CHAPTER 8

HOW I DO IT - TRANSANAL SINGLE PORT SURGERY FOR THE RESECTION OF LARGE POLYPS

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ABSTRACT

Introduction
Transanal endoscopic microsurgery (TEM) is widely used for the excision of both benign and malignant rectal tumors. TEM is relatively expensive and can be a challenging technique. A recent development in laparoscopic surgery is the single port technique (SILS). The SILS port is a flexible multichannel port for transumbilical laparoscopic surgery. Even though not developed for transanal use the port could be ideal because of its shape and texture.

Methods
12 patients underwent transanal resection using a SILS port and normal laparoscopic instruments.

Results
10 out of 12 patients were treated successfully with the SILS port. Two polyps were resected using an open transanal technique because the distance between the SILS port and the polyp was too small. The average operative time was 55 min (range 40–80). All patients could be released on the first postoperative day. There were no major complications.

Conclusion
Our current data show that transanal surgery using a single port is a relatively easy procedure with operative times comparable to TEM. More surgeons will therefore be able to perform transanal endoscopic surgery.
INTRODUCTION

Transanal endoscopic microsurgery (TEM) is widely used for the transanal excision of polyps and T1 carcinoma's. With TEM it is possible to perform controlled local excision of tumors even in the upper part of the rectum with good functional outcome. This technique is, however, technically challenging and the instruments used during the procedure are relatively expensive. Furthermore, anorectal function defects have been described after TEM.

The most recent development in laparoscopic surgery has been Single Incision Laparoscopic Surgery (SILS). This new technique was initially used for appendectomies and cholecystectomies. More recently SILS was introduced for advanced laparoscopic procedures such as colorectal procedures.

The SILS port and the TEM port are comparable in many aspects. They are both using a multichannel access, which allows multiple instruments to pass through. In theory the SILS port has many advantages over the classic TEM proctoscope. Compared to the classic TEM instruments the SILS port is relatively inexpensive and normal laparoscopic instruments can be used, including thermal or ultrasonic energy devices. Furthermore, the SILS Port is flexible and made of sponge like material, thereby possibly reducing the impact of the procedure on anorectal function. Since the procedure resembles normal laparoscopy and basic laparoscopic instruments are used it should be easier to learn for experienced endoscopic surgeons.

In our clinic we started performing SILS procedures in 2009. Starting with SILS cholecystectomies in the beginning of 2009, we progressed to more complex procedures such as sigmoid resections and total colectomies. We demonstrated that the SILS technique was a safe and feasible procedure when performed by an experienced laparoscopic surgeon. More recently we started using the SILS port for transanal procedures. In this article we report our initial experience.

PATIENTS AND METHODS

Our clinic started performing SILS transanal procedures in February 2011. Until now 12 patients were referred to our clinic after polyps were detected by colonoscopy in the rectum. Initially patients were treated because of large villous adenoma's which could not be removed endoscopically. In all these cases a MRI was performed and when invasive growth was suspected a transanal ultrasound was performed to confirm or exclude invasion. After successfully completing our first procedures we also treated patients with small rectal cancers. All these patients were not eligible for abdominal surgery because of a poor clinical condition.

Preoperatively our patients received mechanical bowel preparation with a fosforal enema. Just before the procedure patients were given intravenous antibiotics as prophylaxis.

The patient was placed in lithotomy position or in jack-knife position, depending on the location of the polyp. If possible, the polyp is positioned at the bottom of the surgical field. However the flexibility of the SILS trocar makes it possible to dissect on the lateral side or even circular. In case of the lithotomy position, the surgeon and the assistant sit between the legs of
the patients. With the patient in jack-Knife position the surgeon is on the right side of the table with the assistant on the left.

The SILS port (Covidien, Mansfield, MA, USA) was introduced in the rectum without prior dilatation [fig 1]. Three 5mm trocar were introduced in the port and pneumorectum was established at a pressure of 15-20 mmHg [fig 2]. In all patients, a stable pneumorectum was created. In some patients with a more distal tumor it was necessary to fixate the trocar to the perianal skin, using a running vicryl suture. This was done to prevent the trocar from luxating.

**Figure 1.** Introduction of the SILS port without prior dilatation

**Figure 2.** SILS port with the introduction of 3 5mm trocars
A 5mm extra long 30° camera was used (Storz, Tuttlingen, Germany). Other instruments which were used were an atraumatic grasper and for dissections the Ligasure (Covidien, Mansfield, MA, USA) [Fig 3]. Care was taken not to manipulate the polyp directly by grasping the mucosa nearby. With the ligasure the dissection was performed into the perirectal plane to perform a full-thickness bowel wall excision [fig 4]. After dissection was completed, the defect was closed using a V-Lock Suture (Covidien, Mansfield, MA, USA). The specimen was left in the rectum until the defect was closed. After suturing the defect, the specimen was grasped with a laparoscopic instrument and the specimen and SILS port were removed at the same time.
RESULTS

Between February and June, 12 patients were treated with the transanal SILS port, 7 female and 5 male patients. The average age was 67 (range 54-86) and average BMI was 28 (range 22-47). The average distance from the anal verge was 7 cm (range 3-20) and the mean diameter was 3.5 cm (range 2.5-5 cm). As mentioned before a diverse group of patients was treated. Nine patients were diagnosed with villous adenoma preoperatively. Three patients in poor medical condition biopsies showed carcinoma. These cases will be described in detail below. Two polyps could not be resected with the aid of a SILS port due to a small distance between the port and the polyps. These polyps were resected using an open transanal technique. All other polyps were located at least 3 cm from the anal verge. The average operative time was 55 min (range 40–80). All patients could be released on the first postoperative day. No clinically relevant infections were found.

