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Comparison of short-term surgical outcomes between totally laparoscopic and laparoscopic-assisted distal gastrectomy for gastric cancer: a 10-y single-center experience with meta-analysis

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ABSTRACT

Background: Laparoscopic-assisted distal gastrectomy (LADG) and totally laparoscopic distal gastrectomy (TLDG) are two commonly used methods of laparoscopic gastrectomy for gastric cancer. This study aimed to compare the short-term surgical outcomes of these two methods.

Methods: A prospectively maintained gastric cancer database between October 2004 and February 2014 was reviewed and 115 patients underwent LADG and 198 patients underwent TLDG were included. The clinical characteristics and perioperative clinical outcomes of two groups were compared. Moreover, a systematic review and meta-analysis were conducted.

Results: The mean operation time and blood loss were similar in two groups, as was the number of retrieved lymph nodes. There was no significant difference in time to first flatus, the time to restart oral intake, the length of the hospital stay after surgery, and postoperative complications. The meta-analysis revealed no significant differences in the operative time, surgical margin, time to first flatus, length of hospital stay, mortality, overall, and anastomosis-related complications among the groups. However, the intraoperative blood loss was lower in TLDG (weighted mean difference = 21.50 mL; 95% confidence interval: 9.79–33.22; $P < 0.01$), and number of retrieved lymph nodes was higher in TLDG (weighted mean difference = −1.56; 95% confidence interval: −2.69 to −0.44; $P < 0.01$).

Conclusions: TLDG is safe and feasible compared with LADG. However, it is difficult to identify the clinical advantages of TLDG over LADG based on our study. Thus, the choice of surgical approach mainly depends on the patient conditions and the preference of the patients or surgeons.

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1. Introduction

Since it was first reported in 1994 [1], laparoscopic-assisted distal gastrectomy (LADG) for gastric cancer has undergone rapid development and gained popularity in the past 20 y. Compared with traditional open gastrectomy, some advantages of LADG have been reported, such as better cosmesis, shorter hospital stay, faster postoperative recovery, and better postoperative quality of life [2–5]. Until recently, LADG was the most commonly performed procedure. With LADG, lymph node dissection is performed laparoscopically. However, resection of the stomach and anastomosis are performed with a direct view through a minilaparotomy made on the epigastrium. Totally laparoscopic distal gastrectomy (TLDG) is considered to be incisionless, except for the trocar wounds, and it is a laparoscopic approach for intracorporeal anastomosis without auxiliary incision. TLDG preserves the integrity of the abdominal wall; therefore, less operative trauma, better recovery, and cosmetics can be expected [6]. However, it has not been generalized yet, whether further less invasiveness could be achieved by merely avoiding a minilaparotomy or that intracorporeal anastomosis has inherent advantages over extracorporeal anastomosis. On the other hand, because reconstruction of the digestive tract intracorporeally is technically demanding, the safety and feasibility of TLDG have not been fully evaluated. For these reasons, we compared the short-term outcomes of patients undergoing LADG and TLDG from our center, and a systematic review with meta-analysis was conducted to further clarify the safety and feasibility of TLDG and to summarize the operative experience.

2. Materials and methods

2.1. Patients

We reviewed a prospectively maintained gastric cancer database between October 2004 and February 2014 in the Department of General Surgery at the Sir Run Run Shaw Hospital, Affiliated Hospital of School of Medicine, Zhejiang University, China. Of these patients, 115 underwent LADG and 198 patients underwent TLDG. All these patients were preoperatively diagnosed with gastric adenocarcinoma in the lower stomach, and distal gastrectomy was performed with modified D_2 lymph node dissection. Clinical and pathologic staging were classified according to the American Joint Committee on Cancer (seventh edition) and TNM classification. The trial received approval from the local research ethics committee, and written informed consent was obtained from all patients before the investigation.

2.2. Surgical procedure

The details of the surgery are described in our previously published articles [7,8]. With the patient in the supine position, mobilization of the stomach and *en bloc* systematic lymph node dissection were performed via five trocars under a pneumoperitoneum [9] (Fig. 1). Lymphadenectomy was performed according to the Gastric Cancer Treatment Guidelines 2010 by the Japanese Gastric Cancer Association [10], which included number 7, 8, 9, 10, 11p, 11d, and 12a in addition to the D_1 dissection. Anastomosis methods included Billroth I or Billroth II gastrojejunostomy.

2.3. Outcome evaluations

Data related to patient demographics, the surgical procedure, and postoperative outcomes were collected. Outcome parameters included the operation time, estimated blood loss, time to first flatus, time to oral intake, length of postoperative hospital stay, and pathologic findings. In our present study, peripheral blood samples were collected preoperatively (baseline) and 1, 3, and 5 d after operation. White blood cell (WBC) levels were assayed using a Sysmex XE-2100 Haematology Analyzer (Sysmex Corp, Kobe, Japan). C-reactive

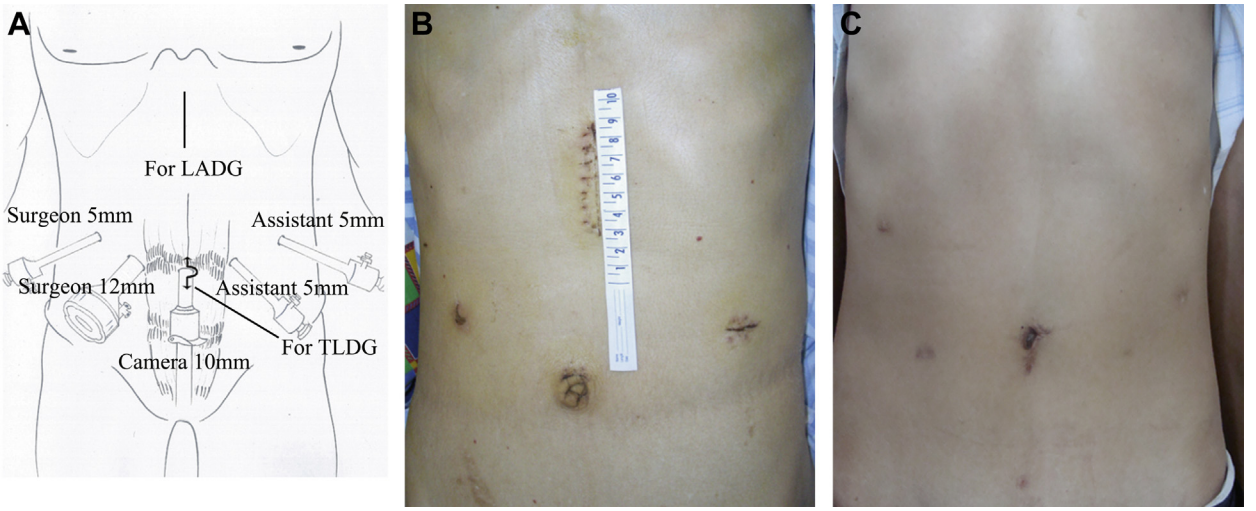

Fig. 1 – (A) Location of trocars placement and incision; (B), postoperative view of abdominal wound (LADG); and (C), postoperative view of abdominal wound (TLDG). (Color version of the figure is available online.)