

Completely laparoscopic reconstruction following distal gastrectomy: what is the best method?

Hiroshi Okabe

Department of Surgery, Graduate School of Medicine Kyoto University, Kyoto, Japan

Corresponding to: Hiroshi Okabe, MD, PhD, FACS. Department of Surgery, Graduate School of Medicine Kyoto University, 54 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto, 606-8507, Japan. Email: hokabe@kuhp.kyoto-u.ac.jp.



Submitted Apr 18, 2013. Accepted for publication May 10, 2013.

doi: 10.3978/j.issn.2224-4778.2013.05.08

Scan to your mobile device or view this article at: <http://www.amepc.org/tgc/article/view/1887/2874>

The number of laparoscopic gastrectomies (LG) has increased since the first LG was performed in the early 1990s (1,2). LG is widely accepted as an option for early gastric cancer in Korea and Japan, where many cases are diagnosed at an earlier stage because the numerous advantages of LG over open gastrectomy, such as less pain, earlier recovery, and improved cosmesis. Most early LG operations were “laparoscopy-assisted” distal gastrectomies, in which reconstruction was performed through a mini-laparotomy after gastrectomy had been completed laparoscopically (2). The laparoscopy-assisted technique has the advantage that surgeons can perform anastomosis in a similar fashion to that employed in open surgery. However, the procedure is still difficult in obese patients, or in cases requiring transection at a more proximal site, because of the limited work space, even under a larger laparotomy.

Totally laparoscopic distal gastrectomy (TLDG) with intracorporeal anastomosis was introduced to solve these problems. Although the first successful case was reported in 1992 by Goh *et al.* (1), it was not widely accepted in the 1990s because of the technical difficulty. Intracorporeal linear-stapled anastomosis for Billroth-I reconstruction, which is the most preferred type of reconstruction in Japan, was reported as the delta-shaped anastomosis by Kanaya *et al.* in 2002 (3). The method is quite simple and can be done quickly using only linear staplers. Reports of TLDG have gradually increased through the late 2000s (4-7). The main objectives of the introduction of TLDG were to minimize the surgical scar and to establish a standardized reconstruction method that can be safely applied to obese patients. However, the increasing popularity of TLDG has revealed several other advantages in comparison to

the laparoscopy-assisted technique. Those include faster bowel recovery, less pain, fewer complications, earlier hospital discharge, and longer safety margins (6-8). These data strongly support the superiority of TLDG over laparoscopy-assisted distal gastrectomy.

The reconstruction method in open surgery is chosen mainly based on the surgeons’ preference, because either the Billroth-I, Billroth-II, and Roux-en-Y methods have their own advantages. Several types of Billroth-I and Roux-en-Y intracorporeal anastomosis have been reported for TLDG (9). More surgeons currently seem to prefer Billroth-I anastomosis in TLDG, because the laparoscopic Roux-en-Y method is more complicated and requires longer time. Du and colleagues have published totally laparoscopic Billroth-II gastrectomy using only staplers (10). They reported that both hand-sewn and stapled methods are safe and feasible, but the stapled method is simpler and less time-consuming, and probably associated with a shorter learning curve.

Billroth-II reconstruction is not preferred by many surgeons, because it can cause more severe bile reflux, which may lead to increased risk of metachronous cancer development (11,12). However, recent findings suggest that helicobacter pylori infection is a stronger risk factor. There is no clear clinical evidence that remnant cancer develops more frequently following Billroth-II procedures, than after other methods (13). Furthermore, the mean time interval between Billroth-II gastrectomy and detection of a stump cancer can be as long as 20 to 30 years (13,14). Therefore, Billroth-II anastomosis could be used as a standard method at least for older patients, when a simple and easy laparoscopic method is available. Billroth-II

anastomosis was done within 20–25 min by using the new stapling method reported by Du *et al.*, which is shorter than that with the hand-sewn method (10). They experienced no postoperative complications. Their data shows that Billroth-II reconstruction is another feasible choice for TLDG.

A simple and easy anastomosis technique is a key factor in expanding the use of TLDG. Although the outcome reported by Du *et al.* was excellent, the anastomotic time was a little longer than those with the recently reported linear-stapled Billroth-II technique (10 min), or the delta-shaped anastomosis (13 min) (9,15). The difference might be the learning period; they reported 34 cases, while the latter two case series included 130 and 100 cases, respectively. Another difference is that the latter two methods use only linear staplers. Using either a hand-sewn, circular stapler or linear stapler method can yield excellent outcomes when performed by experienced laparoscopic surgeons. The clinical outcome of TLDG with Billroth-II gastrectomy with their matured technique is awaited.

