CHAPTER 10
GENERAL DISCUSSION AND FUTURE PERSPECTIVES

Peter van den Boezem
DISCUSSION

The progress of minimally invasive surgery and the advances in endoluminal (flexible) endoscopy have converged to generate a new concept in digestive surgery in which the wall of a hollow organ is trespassed to gain access to the peritoneal cavity. However, drawbacks in the development of instruments and the high level of required technical skills have facilitated the development of SILS. Both NOTES and SILS have attracted tremendous interest from medical specialists. The aim of this thesis was to evaluate the introduction of these new techniques into clinical practice. In this chapter results, clinical implications and future research directions will be discussed.

The introduction of SILS and NOTES in the Netherlands is slow due to questions about safety and possible increase of procedure related complications. The perceived complexity of these procedures causes many surgeons to be reluctant to start. Finally, the associated extra introduction costs present a threshold for hospitals in the Netherlands in this uncertain economic period.

Cholecystectomy

SILS cholecystectomy was introduced as a new scarless approach for laparoscopic surgery. Indeed, when the umbilicus is used as entry point, the cosmetic result can be very satisfying with only a minor scar visible. Nevertheless, wound related complications such as infection and hernias are inherent to this technique. With limited follow up we observed a low number of post-operative hernias in our studies. Whether the number of hernias will rise with longer follow up is unclear, as currently data on long-term follow up is not yet available.

Our institution was the first hospital in the Netherlands that offered the hybrid transvaginal cholecystectomy (TVC) as an option to women with uncomplicated gallstone disease. When compared to SILS cholecystectomy and conventional laparoscopic cholecystectomy, the cosmetic result is superior. Furthermore, complications or disadvantages that were attributed to the transvaginal access route were not observed in our series. Dyspareunia and infectious complications were not encountered. As these are typically short-term complications, we don’t expect them to occur with longer follow up. Both procedures have acceptable operative times, which could be further improved after more experience is gained. We also observed a trend in favour of the TVC with regard to postoperative recovery.

An increase in bile duct lesions is probably the most feared complication after introducing a new technique for cholecystectomy. In the beginning of the laparoscopic era there was a considerable increase in biliary injuries noticed and many editorials have expressed a word of caution. A recent review concluded that there seems to be an increase of bile duct injuries after SILS cholecystectomy.

We didn’t observe bile duct lesions in our series of SILS and NOTES cholecystectomy with rigorous administration of the principle of critical view of safety (CVS). If CVS couldn’t be reached within a reasonable amount of time, an extra trocar was inserted and this was seen as a conversion.

A number of RCT’s is published to this date regarding the effectiveness of SILS cholecystectomy. Whether there is a benefit in postoperative pain and recovery remains controversial. Even the
supposed cosmetic benefit is debated in some papers. Trials including TVC are rare and those who are carried out have included only small groups of patients. In the future, the results of our case matched series should be verified in a RCT, with larger groups and, ideally, longer follow up. The value of a RCT in confirming the safety of both SILS and NOTES cholecystectomies with regard to bile duct injuries is limited. With injury rates less than 1% it is impossible to detect differences in populations of a few hundred patients. Future meta-analysis should address this topic.

Colorectal surgery
After experience with the SILS technique had increased in our clinic, this technique was also applied in colorectal surgery. A report of our first 50 consecutive SILS colorectal (SILC) procedures showed that it is a safe and feasible procedure. All procedures were performed with regular straight instruments. In a case-control study the results of right SILC hemicolecction were comparable with multiport laparoscopic right hemicolecction. The results show a similar number and nature of complications after both procedures. Length of specimen, number of harvested lymph nodes and tumor invasion were similar between both groups. We don’t believe that one of both procedures is better from an oncological point of view. However, this statement should be investigated in future long-term trials, since this study wasn’t designed to detect differences in oncological follow up.

