



Comparison of surgical site infection between open and robotic-assisted gastrectomy in patients with gastric cancer



Do not post

Jinnam Kim, MD^{1,2}, Se Ju Lee, MD^{1,2}, Ki Hyun Lee, MD^{1,2}, Eun Hwa Lee, MD^{1,2}, Yae Jee Baek, MD^{1,2}, Jung Ho Kim, MD^{1,2}, Jin Young Ahn, MD^{1,2}, Su Jin Jeong, MD, PhD^{1,2}, Nam Su Ku, MD, PhD^{1,2}, Taeil Son, MD, PhD⁴, Jun Yong Choi, MD, PhD^{1,2}, Joon-Sup Yeom, MD, PhD^{1,2}

¹ Division of Infectious Diseases, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Korea; ²AIDS Research Institute, Yonsei University College of Medicine, Seoul, Korea; ³Yonsei University College of Medicine, Seoul, Korea; ⁴Department of Surgery, Yonsei University College of Medicine, Seoul, Korea

INTRODUCTION

Surgical site infection is a clinically significant postoperative complication and a major cost burden of healthcare-associated infections. Although many studies compare minimally invasive surgery and open surgery, few studies have focused on surgical site infection. This study aimed to investigate the differences in the incidence of surgical site infection after open and robotic-assisted gastrectomy in patients with gastric cancer.

METHODS

We retrospectively reviewed adult patients with gastric cancer who underwent open and robotic-assisted gastrectomy at a 2,400-bed tertiary hospital in Seoul from January 2015 to December 2015. Postoperative outcomes, including surgical site infection between open and robotic-assisted gastrectomy, were compared. Risk factors of surgical site infection were analyzed by logistic regression multivariable analysis.

RESULTS

A total of 684 patients, including 448 patients who underwent open gastrectomy and 236 patients who underwent robotic-assisted gastrectomy, were enrolled. The median age was 58 years. The overall incidence of surgical site infection was 7.6%. The incidence of surgical site infection was significantly lower in the robotic-assisted gastrectomy group than in the open gastrectomy group (9.2% vs. 4.7%, p=0.035). The length of hospital stay was significantly shorter in the robotic-assisted gastrectomy group than in the open gastrectomy group (5 vs. 8 days, p<0.001). Multivariate logistic regression revealed that the operative time, history of smoking, and open gastrectomy were independent risk factors influencing the incidence of surgical site infection.

CONCLUSION

Robotic-assisted gastrectomy is a good multimodality treatment option for gastric cancer in terms of reduced length of hospital stay and incidence of surgical site infection.

Table 1. Baseline characteristics of patients with gastric cancer who underwent gastrectomy

	Total (n=684)	Gastrectomy		p value
		Open (n=448)	Robot (n=236)	
Age (years)	58 (50-66)	60 (53-68)	54 (45-62)	<0.001
Sex				
Male	430 (62.9%)	292 (65.2%)	138 (58.5%)	0.085
Female	254 (37.1%)	156 (34.8%)	98 (41.5%)	
BMI* (kg/m ²)	23.0 (21.0-26.0)	23.0 (21.0-26.0)	23.5 (21.0-25.0)	0.971
ASA [†] class				0.024
<3	522 (76.3%)	330 (73.7%)	192 (81.4%)	
≥3	162 (23.7%)	118 (26.3%)	44 (18.6%)	
Smoking status				0.105
Non-smoker	310 (45.3%)	193 (43.1%)	117 (49.6%)	
Ex-smoker and current smoker	374 (54.7%)	255 (56.9%)	119 (50.4%)	
Co-morbidities				
Hypertension	216 (31.6%)	156 (34.8%)	60 (25.4%)	0.012
Diabetes mellitus	104 (15.2%)	76 (17.0%)	28 (11.9%)	0.077
Intracranial hemorrhage	7 (1.0%)	4 (0.9%)	3 (1.3%)	0.697
Cerebrovascular accident	20 (2.9%)	14 (3.1%)	6 (2.5%)	0.667
Congestive heart failure	8 (1.2%)	5 (1.1%)	3 (1.3%)	0.999
Coronary artery disease	26 (3.8%)	20 (4.5%)	6 (2.5%)	0.211
Asthma	9 (1.3%)	5 (1.1%)	4 (1.7%)	0.504
COPD [‡]	12 (1.8%)	9 (2.0%)	3 (1.3%)	0.559
old tuberculosis	49 (7.2%)	34 (7.6%)	15 (6.4%)	0.552
Liver disease	37 (5.4%)	20 (4.5%)	17 (7.2%)	0.132
Chronic kidney disease	32 (4.7%)	20 (4.5%)	12 (5.1%)	0.715
Connective tissue disease	4 (0.6%)	2 (0.4%)	2 (0.8%)	0.513
Charlson co-morbidity index	4 (3-6)	4 (3-6)	3 (2-5)	<0.001
TNM [§] stage				<0.001
Stage I, II	470 (68.7%)	258 (57.6%)	212 (89.8%)	
Stage III, IV	214 (31.3%)	190 (42.4%)	24 (10.2%)	
Preoperative chemotherapy	53 (7.7%)	51 (11.4%)	2 (0.8%)	<0.001
Surgical extent				<0.001
Subtotal	488 (71.3%)	284 (63.4%)	204 (86.4%)	
Total	196 (28.7%)	164 (36.6%)	32 (13.6%)	
Co-operation	81 (11.8%)	71 (15.8%)	10 (4.2%)	<0.001
Lymph node dissection				<0.001
D1, D1+	194 (28.4%)	47 (10.5%)	147 (62.3%)	
D2, D3	490 (71.6%)	401 (89.5%)	89 (37.7%)	