Minimizing the specific complications, such as afferent loop syndrome, internal hernia, and duodenal stump leakage, is also important for the general use of TLDG with Billroth-II anastomosis. Internal hernia occurs in 2–5% of patients during the long follow-up period after laparoscopic gastrectomy with Roux-en-Y reconstruction (16,17). The frequency is higher than in open surgery, because less adhesion occurs. It is a rare complication, but it could lead to massive strangulation and risk the life of patients. Therefore, closure of the potential defect is recommended when Roux-en-Y or Billroth-II reconstruction is chosen in TLDG, and careful long-term follow-up of patients is necessary.

Acknowledgements

Disclosure: Okabe Hiroshi has no conflicts of interest or financial ties to disclose.

References

- Goh P, Tekant Y, Kum CK, et al. Totally intra-abdominal laparoscopic Billroth II gastrectomy. *Surg Endosc* 1992;6:160.
- Kitano S, Iso Y, Moriyama M, et al. Laparoscopy-assisted Billroth I gastrectomy. *Surg Laparosc Endosc* 1994;4:146-8.
- Kanaya S, Gomi T, Momoi H, et al. Delta-shaped anastomosis in totally laparoscopic Billroth I gastrectomy: new technique of intraabdominal gastroduodenostomy. *J Am Coll Surg* 2002;195:284-7.
- Kim JJ, Song KY, Chin HM, et al. Totally laparoscopic gastrectomy with various types of intracorporeal anastomosis using laparoscopic linear staplers: preliminary experience. *Surg Endosc* 2008;22:436-42.
- Tanimura S, Higashino M, Fukunaga Y, et al. Intracorporeal Billroth 1 reconstruction by triangulating stapling technique after laparoscopic distal gastrectomy for gastric cancer. *Surg Laparosc Endosc Percutan Tech* 2008;18:54-8.
- Kim MG, Kawada H, Kim BS, et al. A totally laparoscopic distal gastrectomy with gastroduodenostomy (TLDG) for improvement of the early surgical outcomes in high BMI patients. *Surg Endosc* 2011;25:1076-82.
- Song KY, Park CH, Kang HC, et al. Is totally laparoscopic gastrectomy less invasive than laparoscopy-assisted gastrectomy?: prospective, multicenter study. *J Gastrointest Surg* 2008;12:1015-21.
- Ikeda O, Sakaguchi Y, Aoki Y, et al. Advantages of totally laparoscopic distal gastrectomy over laparoscopically assisted distal gastrectomy for gastric cancer. *Surg Endosc* 2009;23:2374-9.
- Hosogi H, Kanaya S. Intracorporeal anastomosis in laparoscopic gastric cancer surgery. *J Gastric Cancer* 2012;12:133-9.
- Du J, Shuang J, Li J, et al. Totally laparoscopic Billroth II gastrectomy with a novel, safe, simple, and time-saving anastomosis by only stapling devices. *J Gastrointest Surg* 2012;16:738-43.
- Fukuhara K, Osugi H, Takada N, et al. Reconstructive procedure after distal gastrectomy for gastric cancer that best prevents duodenogastroesophageal reflux. *World J Surg* 2002;26:1452-7.
- Sugiyama Y, Sohma H, Ozawa M, et al. Regurgitant bile acids and mucosal injury of the gastric remnant after partial gastrectomy. *Am J Surg* 1987;153:399-403.
- Tanigawa N, Nomura E, Lee SW, et al. Current state of gastric stump carcinoma in Japan: based on the results of a nationwide survey. *World J Surg* 2010;34:1540-7.
- Takeno S, Noguchi T, Kimura Y, et al. Early and late gastric cancer arising in the remnant stomach after distal gastrectomy. *Eur J Surg Oncol* 2006;32:1191-4.
- Lee J, Kim D, Kim W. Comparison of laparoscopy-assisted and totally laparoscopic Billroth-II distal gastrectomy for gastric cancer. *J Korean Surg Soc* 2012;82:135-42.
- Okabe H, Obama K, Tsunoda S, et al. Advantage of

- completely laparoscopic gastrectomy with Linear stapled reconstruction: a long-term follow-up study. *Ann Surg* 2013. [Epub ahead of print].
17. Kojima K, Inokuchi M, Kato K, et al. Petersen's hernia

after laparoscopic distal gastrectomy with Roux-en-Y reconstruction for gastric cancer. *Gastric Cancer* 2013. [Epub ahead of print].

Cite this article as: Okabe H. Completely laparoscopic reconstruction following distal gastrectomy: what is the best method? *Transl Gastrointest Cancer* 2013;2(S1):108-110. doi: 10.3978/j.issn.2224-4778.2013.05.08