D2 Plus Para-Aortic Lymphadenectomy Versus Standardized D2 Lymphadenectomy in Gastric Cancer Surgery

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Abstract

Purpose. To evaluate the survival benefits and safety of D2 plus para-aortic lymphadenectomy (D2 + PALD) for gastric carcinoma.

Methods. Patients with gastric carcinoma, who agreed to undergo D2 + PALD between February 2001 and December 2003, were allocated to the D2 + PALD group, and compared with a control group who underwent D2 lymphadenectomy. Patients were followed up until August 2007.

Results. Sixty-two patients were allocated to the D2 + PALD group, and a concurrent 55 patients were allocated to the D2 group. The mean follow-up period was 57.6 (range 43.0–77.6) months, with 11.1% lost to follow-up. The morbidity and mortality rates were 24.2% and 0% in the D2 + PALD group, and 27.3% and 1.8% in the D2 group, respectively. The overall 3- and 5-year survival rates were 77.5% and 65.8% in the D2 + PALD group, and 73.2% and 66.1% in the D2 group, respectively, without a significant difference. The frequency of metastasis to the para-aortic lymph nodes (PALN) was 8.1%. The logistic regression revealed that PALN metastasis was correlated to metastasis of No. 8a and No. 9 lymph nodes (P = 0.021 and P = 0.030, respectively).

Conclusion. Although D2 + PALD can be performed safely with an acceptable incidence of complications when performed by well-trained gastrointestinal surgeons, its survival benefits are not significantly greater than those of D2 lymphadenectomy. Therefore, routine D2 + PALD should not be recommended.

Key words Gastric cancer · Lymphadenectomy · Para-aortic lymph nodes · Morbidity · Mortality · Survival

Introduction

Gastric cancer is estimated by some to be the second most common malignancy worldwide, and constitutes a major health problem globally. Moreover, 70%–80% of resected gastric carcinoma specimens have metastases in the regional lymph nodes. Once invasion of primary tumor is graded as up to or beyond the T2 stage, the median percentage of metastasis of resected para-aortic lymph nodes (PALN) has been reported as 21.6% (range 6.2%–33.0%) with pathological confirmation. In an attempt to improve prognosis, D2 plus para-aortic lymphadenectomy (D2 + PALD) has recently been studied by Japanese surgeons; however, its effectiveness remains controversial. Even though D2 + PALD can be performed safely without increasing the risk of postoperative complications and mortality, the long-term survival benefits of this super-extended lymphadenectomy need further investigation. A detailed preoperative assessment using computed tomography (CT), ultrasonography, or magnetic resonance imaging (MRI), might assist in deciding the extension of lymphadenectomy for individual patients. To investigate the operative morbidity, mortality, and long-term survival rates after D2 + PALD, we conducted a retrospective case-control study comparing D2 + PALD with standardized D2 lymphadenectomy alone in patients undergoing gastric cancer surgery.

Patients and Methods

Patients

The present study was conducted as a nonrandomized concurrent controlled trial. Between February 2001 and December 2003, patients with gastric carcinoma who agreed to undergo D2 plus PALD were allocated to the D2 + PALD group, while concurrent patients who
In this study, total or subtotal gastrectomy was performed according to the Japanese Gastric Cancer Association classification. The mean follow-up duration was 57.6 ± 10.1 months (range 43.0–77.6 months). The follow-up duration was 57.0 ± 7.9 (range 43.0–77.6) months in the D2 + PALD group and 56.5 ± 5.7 (range 43.0–67.0) months in the D2 group.

Statistical Analysis

SPSS 11.5 software (SPSS, Chicago, IL, USA) was used for statistical analysis. Quantitative variables of normality were tested, if conforming to normal distribution, and data are expressed as means ±SD. Two independent t-tests were performed, and if not, data were expressed as medians with a range and the Spearman test was considered. For categorical data, the Chi-square test was used to compare frequencies. Survival was calculated by Kaplan–Meier estimation and the log-rank test. The correlation between the PALN metastasis and clinicopathologic factors was investigated by logistic regression with the backward stepwise (conditional) method. A P value of less than 0.05 (two-sided) was considered significant.

Follow-Up

Patients were followed up long-term by telephone calls, letters, or outpatient visits. As of August 15, 2007, the overall follow-up rate was 88.9% (104/117). No response to telephone calls or letters and changed addresses accounted for 8.1% (5/62) of patients from the D2 + PALD group and 14.5% (8/55) from the D2 group being lost to follow-up. The mean follow-up duration was 57.6 ± 10.1 months (range 43.0–77.6 months). The follow-up duration was 57.0 ± 7.9 (range 43.0–77.6) months in the D2 + PALD group and 56.5 ± 5.7 (range 43.0–67.0) months in the D2 group.

Results

Patient Characteristics

There were 62 patients in the D2 + PALD group and 55 in the D2 group. The general clinicopathologic characteristics are summarized in Table 1. The proportion of men and women in the two groups was similar. The mean age was 54.3 ± 11.4 years in the D2 + PALD group and 58.8 ± 11.4 years in the D2 group (P = 0.034). There was no significant difference in depth of invasion, lymph node metastasis status, and TNM stage between the two groups (Table 1). The proportions of early gastric cancer were 12.9% (8/62) and 9.1% (5/55) in the D2 + PALD and D2 groups, respectively. The tumor locations in the D2 + PALD and D2 groups were also not significantly different, with 58.1% (36/62) in the D2 + PALD group and 50.9% (28/55) in the D2 group in the lower third of stomach. Histological differentiation was comparable, with signet-ring cell and poor differentiated carcinoma accounting for the majority in both two groups (77.4% vs 78.2%). Clinicopathologic terminology was based on the Japanese Classification of Gastric Carcinoma.6

Surgical Techniques

In this study, total or subtotal gastrectomy was performed based on the location and infiltration of the primary tumor. Proximal gastrectomy was performed for tumors no larger than 4 cm in diameter located in the upper third of stomach, distal gastrectomy was performed for tumors in the lower third of the stomach, and total gastrectomy was performed for tumors in the middle third or for tumors larger than 4 cm in diameter in the upper third. Pancreaticosplenectomy was not done routinely; it was done only when there was invasion of the pancreatic tail and spleen, or to enable dissection of lymph nodes nearby (No. 11d and No. 10). Standardized D2 lymphadenectomy was done according to the 2nd English edition of the Japanese Gastric Cancer Association classification, after the Kocher maneuver with modified PALD (No. 16a1, No. 16a2, and No. 16b1) in the D2 + PALD group. The grouping rule of regional lymph nodes was according to the Japanese Gastric Cancer Association classification. The No. 16a1 nodes are defined as the para-aortic nodes between the aortic hiatus and the upper margin of the celiac trunk; the No. 16a2 nodes are defined as those between the upper margin of the celiac trunk and the lower margin of the left renal vein; and the No. 16b1 nodes are defined as those between the lower margin of the left renal vein and the upper margin of the inferior mesenteric artery. All the operations were performed by surgeons experienced in gastrointestinal surgery (Z.-X.C., J.-P.C., J.-K.H., and B.Z.) at the West China Hospital, Sichuan University.

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