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Review

Outcomes of gastric cancer resections performed in a high volume community cancer center

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ABSTRACT

Background: Large University Hospitals are usually the referral centers for complex surgical procedures. However, the majority of cancer care takes place in the community hospital. The aim of this study was to analyze the morbidity, mortality and long-term survival of gastric cancer patients after the establishment of a multidisciplinary gastric cancer team in an academic community hospital.

Methods: A retrospective review of medical records was performed for patients who presented with gastric cancer from 2005 to 2013. Thirty-day morbidity and mortality were assessed for patients who underwent gastrectomy with curative intent. Long-term survival was determined by Kaplan–Meier analysis.

Results: Ninety-one patients underwent curative resection over an 8-year period. Eighty-seven patients (96%) had an R0 resection. Mean lymph node recovery was 20. Serious morbidity rate was reported in 10/91 (11%). Mortality in the series was 3/91 (3%). Five-year survival by stage was similar to AJCC reported survival.

Conclusion: Complex surgical resections for gastric cancer can be safely performed at a high volume community cancer center with minimal morbidity and mortality.

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Introduction

Gastric cancer remains the 4th most common malignancy worldwide. In the United States, 22,220 patients will be diagnosed with this disease each year, with 10,990 deaths [1,2]. Most patients have advanced disease on presentation. Curative treatment is only possible for a minority of patients, which involves surgical resection of the stomach, possibly the distal esophagus, and a complete upper abdominal and peri-gastric (D2) lymph node dissection.

Over the years the morbidity and mortality of complex surgical procedures have declined. Both institutional volume and surgeon experience have been linked to this decline. Many studies have shown that centers that perform a high volume of complex surgeries have lower morbidity and mortality compared to low volume

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institutions. This has been demonstrated for hepatectomy, esophagectomy, pancreatectomy and gastrectomy [3–5].

Many community hospitals perform high volume, complex surgery. In addition, a large majority of cancer care takes place in the community hospital. Patients may prefer to be treated locally rather than travel a distance to an outside institution. For this reason we previously published our experience with pancreatic and hepatic resections [6,7]. We were able to show that these complex procedures could be performed safely. We now describe our surgical experience with gastric cancer over an 8-year period. These data reflect the establishment of a multidisciplinary gastric cancer team, and centralizing the majority of gastric cancer surgery to two surgical oncologists. Our goal was to show that curative R0 gastrectomy can be performed at a high volume community cancer center with low morbidity and mortality consistent with national data. This supports the role of high volume community cancer centers providing quality care for patients with gastric cancer.

Methods

The study setting was a community-based, 1100-bed hospital with a general surgery residency training program, and a National Cancer Institute selected Community Cancer Center (NCI Community Cancer Center Program). The hospital is a Level 1 Trauma Center with greater than 46,000 surgical procedures performed annually, along with a 22 bed surgical intensive care unit.

Our study evaluated the clinical outcomes of patients with gastric cancer who had an R0 or R1 resection with curative intent from 2005 to 2013. The study was a retrospective review of patient medical records and was approved by the Institutional Review Board. Minimum follow-up required for all patients was at least 12 months, median follow up was 13 months, and range was 1–95 months. Survival data was performed using Kaplan–Meier analysis. Patients who presented with Siewert I and most Siewert II cancers were managed as esophageal cancer in accordance with the most recent National Comprehensive Cancer Center Network (NCCN) guidelines. These patients are not included in the current study. Patients who presented with metastatic disease, patients who did not have surgery, or patients who had palliative procedures were excluded. A board certified pathologist evaluated all specimens. During the time period of our study the revised 7th edition AJCC staging was introduced. The staging system used for our patients was the edition that was used by the pathologist at the time of the initial surgical specimen evaluation. No attempts were made to convert patients into the new staging system.

Table 1
Demographics and characteristics of gastric cancer patients $n = 91$.

Characteristic	*n*	(%)
Age, *y*		
Mean age	68	
Median age	70	
Range	31–96	
Sex		
Male	58	58%
Female	33	33%
Race		
Caucasian	66	73%
African American	23	25%
Native American	1	1%
Asian	1	1%
Resection type		
R0	87	96%
R1	4	4%
Tumor size (mm)		
Mean	53	
Median	45	
Tumor location		
Gastroesophageal junction/Cardia	23	25%
Proximal	10	11%
Mid	12	13%
Antral/Pylorus	42	46%
Other	4	4%
T stage		
Tis	1	1%
T1	17	19%
T2	19	21%
T3	38	42%
T4	16	18%
Nodal distribution		
N0	35	38%
N1	32	35%
N2	10	11%
N3	14	15%

Demographics and tumor characteristics of the 91 patients in the CCHS reported series.

Results

From January 2005 to March 2013, a total of 116 patients diagnosed with gastric adenocarcinoma were referred to the surgical oncology service. The demographics of our patient population are listed in Table 1. The majority of patients were Caucasian males. Patients tended to present in the later stages of life and the median age of presentation was 70 years (Range 31–96). Of the 116 patients evaluated, 25 (22%) were found to have metastatic disease and were offered palliative therapy. Of these 25 patients, 14 (12%) had metastatic disease on pre-operative staging workup while 11 (9%) patients were ultimately deemed unresectable during surgical exploration.

The remaining 91 patients underwent resection with curative intent. The most common location for tumors was the antrum and pylorus, which comprised 46% of patients, while 25% were gastroesophageal junction (GEJ) tumors. The remainder are listed in Table 1. About 4% of cancers were found in patients that had prior gastrectomy for ulcer disease usually at their prior anastomotic site. The mean tumor size was 5.3 cm (Range 0.4–20).

When evaluating the T stage, more than half of the patients (60%) had deeply invading tumors, which were either T3 or T4. In addition, 61% of patients were found to have nodal involvement after resection (Table 1).

There were 87 patients (96%) who underwent an R0 resection while 4 patients (4%) had an R1 resection. No patients underwent an R2 resection. Our final study sample included 91 patients.

Two surgeons who were trained in surgical oncology performed 75% of the gastrectomies in this series. Since our hospital is private practice based, there was no initial mandatory referral pattern to

Table 2
Distribution of surgeries and nodal dissection $n = 91$.

Characteristic	*n*	(%)
Type of surgery		
Total gastrectomy	26	29%
Distal subtotal	46	51%
Esophagogastrectomy	19	21%
Mean lymph node recovery by procedure		
Overall	20	
Total gastrectomy	22	
Distal subtotal	19	
Esophagogastrectomy	17	
Range of nodal dissection		
1–6 nodes	10	11%
7–14 nodes	23	25%
>15 nodes	58	64%

Types of surgeries performed. The mean lymph node recovery for each type of surgery is illustrated.