

Surgical Problems in Proximal GI Cancer Management – Cardia Tumours

cardia (kardē-ă, n., pl. **cardia** (-dē-ă) -di-ă. Anat. an opening that connects the esophagus and the upper part of the stomach. [1775 & s. N.] s. **Gk** *kardia* a medical term for this opening, lit., *heart*, perh. so called because the opening is on the same side of the body as the heart.]

Michael F. Humer

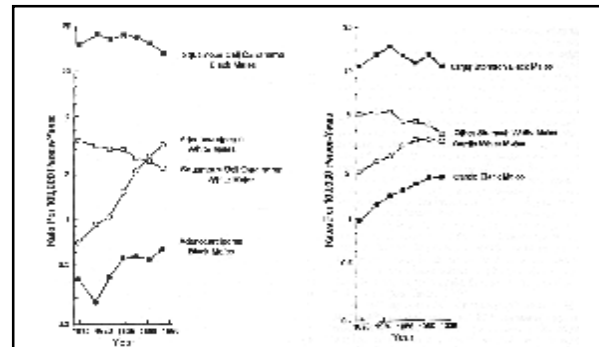
December 3, 2005 Vancouver, BC

Question #1: What are cardia tumours?

Question #2: How are cardia tumours managed?

Case A: Early stage cardia tumour

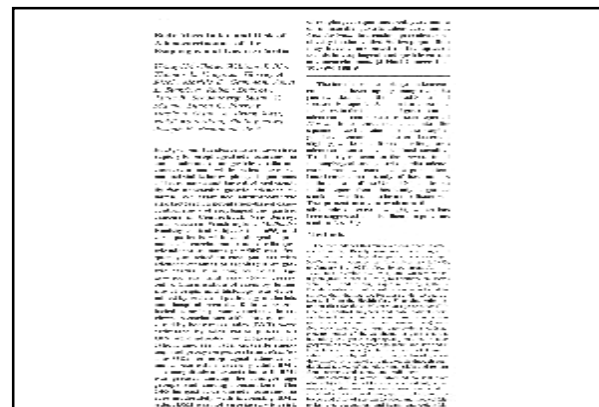
Case B: Locally advanced stage cardia tumour



Devesa SS et al. Cancer 1998; 83: 2049-2053

White males incidence per 100,000 population per year Devesa – 1998

	ESOPHAGUS		GASTRIC	
	adenocarcinoma	squamous cell	cardia	non-cardia
1974-1976	0.7	3.4	2.1	5.1
1992-1994	3.2 ↑	2.2 ↓	3.3 ↑	3.7 ↓



Chow WH et al. J Natl Cancer Inst 1998

Table 1. Gastric Cancer

Year	Site	Stage	Survival (%)	5-year survival (%)	10-year survival (%)	15-year survival (%)	20-year survival (%)
1970	Stomach	Stage I	75	50	30	20	15
1980	Stomach	Stage I	75	50	30	20	15
1990	Stomach	Stage I	75	50	30	20	15
2000	Stomach	Stage I	75	50	30	20	15
2010	Stomach	Stage I	75	50	30	20	15

Chow WH, et al. J N Cancer Inst 1998

Carcinoma of the Gastroesophageal Junction

“tumours who have their center within 5 cm oral and aboral of the anatomical gastroesophageal junction”

Sewart JR et al. Chirurg 1987

Type I tumors: Adenocarcinoma of the distal esophagus, which usually arises from an area with intestinal metaplasia, i.e. Barrett's esophagus, and may infiltrate the gastroesophageal junction;

Type II tumors: True carcinoma of the cardia arising from the epithelium of the gastroesophageal junction. This entity is also often referred to as "junctional carcinoma";

Type III tumors: Subcardial gastric carcinoma which infiltrates the gastroesophageal junction and distal esophagus from below.

