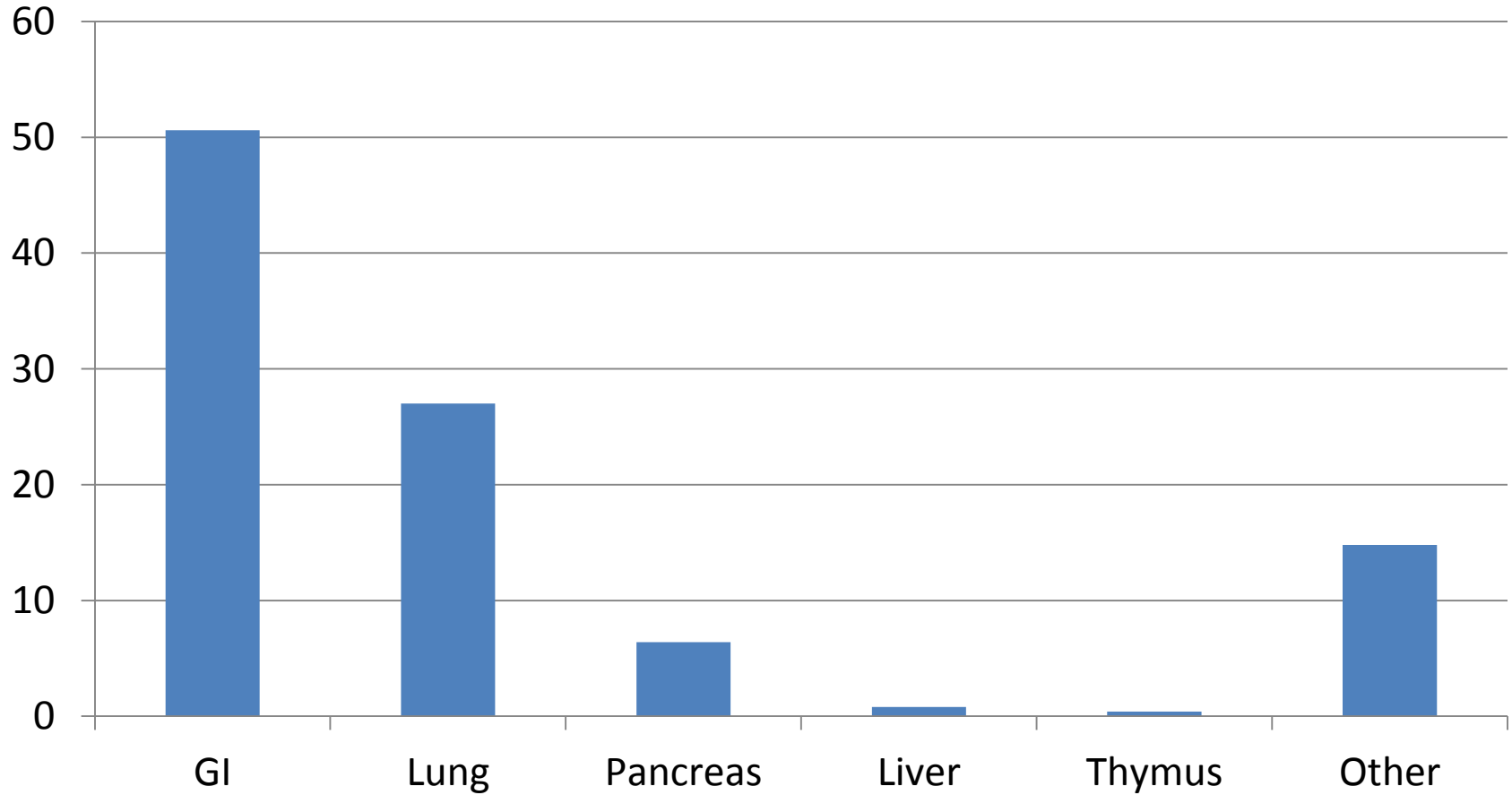


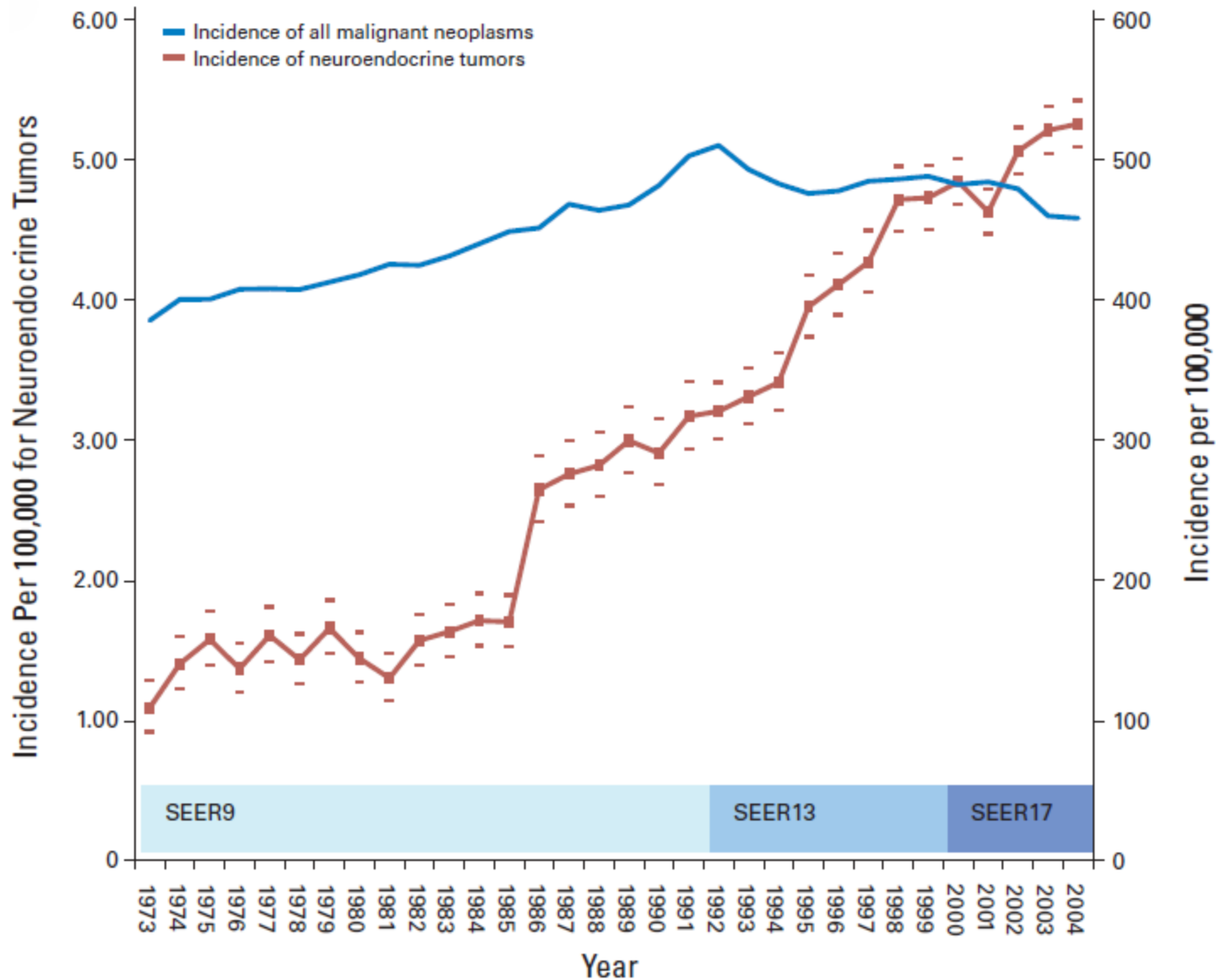