Transanal surgery
Although not designed for transanal surgery, the SILS port proved to be quite practical for transanal procedures. In a small study we showed that this technique is feasible for the removal of polyps. Compared to transanal endoscopic microsurgery, regular laparoscopic instruments can be used, thus making this approach less expensive. Combining our SILS experience for colorectal and transanal surgery resulted in a novel approach for low rectal cancer, the transanal total mesorectal excision (TME). In this technique, dissection is started at the anus, following the mesorectal fascia upwards. We proved that this principle is feasible. Conversions during laparoscopic TME are sometimes unavoidable due to technical limitations. These limitations include bulky tumors and a narrow (male) pelvis, which can make dissection distally of the tumor difficult. Another limitation of the laparoscopic approach in distal rectal tumors is the surgical margin. It is often difficult to determine the margin after placement of endoscopic staplers and this may result in insufficient surgical margin and conversion. However, during open surgery operative views and access can even be worse. Our novel technique could provide benefits in patients with a narrow pelvis. Moreover, it could be easier to determine an adequate resection margin distally from the tumor and so could decrease the number of local recurrences. We believe that this is a promising technique and another good example of a hybrid NOTES procedure that can be implemented in current clinical practice since regular laparoscopic instruments can be used. Future research will be conducted at our institution to determine oncologic, long term postoperative and functional results.
FUTURE PERSPECTIVES

Simultaneous with the introduction of NOTES and SILS, robotic surgery attracted much (media) attention. Although the indications for robotic surgery in abdominal surgery are still limited, the first reports of robotic Single-Port surgery are currently available. Similar to the introduction of SILS, the first reports are focusing on cholecystectomies. Given the technical difficulties with SILS, robotic surgery might have some benefits regarding triangulation, ergonomics and surgical exposure. However, the availability of robots, economic and training aspects are likely to negatively influence a speedily implementation in clinical practice.

A cholecystectomy has become a popular procedure to investigate new laparoscopic techniques. It can be argued whether this is the right procedure to investigate these techniques. In contrast to transgastric procedures, there is a straight route to the upper abdomen during a hybrid TVC, making a cholecystectomy less suitable for a transgastric approach. Furthermore, dissection during a cholecystectomy is a precise procedure in a limited space. Loss of triangulation, as occurs with the SILS and pure NOTES techniques makes the dissection more challenging. We observed that triangulation, clashing of instruments and orientation difficulties are much less obvious during a SILS colectomy. This is probably because the area of dissection is much larger. This observation is reflected by our operative times as discussed in chapter 4.

In our opinion, a SILS cholecystectomy is a complex procedure, even more complex than a SILS colectomy. Nevertheless, it can be introduced and performed in a safe manner as discussed in this thesis. However, we would like to suggest that surgeons who start with Single-Port surgery should begin with a SILS right hemicolectomy, in order to get used to the limited amount of space and the complexity of the procedure.

The role of NOTES is limited in the current medical practice, but is likely to evolve over time. Hybrid procedures like the transvaginal cholecystectomy and transanal rectal surgery are safe and offer potential benefits, especially in selected patients. The complexity and the required instruments for such procedures are not so different from regular laparoscopic surgery. In theory, many minimally invasive surgeons can perform these procedures facilitated by the familiar environment of the peritoneal cavity.

Pure NOTES procedures like the transgastric approaches are struggling with the challenges mentioned in the introduction of this thesis. Hampered by the deteriorated economic environment, many companies have slowed down the development of specific instrumentation for NOTES procedures. Nevertheless, we believe that there is room for the transgastric route. As discussed earlier, a cholecystectomy is not the best procedure to start with. Perhaps more experience should be gathered with, for example, diagnostic transgastric peritoneoscopies instead of cholecystectomies.

NOTES will bring gastro-intestinal surgeons and gastroenterologists closer to each other and may result in a new subspecialty. Current Dutch surgical residents lack training in endoscopy and gastroenterologic residents are not trained in surgical techniques and lack the knowledge...
of surgical anatomy. To make NOTES successful in the future, both worlds have to converge. Training of current and future specialists will be crucial and must be implemented in existing training programs. It is obvious that educating residents in both laparoscopic surgery and endoscopic gastroenterology will take longer and therefore will have financial repercussions.
REFERENCES


SUMMARY
IMPLEMENTATION OF SINGLE-PORT SURGERY AND NOTES IN CLINICAL PRACTICE

SAMENVATTING
INTRODUCTIE VAN SINGLE-PORT CHIRURGIE EN NOTES IN DE KLINISCHE PRAKTIJK

Peter van den Boezem