Sewart JR. Dis Esoph 1996; 9: 173-182

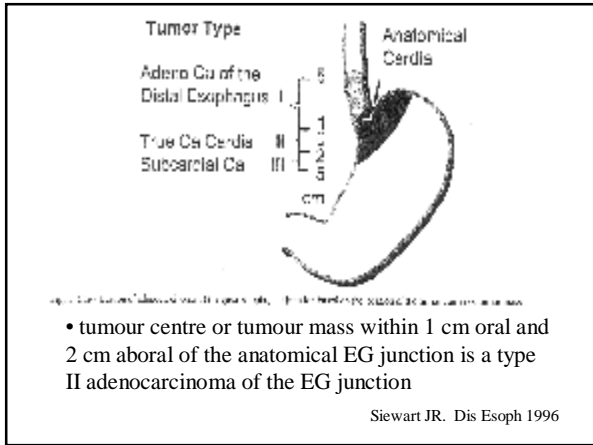


Table 1. Pathologic features of the two different tumor entities arising in the vicinity of the gastroesophageal junction.

Feature	Type I tumor (Distal esophagus, n=202)	Type II tumor (True cardia, n=228)	Type III tumor (Subcardial, n=27)
Mean age at diagnosis (years)	66.3	72.2	77.6
Sex ratio (M/F)	2.4/1	2.1/1	2.6/1
Frequency of Barrett's esophagus (%)	75	28	27
Frequency of CCSD (%)	86	67	78
Frequency of intestinal metaplasia in the distal esophagus (Mean: 1.5 cm, range: 0-7.5)	75	17	1
Frequency of adenocarcinoma of the cardia (Mean: 1.5 cm, range: 0-7.5)	51	57	47
Frequency of adenocarcinoma of the distal esophagus (Mean: 1.5 cm, range: 0-7.5)	4	11	45
Primary site of origin of lymph node metastases	11	101	4

Sewart JR, et al. Br J Surg 1998

Esophageal Carcinoma

DEFINITION OF TERMS

ANATOMY (Abbott, 1972)

1. Esophagus
2. Cardia
3. Stomach
4. Duodenum
5. Jejunum
6. Ileum
7. Cecum
8. Sigmoid colon
9. Rectum
10. Anus

STAGING (AJCC, 1997)

11. Tumor
12. Node
13. Metastasis
14. Resection
15. Survival
16. Quality of life
17. Cost-effectiveness
18. Health economics
19. Patient education
20. Clinical research
21. Biostatistics
22. Epidemiology
23. Public health
24. Environmental health
25. Occupational health
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862. Epidemi

Esophageal Carcinoma

STAGE GROUPING			
Stage II	T _{1b}	N ₀	M ₀
Stage I	T ₁	N ₀	M ₀
Stage IIA	T ₂	N ₀	M ₀
	T ₃	N ₀	M ₀
Stage IIB	T ₁	N ₁	M ₀
	T ₂	N ₁	M ₀
Stage III	T ₃	N ₁	M ₀
	T ₄	Any N	M ₀
Stage IV	Any T	Any N	M ₁
Stage IVA	Any T	Any N	M _{1a}
Stage IVB	Any T	Any N	M _{1b}

