

Reduced port surgery for gastric cancer: another giant leap for mankind?

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According to a nationwide survey conducted by the Japanese Society for Endoscopic Surgery, there has been a steep rise in the number of laparoscopic gastric cancer surgeries performed in Japan during the past decade. Innovations in surgical devices and video cameras, refinement of the surgical technique, and easy access to various types of information associated with the new approach have enabled an increasing number of surgeons to safely add laparoscopic gastrectomy to their armamentarium.

In Japan, after the first successful attempt by Kitano et al. [1] to perform distal gastrectomy laparoscopically, consistent efforts had been exerted by a small number of the so-called first-generation laparoscopic surgeons to improve the technique and to conduct the procedure safely with curability that was hoped not to be inferior to the conventional open surgery. The guideline-oriented surgical procedure for patients with early gastric cancer has been designed to obtain arguably an overly cautious safety margin in terms of nodal dissection so that the cure rate would be as close to 100 % as possible. Thus, most patients in this category are likely to be cured even if subjected to technically immature surgery. The high incidence of early-stage cancer in Japan meant that surgeons were able to rapidly acquire sufficient experience and expertise in the laparoscopic approach without having too much concern about the long-term outcome. Representative members of the first generation of surgeons eventually compiled and

published retrospective data that indicated the feasibility and benefits of this approach [2]. In due course, these selected surgeons were invited to join the gastric cancer surgery division of the Japan Clinical Oncology Group (JCOG), the most distinguished multi-institutional study group in Japan, funded by the Ministry of Health, Labor and Welfare, to conduct trials and establish the place of laparoscopic surgery as a treatment option for early (T1 stage) gastric cancer. However, the time needed to conduct a preparative phase II study to investigate at the safety of the procedure [3] and then to design a subsequent phase III trial to evaluate the oncological outcome was too great for these celebrated laparoscopic surgeons to remain loyal to the policy of the JCOG. By the time the JCOG phase III trial was launched, advocates of laparoscopic surgery no longer felt comfortable treating 50 % of their patients with the open approach, particularly when their patients visited them expecting to receive laparoscopic surgery.

In the mean time, high-volume centers in Japan gradually added laparoscopic gastrectomy to their repertoire either through headhunting an established expert or by having their staff go through training programs with the assistance of experts from another institution. Two examples of such processes have been documented in recent volumes of *Gastric Cancer* [4, 5]. The aforementioned JCOG phase III trial is currently ongoing in the hands of these and other “second-generation” surgeons who had once been dedicated open surgeons but have striven hard more recently to become board certified as laparoscopic surgeons. Thus, the situation in Japan is steadily changing and, although the Japanese Gastric Cancer Treatment Guidelines remain cautious about the role of laparoscopic approach, an increasing number of surgeons would now consider laparoscopic gastrectomy as their standard treatment for early cancer of the distal stomach. Some

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advocates have gone further and extended their indication of laparoscopic approach to advanced cancer. Even a greater number of surgeons now attempt total gastrectomy by the laparoscopic approach for early-stage cancer of the proximal stomach. In this procedure, an optimal method for the esophagojejunostomy remains under debate. Admittedly, leading experts would by now have acquired their own technique with which they feel comfortable in creating esophagojejunostomy. However, the abundance of video symposiums that focus on this technique and the sheer size of the audience in such sessions at recent surgical meetings eloquently disclose the fact that a standardized method that is acceptable for all surgeons is yet to be established. Laparoscopy-assisted total gastrectomy thus remains an advanced surgery.

There is no doubt that optimal placement of the ports is the essential first step in laparoscopic surgery. During open surgery, optimal traction of tissues or organs to adequate directions by the assistants is mandatory for the operator to recognize the line to be dissected or the plane to be exposed. Similar visual fields can be reproduced at laparoscopic surgery by graspers that are inserted through the ports and handled by well-trained assistants. Conflicts between surgical instruments resulting from inadequately placed ports are frustrating, and a beginner in laparoscopic surgery is usually taught not to hesitate to place another port in a better site when deemed necessary. The number, the size, and the site of the ports have been more or less standardized for each type of surgery so that the operators can deliver their utmost performance within the confines of the handicaps inherent to the laparoscopic approach.