Table 2. Postoperative outcomes of patients with gastric cancer who underwent gastrectomy

Post-operative outcome	Total (n=684)	Gastrectomy		p value
		Open (n=448)	Robot (n=236)	
Operative time (min)	185 (156-218)	183 (157-215)	189.5 (154-227)	0.023
Length of stay (days)	7 (5-9)	8 (7-10)	5 (5-6)	<0.001
Readmission within 30 days	32 (4.7%)	26 (5.8%)	6 (2.5%)	0.055
Mortality	2 (0.3%)	1 (0.2%)	1 (0.4%)	0.999
SSI [*]	52 (7.6%)	41 (9.2%)	11 (4.7%)	0.035
Incisional	11 (1.6%)	8 (1.8%)	3 (1.3%)	0.756
Organ/space	41 (6.0%)	33 (7.4%)	8 (3.4%)	0.037
Wound dehiscence	40 (5.8%)	22 (4.9%)	18 (7.6%)	0.150
Pneumonia	27 (3.9%)	22 (4.9%)	5 (2.1%)	0.075
UTI [†]	28 (4.1%)	22 (4.9%)	6 (2.5%)	0.137
Anastomosis leakage	30 (4.4%)	23 (5.1%)	7 (3.0%)	0.188
Anastomosis stenosis	4 (0.6%)	3 (0.7%)	1 (0.4%)	0.999
Ileus	9 (1.3%)	8 (1.8%)	1 (0.4%)	0.175
Bleeding (postoperative)	10 (1.5%)	6 (1.3%)	4 (1.7%)	0.744
Anemia	27 (3.9%)	25 (5.6%)	2 (0.8%)	0.003
Cardiac complication	3 (0.4%)	1 (0.2%)	2 (0.8%)	0.275

Table 3. Univariable and multivariable analyses of surgical site infection in patients with gastric cancer who underwent gastrectomy

Characteristics	N	Univariable analysis			Multivariable analysis		
		OR	95% CI	p-value	OR	95% CI	p-value
Operative time		1.007	1.001-1.013	0.020	1.008	1.003-1.014	0.002
Sex							
Male	430	1.145	0.434-3.019	0.785			
Female	254	1					
Smoking	374	1.910	0.785-4.648	0.154	2.249	1.188-4.257	0.013
BMI [*]		1.081	0.989-1.181	0.085			
Charlson co-morbidity index		1.105	0.966-1.264	0.147			
TNM [†] stage							
Stage I, II	470	1					
Stage III, IV	214	1.365	0.681-2.737	0.380			
Preoperative chemotherapy	53	1.163	0.462-2.928	0.748			
Operation method							
Open	448	1.767	0.749-4.171	0.194	2.281	1.123-4.634	0.023
Robot-assisted	236	1			1		
Co-operation	81	0.823	0.350-1.937	0.656			
Lymph node dissection							
D1, D1+	194	1					
D2, D3	490	1.142	0.466-2.803	0.771			