Laparoscopic reinforcement suture of duodenal stump using barbed suture during laparoscopic gastrectomy for gastric cancer: preliminary results in consecutive 62 patients

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Abstract: Duodenal stump leakage after gastrectomy is one of serious complications related to severe morbidity or mortality. However, definite surgical method for duodenal stump leakage is not established. Herein, we introduced a new and simple surgical technique to reduce duodenal stump leakage during laparoscopic gastrectomy for gastric cancer. We retrospectively reviewed the medical records for consecutive 62 patients who underwent laparoscopic reinforcement suture (LARS) during laparoscopic gastrectomy for gastric cancer from June 2015 to February 2016 in our institute. After cutting of duodenal stump, LARS commenced with continuous invagination method or interrupted method using barbed suture. Sixty patients underwent distal gastrectomy with B-II, and two patients had total gastrectomy. Mean operation time was 160 minutes, and the mean time for LARS was 8 minutes. Duodenal stump leakage was not observed; however, we observed one case of esophagojejunostomy leakages and one case of artificial lesser curvature leakage. LARS can be performed in a relatively short operation time without any technical difficulties. LARS on staple-line of duodenal stump can be helpful to prevent DSF after laparoscopic gastrectomy for gastric cancer.

Keywords: Laparoscopic reinforcement suture (LARS); leakage of duodenal stump; gastric cancer

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The overall incidence of duodenal stump fistula (DSF) or duodenal stump leakage is reportedly between 1.6% to 5% and is one of the most serious complications of Billroth-II or Roux en Y reconstruction after gastrectomy for gastric cancer (1,2). DSF is a rare complication but is associated with a high morbidity and mortality rate. The mortality rate of DSF is reported as 16% to 20% (1). This serious complication affects not only patients and their families, but also the surgeon especially in cases with laparoscopic gastrectomy. Several investigators presented their clinical experience, such as the clinical course and the pertinent management of DSF (3,4). It is possible to predict possibilities of DSF in some patients, such as patient's age, co-morbidity, nutritional status impairment and technical difficulties during surgery (5,6).

During the past two decades, laparoscopic gastrectomy for stage I gastric cancer has become an attractive alternative to open gastrectomy in Korea, Japan and China (7-12). Although the incidence of wound complication in laparoscopic gastrectomy is significantly lower in open gastrectomy, the incidence of overall complication is similar between the two groups (7,8). However, the incidence of major complication, such as DSF or intra-abdominal bleeding in laparoscopic gastrectomy remains unclear (9).

I have performed additional mechanical reinforcement on staple-line of duodenal stump. Herein, we introduced a new and simple surgical technique for reducing DSF during laparoscopic gastrectomy.

Surgical technique (*Figure 1*)

For laparoscopic gastrectomy in cases of gastric cancer,

five trocars were used while standing at the patient's right side during the entire procedure. After cutting of duodenal stump of about 1–1.5 cm length using linear stapler, Laparoscopic reinforcement suture (LARS) commenced from upper to lower part on staple-line of duodenal stump. Continuous suture with invagination was performed using a barbed suture (*Figure 2*). In case of patient with short duodenal stump because of chronic ulcer or ectopic pancreas at duodenal bulb or cancer invasion to pylorus, 3 or 4 interrupted sutures without invagination of duodenal stump was conducted using barbed sutures.

In conclusion, DSF after laparoscopic gastrectomy for gastric cancer did not occur in my experience and LARS can be performed in a relatively short operation time without any technical difficulties. LARS on staple-line of duodenal stump can be helpful to prevent DSF after laparoscopic gastrectomy for gastric cancer.

Figure 1 After cutting of duodenal stump of about 1–1.5 cm length using linear stapler LARS commenced from upper to lower or from lower to upper part on staple-line of duodenal stump (13). A continuous suture with invagination of duodenal stump using 3-0 15 cm barbed suture was conducted. LARS, laparoscopic reinforcement suture.
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Footnote

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/ales.2017.01.09). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

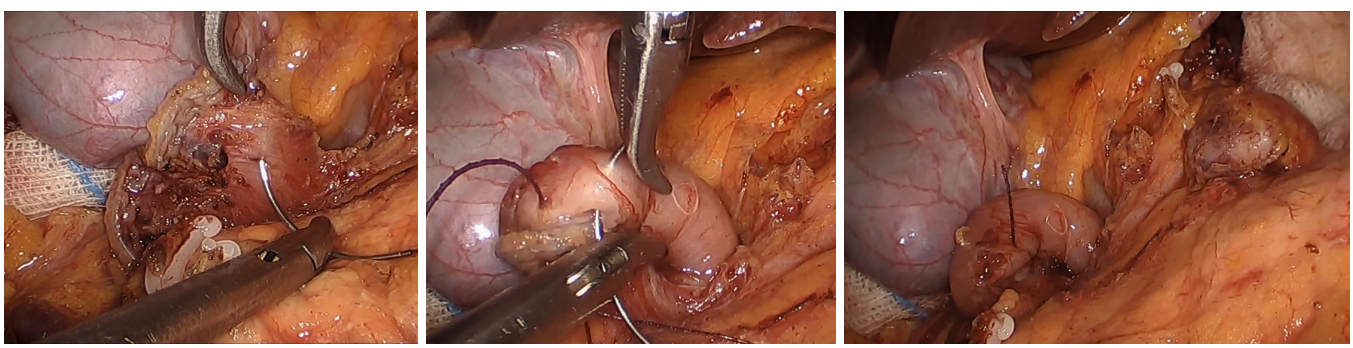

Figure 2 Laparoscopic reinforcement suture (LARS) commence from upper to lower part on staple-line of duodenal stump using barbed suture. Continuous suture with invagination is completed after 4 or 5 stitches.

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