AJCC-Cancer Staging Handbook 6th Edition 2002; pg 105

Gastric Carcinoma

DEFINITIONS OF TERMS

Stage I

Stage IA: T₁ N₀ M₀

Stage IB: T_{1b} N₀ M₀

Stage II

Stage IIA: T₂ N₀ M₀

Stage IIB: T₃ N₀ M₀

Stage III

Stage IIIA: T₁ N₁ M₀

Stage IIIB: T₂ N₁ M₀

Stage IIIC: T₃ N₁ M₀

Stage IV

Stage IVA: Any T Any N M_{1a}

Stage IVB: Any T Any N M_{1b}

DEFINITIONS OF TERMS

Stage I

Stage IA: T₁ N₀ M₀

Stage IB: T_{1b} N₀ M₀

Stage II

Stage IIA: T₂ N₀ M₀

Stage IIB: T₃ N₀ M₀

Stage III

Stage IIIA: T₁ N₁ M₀

Stage IIIB: T₂ N₁ M₀

Stage IIIC: T₃ N₁ M₀

Stage IV

Stage IVA: Any T Any N M_{1a}

Stage IVB: Any T Any N M_{1b}

AJCC-Cancer Staging Handbook 6th Edition 2002; pg 115

Gastric Carcinoma

STAGE GROUPING			
Stage I	T _{1a}	N ₀	M ₀
Stage IA	T ₁	N ₀	M ₀
Stage Ib	T _{1b}	N ₀	M ₀
	T _{2a,b}	N ₀	M ₀
Stage II	T ₁	N ₁	M ₀
	T _{2a,b}	N ₁	M ₀
	T ₃	N ₀	M ₀
Stage IIIA	T _{2a,b}	N ₂	M ₀
	T ₃	N ₁	M ₀
	T ₄	N ₀	M ₀
Stage IIIB	T ₃	N ₂	M ₀
Stage IV	T ₁₋₃	N ₁₋₃	M ₁
	T ₁₋₃	N ₂	M ₁
	Any T	Any N	M ₁

AJCC-Cancer Staging Handbook 6th Edition 2002; pg 115

Regional Lymph Nodes

Type I (E) -N1 = mediastinal, perigastric (excluding celiac)
-celiac = M1a (IV)

Type II, III (S)-N1 = perigastric
-lesser and greater curve (≤ 3 cm from tumour)
-N2 = left gastric, common hepatic, splenic, celiac (IIIB)
-lesser and greater curve (> 3 cm from tumour)

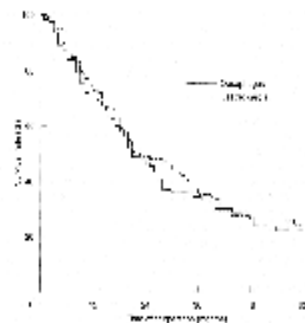


Fig. 1. Kaplan-Meier survival curves for patients with gastric adenocarcinoma and gastric cancer.

Wijnhoven BPL, et al. Br J Surg 1999

“controversy exists over how to distinguish proximal gastric cancers involving the EG junction from distal esophageal and EG junction cancers extending inferiorly to involve the gastric cardia”

AJCC-Cancer Staging Handbook 6th Edition 2002; pg 102

“Siewart has proposed classifying EG junction cancers into Type I, II and III depending upon the relative extent of involvement of either the esophagus or the stomach”

AJCC-Cancer Staging Handbook 6th Edition 2002; pg 102

“further validation of this classification is needed to determine whether it is reliable for staging or for prognosis”

AJCC-Cancer Staging Handbook 6th Edition 2002; pg 102

Case A – Siewart Type II

- 41 year old male, life long GERD on PPI
- EG scope -2000 N
 - 2002 CLE/Barrett’s
 - 2004 Glandular atypia vs LGD
 - 2005 2 cm Barrett’s, 5 mm nodule EG junction
- Bx – intramucosal carcinoma
- CT scan – hiatal hernia, nil else

Case B – Siewart Type II

- 53 year old male, 6 months 15 pound weight loss, postprandial epigastric pain, no long term GI symptoms
- contrast radiography 2005 - x2 normal
- EG scope 2005 - 2 cm CLE, 1 cm cardia ulcer around inflammed heaped mucosa
- Bx adenocarcinoma, diffuse, lymphatic invasion
- CT scan - 7 cm mass at gastric cardia, no mets

Siewart Type II Adenocarcinoma of the EG Junction

Management – role of surgery, chemotherapy and radiotherapy in patients treated with curative intent

Surgical Goals

- complete removal of the primary tumour and any associated columnar lined esophagus (Barrett’s)
- en bloc resection of associated lymphatic drainage
- reconstitution of GI continuity
- acceptable mortality and morbidity

Surgical Management of Adenocarcinoma of the Cardia

Andrew J. Finley, MD, Richard J. Finley, MD, Joseph C. Chen, BA, Mark D. Dunn, MD, Guy Vander, MD, Milwaukee, WI, Madison, WI

Background: The incidence of adenocarcinoma of the esophagus is rising. The surgical management of adenocarcinoma of the esophagus is controversial. The purpose of this study was to evaluate the results of esophagectomy for adenocarcinoma of the cardia. The purpose of this study was to evaluate the results of esophagectomy for adenocarcinoma of the cardia. The purpose of this study was to evaluate the results of esophagectomy for adenocarcinoma of the cardia.

