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EJSO

the Journal of Cancer Surgery

ELSEVIER

EJSO xx (2017) 1–9

www.ejso.com

Is it necessary to dissect the posterior lymph nodes along the splenic vessels during total gastrectomy with D2 lymphadenectomy for advanced gastric cancer?☆

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Accepted 6 September 2017
Available online ■ ■ ■

Abstract

Background: D2 lymphadenectomy including No.10 lymph nodes (LNs) is the standard procedure for treating advanced gastric cancer (AGC) via total gastrectomy. However, there was no research focusing on the posterior LN dissection along the splenic vessels (No.10p LNs). This study is performed to assess the effect of dissecting No.10p LNs.

Methods: We analyzed 404 consecutive gastric cancer patients who underwent laparoscopic total gastrectomy (LTG) with D2 lymphadenectomy. There were 68 patients with No.10p LN dissection (No.10p group), and 336 patients without No.10p LN dissection (nNo.10p group). The surgical outcomes are compared.

Results: No.10p LN dissection was preferentially performed in patients who were younger and had a lower BMI, concentrated and single-branched type of splenic artery, and pancreatic tail near the lower pole of the spleen. The time for No.10 LN dissection and the number of No.10 LNs were greater in the No.10p group than in the nNo.10p group. There was no No.10p LNs metastasis, and the numbers of positive No.10 LNs were similar between the two groups. The morbidity and mortality rates of the No.10p group were comparable to those of the nNo.10p group. The overall survival (OS) rates of the two groups were not significantly different ($P > 0.05$).

Conclusions: Although No.10p LN dissection might retrieve more No.10 LNs, operation times were longer, and the number of positive No.10 LNs and the OS rate were not improved. It might be no necessary to dissect No.10p LNs during total gastrectomy with D2 lymphadenectomy for AGC.

Keywords: Stomach cancer; Laparoscopy; Lymphadenectomy; Splenic hilar lymph nodes

Introduction

According to 14th edition of the Japanese gastric cancer treatment guidelines, D2 lymphadenectomy is the standard procedure for treating advanced gastric cancer (AGC), and No.10 lymph nodes (LNs) should be dissected as a part of the total gastrectomy for AGC [1]. Previously, a splenectomy during gastrectomy was performed to excise the No.10 LNs. However, many studies have

☆ Supported by National key clinical specialty discipline construction program of China (No. [2012]649). Scientific and technological innovation joint capital projects of Fujian Province, China (No. 2016Y9031). The youth research project of Fujian Provincial Health and Family Planning Commission (2014-1-48).

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http://dx.doi.org/10.1016/j.ejso.2017.09.008
0748-7983/

reported that splenectomy might not improve the prognosis or may even adversely affect survival, with a greater incidence of complications compared with the results following splenic-preserving surgery for patients with gastric cancer [2–4]. In recent years, following the concepts of preserving visceral function and improving surgical techniques, spleen-preserving total gastrectomy has been applied and recommended for the treatment of advanced proximal gastric cancer [5–7]. The first report of laparoscopic spleen-preserving No. 10 LN dissection for the treatment of AGC was published by Hyung et al. [8] in 2008. In 2010, our center began to perform this procedure [9–11], and we then summarized an effective procedure for this complex operation in three steps, named "Huang's three-step maneuver" [12]. This maneuver simplifies the complicated procedure and improves the efficiency of laparoscopic spleen-preserving No.10 LN dissection. However, because of the deep location of the splenic hilum, narrow operative space, fragile texture of the spleen, and tortuosity and complicated branching pattern of splenic vessels, a spleen-preserving No.10 LN dissection is technically difficult and requires a highly skilled surgical technique. Additionally, like the No.8p LNs, the No.10p LNs are located in the dorsal mesogastrium. When performing a D2 lymphadenectomy, it is unclear whether No.10p LNs should be dissected. And there is no previous research focusing on this question. Therefore, the aim of the current study was to evaluate the effect of dissecting No.10p LNs in a large-volume single center analysis including 404 consecutive patients treated with laparoscopic D2 lymphadenectomy including spleen-preserving No.10 LN dissection during total gastrectomy for AGC and to provide a more focused and detailed report in this subject.

