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Risk factors and management of intra-abdominal infection after extended radical gastrectomy

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Risk factors

Abstract

BACKGROUND: This study elucidated risk factors and management for intra-abdominal infection after extended radical gastrectomy.

METHODS: From 1988 to 2004, 2,076 patients with gastric cancer underwent extended radical gastrectomy at Taipei Veterans General Hospital. Risk factors for intra-abdominal infection were determined by analyzing clinicopathological factors, operative procedure, combined organ resection, operative time, blood loss, and associated disease(s). Management modalities were summarized.

RESULTS: The overall complication rate was 18.7%. Eighty (3.9%) patients were found to have intra-abdominal infections. Age, prolonged operation time, and combined organ resection were the precipitating factors. These patients were categorized into 3 groups: intra-abdominal abscess with adequate drainage, intra-abdominal abscess without anastomotic leakage, and intra-abdominal abscess because of leakage. Adequate drainage was the primary treatment. Mortality rate was 22.5% (18), and the most common cause of mortality was intra-abdominal abscess caused by leakage.

CONCLUSIONS: Although expert surgical skills can minimize the incidence of intra-abdominal infection, management also requires experience and training.

Although the incidence of gastric cancer is declining worldwide, gastric cancer is still the fifth-ranked cause of cancer mortality in Taiwan. Surgical resection remains the first choice for treatment. Although varying survival rates have been reported for extended lymph node dissection of gastric cancer,[1–3] the incidence of postoperative morbidity and mortality is significantly increased in extended lymph node dissection.[4,5] Anastomotic leakage and intra-abdominal infection (IAI) are the most frequent complications after extended radical gastrectomy,[4–6] particularly after distal pancreatectomy and splenectomy, and often cause significant mortality.[5,7] The incidence of IAI was also higher in extended lymph node dissection (>D1 dissection) but did not lead to significant mortality in our series.[6,8] Because intra-abdominal infection is a rarely reported major complication after radical surgery, the current study was initiated in order to evaluate the predisposing factors and management of IAIs after extended radical gastrectomy.

Patients and Methods

From January 1988 to December 2004, 2,076 patients with gastric cancer underwent elective radical gastrectomy

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Table 1 Analyses of clinicopathological factors between gastric cancer patients with and without IAI

	IAIs (n = 80)	No complication (1996)	*P*
Age			
<65	17	721	
≥65	63	1,275	.010
Operative procedure			
Subtotal gastrectomy	40	1,486	
Total gastrectomy	40	510	<.001
Combined organ resection (splenectomy ± distal pancreatectomy)			
Yes	26	226	
No	54	1,564	<.001
Operative time	6.01 ± 2.5	5.07 ± 2.0	.001
Blood loss	960	630	<.001
Diabetes	9	181	.533
Hypoalbuminemia (<3.0)	17	429	.912
Associated diseases (lung, hypertension, cardiovascular, renal)	53	1,305	.809

	Coefficiency	Standard error	95% confidence interval	*P*
Combined organ resection	1.047	.276	1.661–4.898	.0001
Age	.698	.274	1.175–3.436	.011
Operative time	.110	.053	1.005–1.238	.039

at Taipei Veterans General Hospital. All patients underwent extended radical gastrectomy combined with lymph node dissection (D1+ α, D2, or D3 [before 1997]).[6,9] Prophylactic antibiotics were administered for 3 to 7 days after operation. Two modified Foley drain tubes[10] were placed in the Morrison pouch and subhepatic space, and another modified Foley tube was placed in the splenic fossa if radical total gastrectomy or combined distal pancreatectomy and splenectomy were performed; these were subsequently removed 1 or 2 days after starting feeding. Preoperative patient information, operative findings, operative procedure, combined organ resection (splenectomy with/without distal pancreatectomy), postoperative complications, duration of the hospital stay, and survival were prospectively recorded for all patients and stored in a computerized data bank.

Clinical characteristics including age, operating procedure, combined organ resection, operating time, blood loss, and preoperative comorbid diseases were compared between patients with and without IAI to evaluate possible predisposing factors. IAI was defined as follows: (1) intra-abdominal abscess with adequate drainage (contaminated fluid or purulent discharge from the drainage tube and no fluid accumulation observed in the peritoneal cavity by imaging study), (2) intra-abdominal abscess without anastomotic leakage (fluid collection detected in peritoneal cavity by imaging studies but with no evidence of anastomotic leakage), and (3) intra-abdominal abscess resulting from anastomotic leakage (fluid collection combined with anastomotic leakage confirmed by imaging).

Clinical presentations, diagnostic methods, bacterial culture, and management of IAIs were analyzed by reviewing the medical records of all patients meeting the previously described criteria. Univariate analyses were tested by the chi-square test, and logistic regression was used for multivariate analyses. $P < .05$ was regarded as significant. The software package SPSS version 11.0 (SPSS, Chicago, IL) was used for data analysis.

Results

Evaluating from our computerized data bank, 389 of 2,076 patients (18.7%) had complications after extended radical gastrectomy. Among them, 80 patients had IAIs (3.9%). Table 1 summarizes the analytic results for risk factors. According to univariate analyses, significant risk factors were age (≥ 65), radical total gastrectomy, combined organ resection, operating time, and blood loss. However, only age, prolonged operating time, and combined organ resection significantly correlated with IAI after multivariate analyses. Diabetes mellitus, hypoalbuminemia (<3.0 g/dL), and other comorbid diseases were not significantly related to IAI.

Of the 80 IAI patients, 16 were categorized as intra-abdominal abscess with adequate drainage, 41 as intra-abdominal abscess, and 23 as intra-abdominal abscess with anastomotic leakage. Age was comparable in the 3 groups, but patients with intra-abdominal abscess with anastomotic leak displayed an increased incidence of combined organ resection (43.4%), abscess without leak (29.3%), and tract infection (25%).

Intra-abdominal abscess with adequate drainage

The most common symptom was purulent discharge from drainage tubes (14/16, 87.5%), which usually appeared by the 11th day after surgery (range day 3–23). The