Evaluation of Nationwide Trends in Nodal Sampling Guideline Adherence for Gastric Cancer: 2005-2017

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Introduction

Surgical resection is the primary curative treatment for localized gastric cancer. A multitude of research supports surgical nodal sampling guidelines. Though there are known disparities in adherence to nodal sampling, it is unclear how hospital program-level disparities have changed over time. The purpose of this study is to evaluate trends in program-level disparities in adherence to gastric cancer nodal sampling guidelines.

Methods

Patients who underwent resection of gastric cancer from 2005-2017 were identified in the National Cancer Database (NCDB). Patients treated at academic programs were compared to those treated at nonacademic programs, and rates and trends of adherence to nodal sampling guidelines (defined as ≥15 lymph nodes) were determined. Adjusted multivariable analysis was used to determine likelihood of nodal sampling adherence and receipt of adjuvant chemotherapy while controlling for sociodemographic, clinical, hospital, and travel distance characteristics.

Results

A total of 55,421 patients were included with 27,201 (49.1%) of patients meeting adherence criteria for lymph node sampling. Academic programs treated 44.4% of the total cohort.

Overall, lymph node sampling criteria were met in 59.2% of patients treated at high-volume academic programs and 37.0% of patients treated at low-volume nonacademic programs (IRR 0.67, 95% CI 0.63-0.72 vs high-volume academic programs).

Adherence rates improved from 2005 to 2017 for both low-volume nonacademic programs (27.8% in 2005 to 50.1% in 2017) and high-volume academic programs (46.0% in 2005 to 69.8% in 2017, p<0.001).

In adjusted multivariable analysis, lymph node guideline adherence (≥15 lymph nodes sampled) was associated with increased likelihood of receipt of adjuvant chemotherapy (IRR 1.23, 95% CI 1.20-1.27 vs <15 lymph nodes sampled).

Guideline Adherence for Lymph Node Sampling is Improving

Year of Diagnosis	% ≥15 LN‡
2005:	35.9%
2011:	48.5%
2017:	**62.9%**

LN, Lymph Nodes Sampled

High Volume Academic Programs More Likely to Adhere to Guidelines

Volume/Program	IRR (95% CI)*
Low-volume/Nonacademic:	0.67 (0.63-0.72)
High-volume/Academic:	**Reference**

IRR, Incidence Rate Ratio; CI, Confidence Interval

Adjuvant Chemotherapy More Likely for Patients with ≥15 Lymph Nodes Sampled at Resection

Lymph Nodes	IRR (95% CI)*
<15 LN:	Reference
≥15 LN:	**1.23 (1.20-1.27)**

*Likelihood of receipt of adjuvant chemotherapy among early-stage patients upstaged after surgery

FIGURE 1. Gastric cancer lymph node sampling adherence by surgical volume and program type

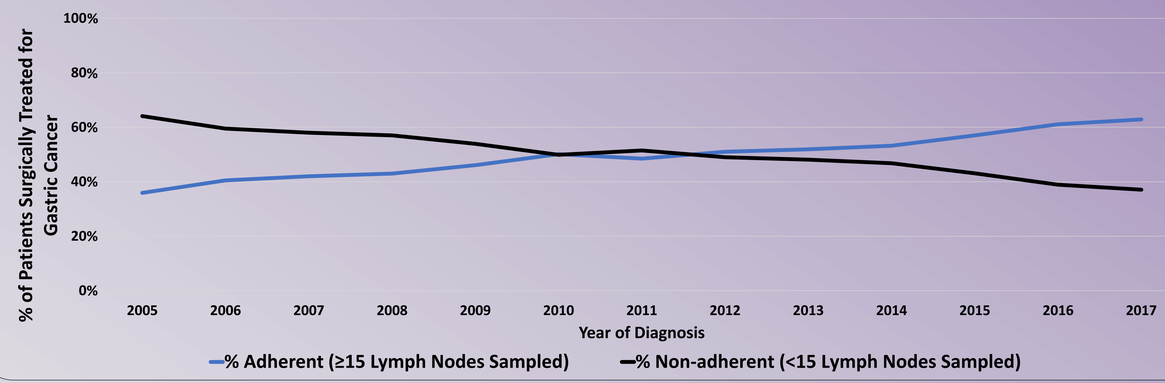

FIGURE 2. Gastric cancer lymph node sampling adherence by surgical volume and program type

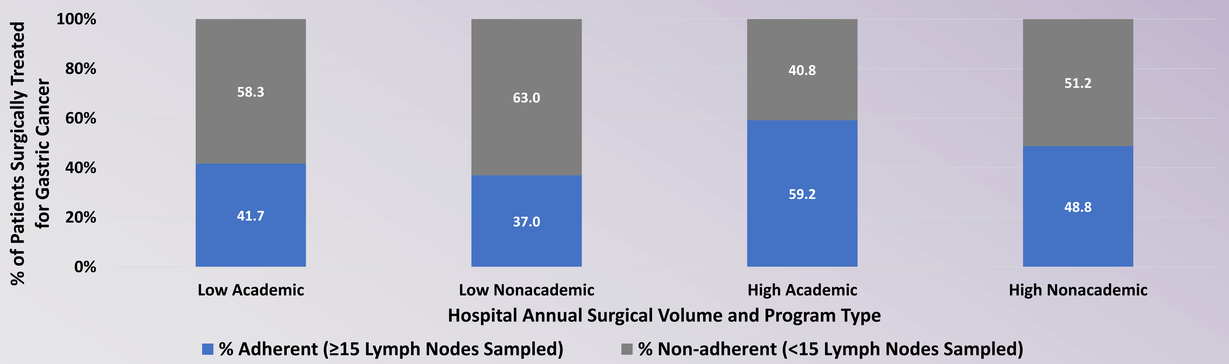

TABLE 1. Characteristics of patients who underwent resection for gastric cancer

	≥15 Lymph Nodes Removed with Resection			
	Total	Adherent	Non-Adherent	
	55,421	27,201 (49.1%)	28,220 (50.9%)	P Value
Parameter	**N**	**%**	**%**	
Program Type				<0.001
Nonacademic	30,821	42.5	57.5	
Academic	24,600	57.4	42.6	
Annual Surgical Volume				<0.001
<6.6 (Low)	19,158	37.6	62.4	
≥6.6 (High)	36,363	55.1	44.9	
Volume and Program Subgroups				<0.001
Low Academic	2,586	41.7	58.3	
Low Nonacademic	16,572	37.0	63.0	
High Academic	22,014	59.2	40.8	
High Nonacademic	14,249	48.8	51.2	
Year of Diagnosis				<0.001
2005	4,515	35.9	64.1	
2006	4,388	40.5	59.5	
2007	4,404	42.0	58.0	
2008	4,356	43.0	57.0	
2009	4,378	46.1	53.9	
2010	4,451	50.1	49.9	
2011	4,478	48.5	51.5	
2012	4,327	51.0	49.0	
2013	4,373	51.9	48.1	
2014	4,272	53.2	46.8	
2015	4,014	57.0	43.1	
2016	3,832	61.1	38.9	
2017	3,633	62.9	37.1	

Conclusions

Though adherence rates have improved from 2005-2017, nonacademic and low volume facilities have lower likelihood of successful adherence to guidelines for gastric cancer. Adherence to lymph node sampling guidelines is associated with increased likelihood of receipt of adjuvant therapy.

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