

Abstract

Single-incision laparoscopic surgery (SILS) is developed based on that of conventional laparoendoscopic surgery with a better cosmetic outcome and more minimal invasiveness. Compared with natural orifice transluminal endoscopic surgery (NOTES), SILS is more applicable and practical at present for surgeons. In the recent 3 years, we have finished more than 1,000 cases of SILS operations (more than 40 types) of general surgery. General anesthesia and herringbone position is often used during SILS. Though the so-called “Chopsticks effect” exists during the surgery, we believe most of the operations performed by us during our daily clinic practice can be successfully completed by SILS technique. More experience accumulation and learning curve training are needed to further develop this technique. We expect this technique would be a powerful weapon of our surgeons in the near future.

Keywords

Single-incision laparoscopic surgery (SILS) • Natural orifice transluminal endoscopic surgery (NOTES) • Chopsticks effect

The techniques of single-incision laparoscopic surgery (SILS) is developed based on that of conventional laparoendoscopic surgery. At first, surgeons attempted to find a method for visceral surgery with no incision on body's surface, which is called natural orifice transluminal endoscopic surgery (NOTES). As we know, soft endoscopies, such as gastroscope, enteroscope and choledochoscope, were used only for diagnosis and treatment of diseases in mucosa or submucosa of digestive lumen. Since the appearance of NOTES, the operations aimed at the sickness of appendix, gallbladder and spleen have been performed gradually, based on these further improved soft endoscopies. For several years of clinical practice, doctors have achieved a gratifying progress and harvest. However, the technique still reached its developmental bottleneck. Research and development of instrument cannot meet the need of clinical necessity. Other available methods are time-consuming, strenuous and inefficient. Compared to NOTES, SILS is easier, safer, more applicable and convenient for surgeons to master. Why it is difficult for NOTES to develop now? The main reason is that physi-

cians, but not surgeons always use endoscopies. However, laparoscope has been a tool for surgeons for a long time. So, it is not an insurmountable problem to perform operations through three close packed ports. What's more, the way to use chopsticks is similar to that of SILS. As Chinese people, we are born with a unique advantage. In the recent 3 years, we have finished more than 1,000 cases of SILS operations (more than 40 types) of general surgery. Its learning curve goes with a swing. Now, we display a table to compare the advantages and disadvantages between SILS, conventional laparoscopic surgery and open surgery (Table 1.1).

What's the characteristics of body position for patients, position between surgeon and assistant, and operation technique? The anesthesia of patients is the same to that in traditional laparoscopic surgery and herringbone position is often used. SILS is operated mainly by the surgeon himself, and his assistant co-operates closely. To avoid much disturbance, it seems reasonable for surgeon and assistant to stand slightly apart. However, for multi-port laparoscopic surgery, it requires the second assistant to perform some pulling and

Table 1.1

	Single port	Multiple port	Open
Cholecystectomy	★★★	★★	★
Appendectomy	★★★	★★	★
Common bile duct exploration (without operation history)	★★	★★	★
Cholecystojejunostomy	★★★	★★	★
Cholangiojejunostomy	★	★★★	★★
Splenectomy (non-giant spleen)	★★★	★★	★
Splenectomy (portal hypertension)	★★	★★	★★
Sigmoid colon, rectum	★★	★★	★
Esophageal surgery	★★★	★★	★
Partial gastrectomy	★★★	★★	★
Subtotal gastrectomy (BII)	★★★	★★	★
Radical gastrectomy	★★	★★★	★★
Proximal or total gastrectomy	★	★★	★★
Liver cyst fenestration	★★★	★★	★
Partial hepatectomy	★★	★★	★
Semi-hepatectomy	★	★★	★★
Pancreaticoduodenectomy		★	★★★
Distal pancreatectomy (benign)	★★	★★	★★
Distal pancreatectomy (malignant)	★	★	★★★
Hernioplasty	★★	★★	★
Breast	★★	★★	★
Thyroidectomy	★	★★	★★

grasping movements, therefore the assistant holding the laparoscope has to stand at the same side with the surgeon. We need to fix the patient on the operating bed to avoid the patient body slipping while reaching an excellent exposure. The typical characteristic of SILS operation is that the two operation ports are close to the observation port (the distance between them can be less than 10 mm), and they often form a triangle (an inverted triangle in upper abdominal operation and an equilateral one in lower abdominal operation). These three ports interfere with each other, influencing exposure of the operation fields and effective tissue separation, which is called “Chopsticks effect”. Except for complicated operations such as pancreaticoduodenectomy,

lesions in right posterior liver, frozen Calot’s triangle in cholecystitis and so on, many operations can be performed successfully by the use of SILS technique. As for operations like cholecystectomy, appendectomy and hernioplasty, operative time and amounts of intra-operative bleeding are similar by using SILS or traditional laparoscopic surgery technique. Surgery of spleen, liver and stomach may cost more time by the former one. It requires surgeons to accumulate more experience on these surgeries. All in all, the SILS results in a better cosmetic outcome and more minimally invasive. More popularity has taken on a booming appearance in a few years. We expect this technique would be a powerful weapon of our surgeons in the near future.