Materials and methods

Materials

This study was a retrospective analysis of a prospectively collected database of upper- or middle-third AGC patients treated with laparoscopic spleen-preserving No.10 LN dissection in the Department of Gastric Surgery of Fujian Medical University Union Hospital (FMUUH), Fuzhou, China, between January 2010 and December 2014. The policy of spleen-preserving lymphadenectomy for AGC was followed for cases without definite LN enlargement in the splenic hilum or direct tumor invasion of the gastrosplenic ligament. The inclusion criteria were as follows: (1) a histologically confirmed primary adenocarcinoma in the upper- or middle-third of the stomach; (2) no evidence of tumors invading the adjacent organs and enlargement or integration of the para-aortic LNs, or distant metastasis demonstrated via preoperative abdominal computed tomography (CT), abdominal ultrasound or endoscopic ultrasound; and (3) total gastrectomy plus D2 lymphadenectomy with curative R0 resection based on the postoperative pathological diagnosis. The exclusion criteria were the presence of T4b tumors, incomplete clinicopathological data, intraoperative evidence of peritoneal dissemination or distant metastasis, neoadjuvant therapy, or gastric stump carcinoma. Preoperative comorbidities were described in terms of the American Society of Anesthesiologists' class system [13]. CT scanning and multi-slice spiral CT angiography were performed to preoperatively assess the splenic vascular anatomy of each patient [14]. Patient demographics, underlying diseases, clinicopathology, and surgical, preoperative and postoperative monitoring data were recorded in a clinical database for gastric cancer surgeries [15]. The type of surgical resection (i.e., a distal subtotal gastrectomy, proximal subtotal gastrectomy, or total gastrectomy) and extent of LN dissection were selected according to the Japanese gastric cancer treatment guidelines [16]. The resected specimens were examined histopathologically and staged according to the 7th edition of the UICC TNM classification [17]. Adjuvant chemotherapy with 5-fluorouracil (5-FU)-based regimens (mostly oxaliplatin with either Xeloda or S1) was recommended for the majority of patients with AGC [18,19]. This project was approved by the local ethics committee of the FMUUH, China. The follow-up data were collected from the follow-up office established by the Department of Gastric Surgery or National Statistical Office data. Survival duration was measured from the time of surgery to either the last date that survival information was collected or the confirmed date of death. All patients were observed until death or a final follow-up date of September 2016, which ever occurred first.

Variables and definitions

The time for No.10 LN dissection was the time from dissecting the gastrosplenic ligament to finishing the No.10 LN dissection. Blood loss was estimated based on the volume of blood absorbed by gauze and suctioned after subtracting the volume of fluids used for irrigation. When the splenic artery (SpA) divided into its terminal branches <2 cm from the splenic hilum, it was considered to be concentrated. If the distance was >2 cm, it was considered to be distributed [20,21]. The splenic lobar artery (SLA) refers to the terminal branch of the SpA at the splenic hilum and is divided into 4 types. If the SpA passed tortuously through the splenic hilum without dividing into terminal branches, it was considered to be the 1-branched type; if it branched off the superior and inferior SLAs, it was considered to be the 2-branched type; if it divided into the superior, middle, and inferior SLAs, it was considered to be the 3-branched type; and if it has more than 3 branches that enter the splenic hilum, it was considered to be the multiple-branched type [20,21]. The relationship between the pancreatic tail (PT) and the splenic hilum was

Please cite this article in press as: Lin J-X, et al., Is it necessary to dissect the posterior lymph nodes along the splenic vessels during total gastrectomy with D2 lymphadenectomy for advanced gastric cancer?, Eur J Surg Oncol (2017), http://dx.doi.org/10.1016/j.ejso.2017.09.008