single port laparoscopic surgery (SPLS) is a modified access technique allowing grouping of instruments at a single parietal site. It is intuitively appealing specifically for patients with Crohn's disease (CD) as its minimal invasiveness favors cosmesis and facilitates any future (re) operation.

**Methods:** Consecutive patients presenting either electively or urgently for resectional surgery for CD over a 36 month period were considered for SPLS using, by preference, a transumbilical 'Surgical Glove Port'. Standard, straight laparoscopic instrumentation was used without additional resources.

**Results:** Of 33 consecutive, unselected patients, 28 (92%) had their procedure initiated by SPLS including those needing urgent intervention (n = 15) and those with prior abdominal operation (n = 8), obstruction (n = 7), mass (n = 6), fistula (n = 6) and/or abscess (n = 4). The median (range) age and BMI of the patients were 31 (17–69) years and 21.3 (18.6–28) kg/m<sup>2</sup> respectively. 31 had ileocolonic resection (6 with recurrent disease) while two underwent segmental colectomy. No-one suffered intraoperative or anastomotic complication. Both conversion (15%) and postoperative complication (13 Clavien–Dindo complications – I: 8; II: 2; IIIa: 3) rates were predominantly reflective of patient and disease complexity. Median (range) postoperative day of discharge was 6 (3–33) overall and 5 (3–18) in those completed by SPLS. There was one early readmission (for infectiouscolitis) and median follow-up is now 21 months.

**Conclusions:** Complex and recurrent Crohn's resections can be performed by SPLS in the majority of patients presenting elective or urgently for surgery. The Surgical Glove Port performs capably and, by minimizing cost, can facilitate broad embrace of this approach.

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## 1. Introduction

Single port laparoscopic surgery (SPLS) is a recent modified access operative technique that allows grouping of laparoscopic instrumentation at a single confined site in the abdominal wall in order to further minimize the degree of parietal wounding associated with intraperitoneal surgery. Given that resectional intestinal surgery mandates an extraction site that anyway approximates the diameter of current single port devices, this category of operation fits well with the concept and practice of this evolving modality. To date, analyses of SPLS for colorectal disease have predominantly focused on feasibility and technical adequacy in the elective setting as it relates to early stage, neoplastic disease.<sup>1,2</sup> However, patients with Crohn's disease (CD) represent another major proportion of those undergoing resectional colorectal surgery and seem the cohort more likely to benefit from the technical advance of SPLS.

Firstly, the majority of these individuals are young and so tend to have heightened appreciation of body image issues.<sup>3,4</sup> Furthermore, they may psychologically appreciate the effort regarding minimal scarring especially perhaps as surgery is often considered 'therapeutic failure' in this disease including by physicians. Many also will need their surgery performed at a time when they are physically and immunologically debilitated without a capacity for preoperative normalization and so have an impaired capacity for wound healing. Many such patients will also need further surgery in their future for either disease recurrence or indeed any other intra-abdominal pathology requiring surgery that might develop over subsequent decades of life. Preservation of the majority of the abdominal wall to facilitate peritoneal access at any future operation along with the minimization of postoperative peritoneal adhesion extent should therefore be an advantage. Finally, these patients are often slim and have not previously had a laparotomy and most-often have distinct ileal, jejunal and/or colonic disease (with or without local complications) that can be specifically targeted for operation radiologically. SPLS is therefore likely to be especially relevant for this cohort and these individuals are in turn well suited to this approach.

While initial series concerning SPLS for CD have indicated feasibility and efficacy,<sup>5-7</sup> the effectiveness and appropriateness of SPLS across the spectrum of this disease have yet to be fully reflected in the literature. In particular, there has been little prior experience regarding its routine use for CD including urgent, recurrent and complex diseases. Here we report our experience of SPLS for consecutive patients requiring resectional surgery for CD and debate the technique's pros and cons.

## 2. Methods and materials

All patients presenting for surgical resection for pathologically confirmed or radiologically ascertained (predominantly CT and/or MRI) CD over a 36 month period (December 1st 2010 to December 31st 2013) were considered for a SPLS approach including all those requiring urgent operation. Patients needing emergency surgery were excluded from the study but still recorded in the database. Where possible all were physically and nutritionally optimized for surgery and

all were fully consented regarding the procedure including the means of operative access. Those suitable for a laparoscopic operation were offered the single port approach for its initiation and assured a low threshold for conversion to a standard multiport laparoscopic operation or open surgery as may be required. Those likely to need stoma formation were appropriately counseled prior to surgery and marked for optimal stoma site by a Specialist Nurse Practitioner. All operations were performed by a single surgical team working in a tertiary referral center without specific additional resource provision in terms of either theater capacity or equipment. The procedures were performed either by the Senior Resident/Registrar alongside the scrubbed consultant as camera operator or shared between the two depending on procedure circumstance, difficulty and duration as is our usual practice. Patient demographics along with their clinical, laboratory, radiological and histopathological profiles were recorded prospectively on a dedicated database in addition to operative and postoperative details. Postoperative complications were categorized as by Clavien–Dindo.<sup>8</sup>

### 2.1. Single port access device

The single port access device of preference was the 'Surgical Glove Port'. As previously described,<sup>9,10</sup> this apparatus is constructed table-side by a single member of the surgical team after patient positioning and while operative field sterilization and draping is being performed and so is ready for use immediately at procedure commencement. In short, it comprises a standard surgical glove into which standard laparoscopic trocar sleeves (one 10 mm and two 5 mm) are inserted (without needing obturators) into three fingers cut at their tips. The ports are tied in position using strips cut from the other glove in the pair and the cuff of the 'Glove port' stretched onto the outer ring of a wound protector–retractor (e.g. ALEXIS™, S, Applied Medical) to ensure an air-tight seal (see Fig. 1).

### 2.2. Single port procedure

All patients received standard antithrombosis and antimicrobial prophylaxis and underwent general anesthesia without either epidural or spinal anesthesia. Antegrade PEG solutions for bowel cleansing were not routinely utilized. The patient was placed in a Trendelenburg position on an anti-slip beanbag. A local anesthetic block (bupivacaine) was infiltrated around the intended trans-umbilical incision site. A 3 cm skin and fascial incision were then measured, marked and made here. On securing safe entry into the peritoneum, the 'Glove Port' was established. The carbon dioxide insufflation channel was attached to one of the trocar taps and the pneumoperitoneum induced. The operation was performed using standard rigid laparoscopic instruments, generally a 10 mm 30° high definition laparoscope with an in-line sterile optical cable (Endoeye™, Olympus Corporation) along with an atraumatic grasper and either a laparoscopic scissors or, most often and solely, an energy sealing/dissector device (Ligasure, Covidien).

Segmental resections were performed by a standardized medial to lateral approach focusing on the main arterial

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