More recently, a single-port approach through the SILSTM port was introduced primarily as a more practical version of natural orifice transluminal endoscopic surgery (NOTES). NOTES stands for removal of organs such as appendix or gallbladder by a multi-channeled endoscope armed with various instruments. The scope is introduced through natural orifices such as the mouth, anus, and vagina and enters the peritoneal cavity by penetrating the wall of organs such as the stomach, rectum, or uterus through a hole that must be closed at the end of the procedure. Single-incision laparoscopic surgery (SILS) allows insertion of a single port through the navel which, being another natural orifice (at the time of embryonic development), could be interpreted as akin to the NOTES. The SILS port is a port with a large diameter through which several instruments are to be inserted close to each other. The incision for inserting the SILS port will naturally need to be somewhat larger than that for an ordinary 12-mm port, but a scar made inside the navel will shrink considerably so that a patient who underwent SILS eventually benefits from an almost unscarred abdomen. A laparoscope and two surgical instruments can be introduced through the

SILS port, and procedures performed then would be classified as laparoscopic surgery rather than endoscopic surgery as in the case of genuine NOTES. The operator will experience restrictions because of the inevitable lack of distance between each instrument and a laparoscope, and these must be overcome by the use of curved-type graspers, training, experience, and gift. It would indeed seem meaningful, for instance, if an actress could undergo surgery and remain scar-less, and I would have no objection to creating an insurance system in which a highly talented surgeon who could accomplish such a demanding surgery can receive greater rewards. On the other hand, some might argue that assistance through robotic technology will be mandatory for the average surgeon to be able to handle difficulties associated with NOTES or SILS. For the time being, SILS should be indicated for relatively basic procedures such as appendectomy and cholecystectomy, but even in such cases, insertion of an additional port will prove extremely helpful.

Very recently, an initial experience of total gastrectomy under the SILS approach with one extra port only was reported by Kawamura et al. [6] in the journal *Gastric Cancer*. It seems as though Kawamura placidly walked through all problems associated with the reduced port situation as if he were strolling along a footpath in a local park on a fine autumn day. The short-term outcomes of the patients were almost flawless. Such accomplishment as a consequence of extensive training and talent should be highly commended. As an editor who was responsible for acceptance of this paper, however, I would discourage readers in general from following the steps of Kawamura et al. at this time. It is hoped that the lengthy introduction preceding this paragraph is sufficient to disclose the fact that total gastrectomy by the “conventional” laparoscopic approach remains experimental in general hospitals, and that the future of the SILS approach in oncological surgery is even more uncertain. Laparoscopic total gastrectomy should be conducted by experts with sufficient knowledge and experience in laparoscopic distal gastrectomy who, in addition, never fail to exert the best of their abilities; and the best performance is usually achieved through as many ports as needed in the prototype surgery. When conducting a laparoscopic total gastrectomy, in other words, the surgeon is already confronted with a sufficient challenge that need not be intensified by the additive burden of reduction in the number of ports. The article by Kawamura et al. was published only to demonstrate what could be accomplished by super-selected hands under extraordinary conditions, not to indicate what every skilled surgeon should attempt to pursue.

Is reducing the number of ports as revolutionary as laparoscopic surgery itself had once been? Laparoscopic surgery had for several years been dismissed as unsuitable

for oncological surgery and has only begun recently to be accepted in selected types of cancer owing to several efforts and successes in randomized trials. Will this happen to reduced port surgery with something as complex as total gastrectomy for gastric cancer? Although I do not wish to be reputed as outdated, my perspective would be that the indication for the laparoscopic approach will continue to broaden to include more challenging types of disease such as advanced gastric cancer and cancers of the esophagus, pancreas, and liver. Such surgery will be conducted by placing as many ports as needed, using whatever new devices are available, and perhaps involving new technology such as robotics. The relevance of merely reducing the ports would in comparison seem rather trivial, perhaps too trivial to attract attention of a majority of surgical oncologists whose primary interest is to cure the disease. My prospect could be too pessimistic, however, when I remember some of medical students I have encountered recently. The performances they have shown with the virtual reality simulators for laparoscopic surgery were brilliant. Since their childhood, they have played with various computer games that would naturally train them to easily accomplish demanding tasks with the simulators. At times, we might need to allow selected surgeons of the younger generation to challenge what we cannot imagine doing by ourselves.

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