Conclusion: The results of this study suggest that esophagectomy for adenocarcinoma of the cardia is a safe and effective procedure. The results of this study suggest that esophagectomy for adenocarcinoma of the cardia is a safe and effective procedure. The results of this study suggest that esophagectomy for adenocarcinoma of the cardia is a safe and effective procedure.

Graham AJ, Finley RJ et al. Am J Surg 1998; 175:418-421

5 Year Survival Adenocarcinoma EG Junction

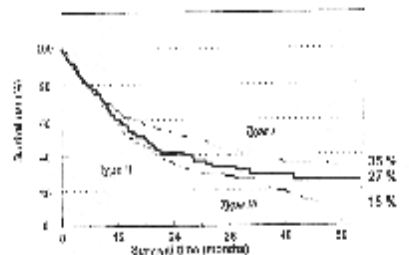


Fig. 1. Overall survival for adenocarcinoma of the esophagus at the esophagogastric junction. Type I, Type II, and Type III tumors.

Stewart JR. Dis Esoph 1996

Transthoracic Versus Transhiatal Resection for Carcinoma of the Esophagus: A Meta-Analysis

Jan S. Hulscher, MD, Dr. G. P. Travers, MD, Hugo Ubbelohde, MD, and Jan S. van Langsh, MD

Department of Surgery, University of Groningen, Groningen, The Netherlands

Conclusion: This meta-analysis suggests that transhiatal resection is a safe and effective procedure for esophageal carcinoma. The results of this meta-analysis suggest that transhiatal resection is a safe and effective procedure for esophageal carcinoma. The results of this meta-analysis suggest that transhiatal resection is a safe and effective procedure for esophageal carcinoma.

Hulscher JBF. Ann Thor Surg 2001

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Hulscher JBF. N Engl J Med 2002

TABLE 2. Local Recurrence-Free Survival by Tumor Stage and Resection Type

Tumor Stage	Transhiatal Resection (%)	Transthoracic Resection (%)	P Value
Stage I	100	100	0.50
Stage II	85	85	0.50
Stage III	75	75	0.50
Stage IV	65	65	0.50

Conclusion: This table shows that local recurrence-free survival is similar between transhiatal and transthoracic resection across all tumor stages. The results of this table show that local recurrence-free survival is similar between transhiatal and transthoracic resection across all tumor stages.

Hulscher JBF. N Engl J Med 2002

Disease Free Survival

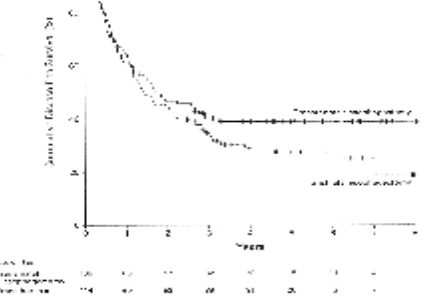


Fig. 2. Disease free survival for adenocarcinoma of the esophagus. Transhiatal Resection (solid line) and Transthoracic Resection (dashed line).

Hulscher JBF. N Engl J Med 2002

Adenocarcinoma of the EG Junction

Surgical Therapy

- Type Specific (I, II, III)
- Stage Specific

Lymph Node Metastases

Tumor Type	I	II	III
Location of Positive Nodes:			
Esophageal	7%	0%	3%
Subcarina	2%	0%	3%
Paraesophageal	10%	20%	5%
Pericardial	3%	20%	23%
Component II	14%	19%	32%
Component I	18%	7%	16%



Fig. 1. Distribution of lymph node metastases in patients with adenocarcinoma of the gastroesophageal junction. (Siewert JR, Dis Esoph 1996)

