Resection of At-Risk Mesenteric Lymph Nodes Improves the Outcome of Patients with Small Bowel Neuroendocrine Tumors

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Background

Neuroendocrine tumors of the small intestine commonly metastasize to regional lymph nodes.

Single institutional reports suggest that removal of lymph nodes improves outcome, but comprehensive data is lacking.[1]

We hypothesized that the performance and extent of lymphadenectomy reported in a large administrative database would be associated with improved survival for jejunal and ileal neuroendocrine tumors.

Methods

A search of the SEER database was performed for patients with jejunal and ileal neuroendocrine tumors from 1977-2004.

Descriptive patient characteristics were collected to include age at diagnosis, gender, race, grade, primary tumor size, lymph node status, number of lymph nodes resected, presence of distant metastasis, and operation.

Statistical analyses were limited to patients with only 1 primary tumor to exclude patients with other malignancies. Univariate and multivariate analyses were performed to analyze the number of lymph nodes resected and the lymph node ratio (number of positive lymph nodes/total number of lymph nodes removed) to determine the effect on cancer-specific survival.

Results

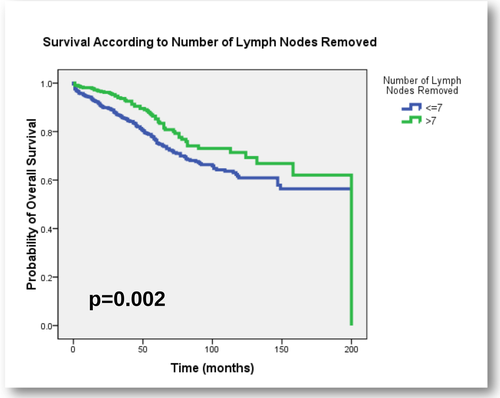
We identified 3,548 patients with jejunal or ileal neuroendocrine tumors. Of these, 1364 possessed 1 primary tumor: 1,112 were alive and 252 died of disease with a median follow-up of 35 months.

Clinical Characteristic	n (%)	Number of Missing Values in SEER Database
Age (years)		0
-Mean	63.9	
-Median	65	
-Range	15-97	
Gender		0
-Female	1708 (48.1)	
-Male	1840 (51.9)	
Location		0
-Jejunum	420 (11.8)	
-Ileum	3128 (88.2)	
Degree of differentiation		3176
-Well	240 (64.5)	
-Moderate	90 (24.2)	
-Poor	30 (8.1)	
-Undifferentiated	12 (3.2)	
Tumor size (cm)		1199
-Mean	2.03	
-Median	1.7	
-Range	0.2-17	
Number of lymph nodes removed		1047
-Mean	6.48	
-Median	4	
-Range	0-77	
Lymph node ratio		1865
-Mean	0.37	
-Median	0.29	
-Range	0-1	

Results

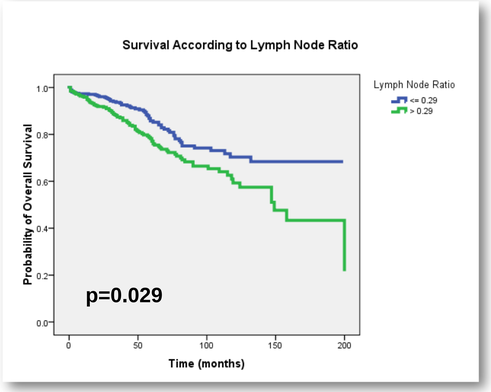
Removal of any LNs was associated with improved cancer-specific survival when compared to patients with no LN removal reported (p=0.0027) on univariate analysis. Among those who had any LN removed, a median of 8 LNs (381 patients had 0 LNs removed; data was missing for 433 patients) were identified in resection specimens with a median LNR of 0.29 (range 0-1).

On multivariate analysis (adjusting for age and tumor size), patients with >7LNs removed experienced an improved cancer-specific survival over those with ≤7LNs removed (median survival not reached vs. 140 months; HR=0.573 [0.402, 0.817], p=0.002).



Results

Lymph node ratio greater than 0.29 was associated with a diminished cancer-specific survival (median survival 134 months vs. median survival not reached; HR=1.497[1.043, 2.149], p=0.029).



Conclusions

This review of a large number of surgical patients suggests that a complete regional mesenteric lymphadenectomy in conjunction with resection of the primary tumor will improve the survival of patients with small bowel neuroendocrine tumors.

[1]Hellman P. et. al. Effect of Surgery on the Outcome of Midgut Carcinoid Disease with Lymph Node and Liver Metastasis. *World J Surgery*. 2002 Aug. 26(8):991-7.

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