One patient had a minor postoperative bleeding 2 days after surgery and was treated with conservative measures. Pathology reports confirmed the diagnosis of villous adenoma in 8 patients, all resection margins were negative. One specimen showed a T2 carcinoma, this patient received radiotherapy 5 time 5 gray followed by a low anterior resection.

A 93 years old patient had a large obstructing polyp 20 cm from the anal verge, carcinoma was suspected however never proven in biopsies. Due to the clinical condition of the patient curative surgery was impossible, a palliative “debulking” was performed, opening the lumen of the sigmoid but leaving tumour behind. The large polyp was removed using an endostapler. Pathology showed adenoma.

One patient with a BMI of 47 with accompanying co morbidity, had a 2 cm rectal carcinoma. MRI showed no enlarged lymph nodes and suggested a T2 tumour. After preoperative radiotherapy a local excision was performed. Histology showed a T2 tumour with negative resections margins.

A 85 year old patient with a small rectal carcinoma opted for local excision after receiving radiotherapy 5 time 5 gray. Pathology showed a T1 carcinoma.

All resection margins were tumour negative. All patients will be followed endoscopically.

DISCUSSION

Benign tumors in the lower rectum can be excised transanally using standard surgical instruments. For many years transanal endoscopic surgery was the only option for local excision of lesions higher up in de rectum\(^1\). TEM was introduced in the 1980s by Buess et al\(^9\). Full-thickness excisions as high as 20 cm from the anal verge could be performed using a 40-mm operating proctoscope.

In recent years the technical development in the field of minimally invasive surgery progressed rapidly. Kalloo reported transgastric biopsy of the liver in an experimental model\(^9\). The first clinical report came from India, a transgastric appendectomy. NOTES was introduced, a
concept in which procedures and diagnostics could be performed transluminal through natural orifices. New instruments and techniques were developed, however, currently technical limitations make clinical application slow. The spinoff of research and development in the field of NOTES was the development of single incision laparoscopic surgery. Laparoscopy through the umbilicus is also known as E-NOTES. In recent years our clinic demonstrated that SILS can be used for most abdominal procedures in a safe manner with acceptable operative times.

TEM can be considered a precursor of modern laparoscopy and even NOTES procedures. However, the technique didn’t change since the introduction. Limitations are the expensive equipment that is necessary and it remains a challenging procedure. Recently, a few case reports described a modified TEM technique replacing the TEM rectoscope with a single-access laparoscopic port. The advantages of the SILS port are numerous. Normal laparoscopic instruments and energy devices can be used. Learning curve of single port surgery seems to be short for experienced laparoscopic surgeons. The endoscopic image with magnification allows precise dissection favoring this technique over the open transanal technique. Polyps up to 15 cm of the anal verge can be dissected full thickness. Polyps above 15 cm were in this series only dissected using stapler devices.

Our data show that the technique can be used in a diverse group of patients. In this first group of patients some technical problems were encountered. A limitation for transanal excision using the SILS port appears to be the distance to the anal verge. We were able to remove polyps relatively close to the anal verge, however, a minimum distance should be 3 cm. Suturing the SILS port to the anal skin made it possible to retract the port outwards, creating more space in case of a distal tumor. Fixating the SILS trocar also had another advantage. In our first procedures we had some problems with maintaining a stable pneumorectum, because the trocar luxated on the dorsal side. This was caused by the angle in which the instruments were held, which caused too much traction on the trocar pulling it out of the anus. We, however, prefer not to suture the trocar to the perineal skin because it reduces the surgeons flexibility. One of the advantages of using the SILS trocar in the rectum is that it can rotate in the anus. Thus making dissection easier on the lateral and ventral side.

The distance to the anal verge caused us to convert to an open transanal resection in two patients. Technically, these open resections were not difficult so in our opinion it is not necessary to have TEM instruments for back up.

Other single port systems are currently available. Whether these systems will have an advantage or disadvantage over the currently used trocar is unclear. Before experimenting with the different systems we decided to use the trocar we were familiar with during transabdominal SILS colectomy.

Suturing during trans anal surgery remains a challenge also when a SILS trocar is used. In the beginning we used interrupted PDS sutures to close the defect. However, this was relatively time consuming and difficult. With the V-lock one handed suturing is possible, which makes it ideal for trans anal use.
Even though we consider the transanal SILS easier than TEM this is not reflected in the operative times. Our mean time was 55 min, which is comparable to operative times mentioned in TEM literature\textsuperscript{1,2}.

The advantages of this new technique are the smaller diameter of the device compared with the TEM rectoscope, which should be less damaging to the anal sphincters. Lorenz et al. describes a series of three patients undergoing transanal single port microsurgery\textsuperscript{10}. Two weeks postoperatively a rectoscopy was performed, showing intact sutures and mucosa. A postoperative endorectal ultrasonography showed an intact internal and external sphincter in all three patients. However these are only preliminary data. So one should be cautious in patients with high sphincter pressure and in longer procedures.

The transanal SILS port will also make more complex NOTES procedures possible. Transanal TME has been described by various authors. Sylla et al reported a transanal rectosigmoid resection using a TEM proctoscope under laparoscopic assistance\textsuperscript{13}. Tuech et al described a comparable procedure using a SILS trocar\textsuperscript{14}. A complete TME was performed transanally also under laparoscopic assistance. The sigmoid was mobilized using a SILS port located at the future ileostomy site. The specimen was exteriorized transanally.

**CONCLUSION**

Standard laparoscopic instruments can be used transanally with relative ease using SILS technology. The potential benefits of this technique are numerous. Transanal SILS seems to be less expensive when compared with standard TEM instruments. More surgeons will therefore be able to perform transanal endoscopic surgery. Careful patient selection and evaluation of long term outcomes have to be made before it can replace TEM.
REFERENCES


