



# Single port laparoscopic surgery: mission completed or more evolution to come?

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Single-port laparoscopic surgery (SPLS) is no longer a new technology for the skilled-hand surgeons. Theoretical advantages of SPLS would be the cosmesis of the wound, and improved surgical outcomes such as less postoperative pain and shorter length of stay (LOS). At the beginning of the SPLS introduction, like many other new surgical approaches, many surgeons raised the questions about this technique (1). To summarize, (I) What are the benefits other than cosmesis? (II) What is the learning curve for SPLS in experienced hands? (III) Can SPLS be safely attempted by inexperienced hands or surgical trainees? (IV) What are the exact indications for SPLS? (V) Are the skill set gained in SPLS transferrable to future applications that are unknown? (VI) Is it cost-effective compared with conventional laparoscopic surgery? I would like to comment on the above questions.

Unlikely in benign disease, cosmesis itself did not mean very much to patients with malignant disease. They are more concerned about the oncologic outcomes rather than the early postoperative outcomes. So, SPLS would not be a standard procedure for the malignant disease, since minimally invasive surgery itself already achieved many goals of surgery. However, it would be a good option in selected patients who concerned comesis. Since SPLS is also a minimally invasive technique, the outcomes of SPLS would be quite similar with conventional laparoscopic surgery. Potential benefits of postoperative pain in the literature between conventional laparoscopic surgery and SPLS did not mean anything to patients.

Learning curve for all minimally invasive surgery deemed to be steep. We demonstrated that even the laparoscopy-

experienced surgeons, the learning curve for SPLS did exist but not that much as we overcome firstly in the training of minimally invasive surgery (2). Therefore, the prerequisite for SPLS is the mastery of minimally invasive surgery in the formal residency training. The definition of learning curve should be re-defined, I think. Because our analysis showed some habits of surgeons also influenced the operation time and surgical success or failure. The most important issue in learning curve of surgery should be the safety of procedures.

Although many western surgeons raised the questions about low body mass index (BMI) of patients in SPLS studies, with further studies, we should define the appropriate indications for SPLS. Low BMI would be one of the indications for SPLS. More and more pouch surgeries for inflammatory bowel disease are performed by SPLS.

Introduction of SPLS technique did influence lots of minimally invasive surgical innovations, for example, transanal minimally invasive surgery (TAMIS) (3) and transanal total mesorectal excision (taTME) (4). We believe SPLS is one of the alternate approaches for colon cancer surgery like robotic surgery for prostate and rectal cancer. In the near future, obstacles of SPLS will be overcome with advanced technologies like robotic technology. Cost-effectiveness is a good question to be raised to judge the new surgical technique. It would be very similar with other minimally invasive surgery.

SPLS is not widely adopted in practice because of the technical flaws. These technical flaws will be overcome by technical innovations in the future. But remember that the ultimate goal of surgery will be scarless or painless surgery. As I described above, SPLS already contributed many

surgical innovations and it will continue.

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