Siewert JR. Dis Esoph 1996

Surgical Resection – EG Junction

Type I

- Esophagectomy with resection of proximal stomach, en bloc lymphadenectomy of lower posterior mediastinum and celiac axis (2 field)
- eG

Surgical Resection – EG Junction

Type III

- Total gastrectomy with transhiatal or transthoracic resection of the distal esophagus with appropriate en bloc lymphadenectomy
- D2 (extended) no difference in survival than D1 (limited) (McCulloch P. BJ Surg 2005)
- eG

Modes of Resection EG Junction Adenocarcinoma

Table 7. Modes of resection employed in patients with adenocarcinoma of the gastroesophageal junction

	Type I	Type II	Type III
Transhiatal en bloc esophagectomy (n = 43)	38	5	0
Radical transhiatal esophagectomy (n = 207)	148	53	6
Extended total gastrectomy (n = 263)	0	103	160
Total	186	161	166

Siewert JR. Dis Esoph 1996

Type II Adenocarcinoma Post Resection Survival

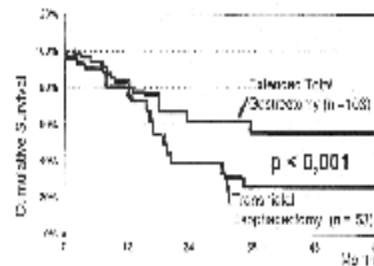


Fig. 2. Cumulative survival in patients with adenocarcinoma of the gastroesophageal junction. (Siewert JR, Dis Esoph 1996)

Siewert JR. Dis Esoph 1996

Surgical Resection – EG Junction

Type II – Esophagectomy (Eg) vs Gastrectomy (eG)

- en bloc lymphatic dissection
- the margins proximal vs distal

? Is it more like a I or a III

Stage Specific Treatment – Esophageal Carcinoma

N Status Related to T (Rice 1999)

T Status	Total n	N1(%)
Tis	29	0 (0.0)
T1	65	7 (10.8)
T1-intramucosal	38	1 (2.6)
T1-submucosal	27	6 (22.2)
T2	37	16 (43.2)
T3	219	169 (77.2)
T4	9	6 (66.7)

Rice TW. Ann Thor Surg 1998

Role of Chemotherapy and Radiotherapy – Esophageal Carcinoma

- no recommended role for CT and/or RT in either preoperative or postoperative setting

Malthaner RA. April 2005; www.cancercare.on.ca/access/PEBC.htm

MacDonald JS. N Engl J Med 2001

MacDonald JS. N Engl J Med 2001

MacDonald JS. N Engl J Med 2001

Overall Survival

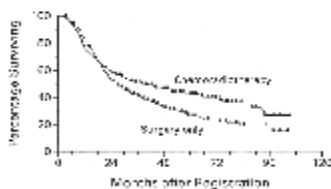


Figure 3. Overall Survival among All High-Risk Patients, According to Treatment Group (Kaplan-Meier). The maximal duration of follow-up was 29 months in the surgery only group and 26 months in the chemoradiotherapy group. The difference in overall survival was significant ($P=0.008$) by a two-sided log-rank test. A total of 122 of the 223 patients in the chemoradiotherapy group and 103 of the 226 patients in the surgery only group died during the follow-up period.

MacDonald JS. N Engl J Med

Type II Adenocarcinoma

Case A: T1 N0 M0 – IA

-Transhiatal esophagectomy

Type II Adenocarcinoma

Case B: T3 N1 M0 – IIIA

- L. thoracoabdominal gastrectomy, partial esophagectomy, splenectomy, Roux-en-Y esophagojejunostomy
- Adjuvant CT/RT (MacDonald)

Question #1: What are cardia tumours?

Answer:

- Siewart type II adenocarcinoma of the EG junction
- currently use gastric TNM classification

Question #2: How are cardia tumours managed?

Answer:

- Eg or eG depending upon extent of disease (I or III)
- stage IB-IV M0 adjuvant CT/RT