Surgical Management of Thymic Carcinoid Tumors

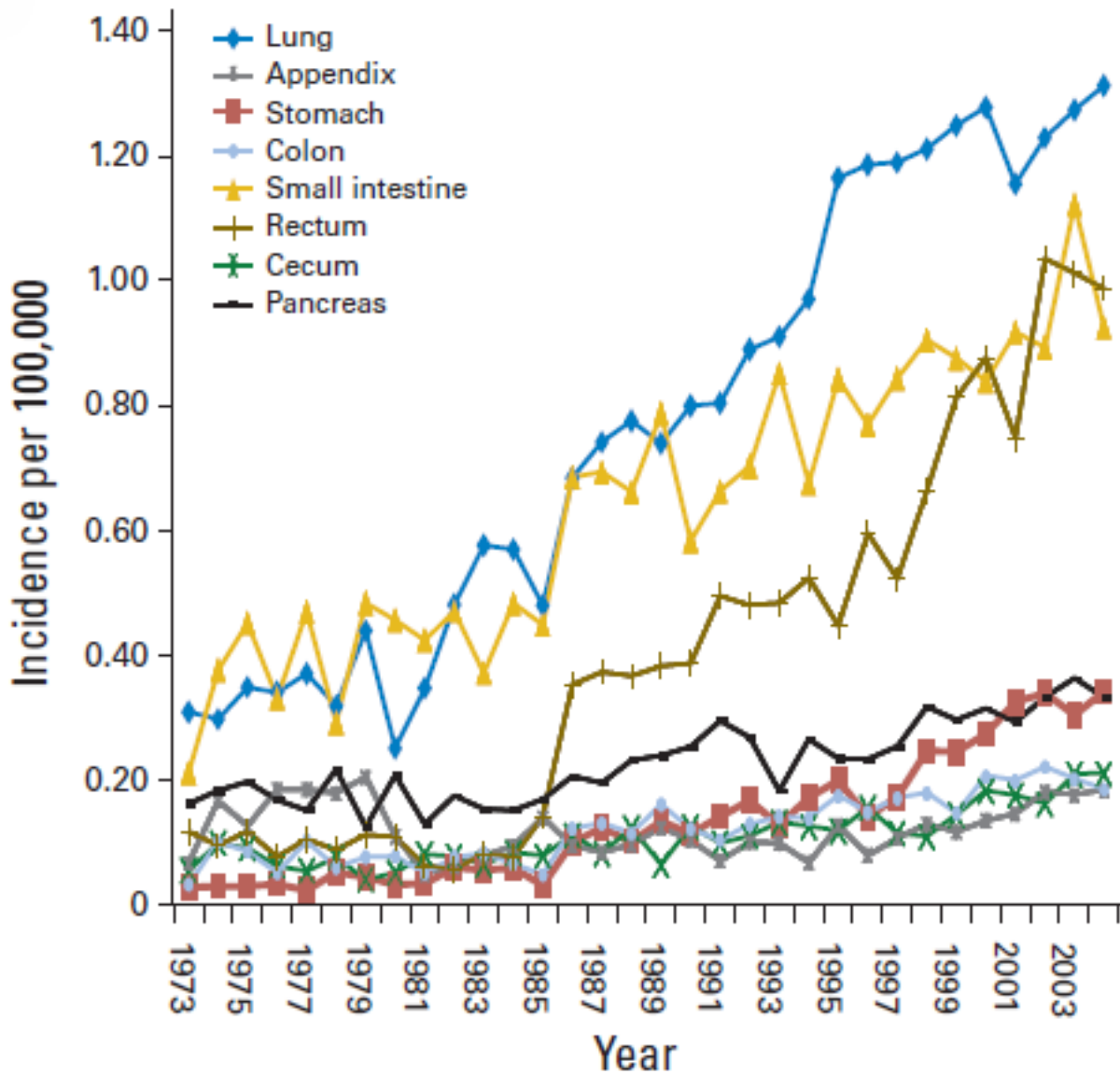
Mark K. Ferguson, MD
Department of Surgery
The University of Chicago



NET Distribution



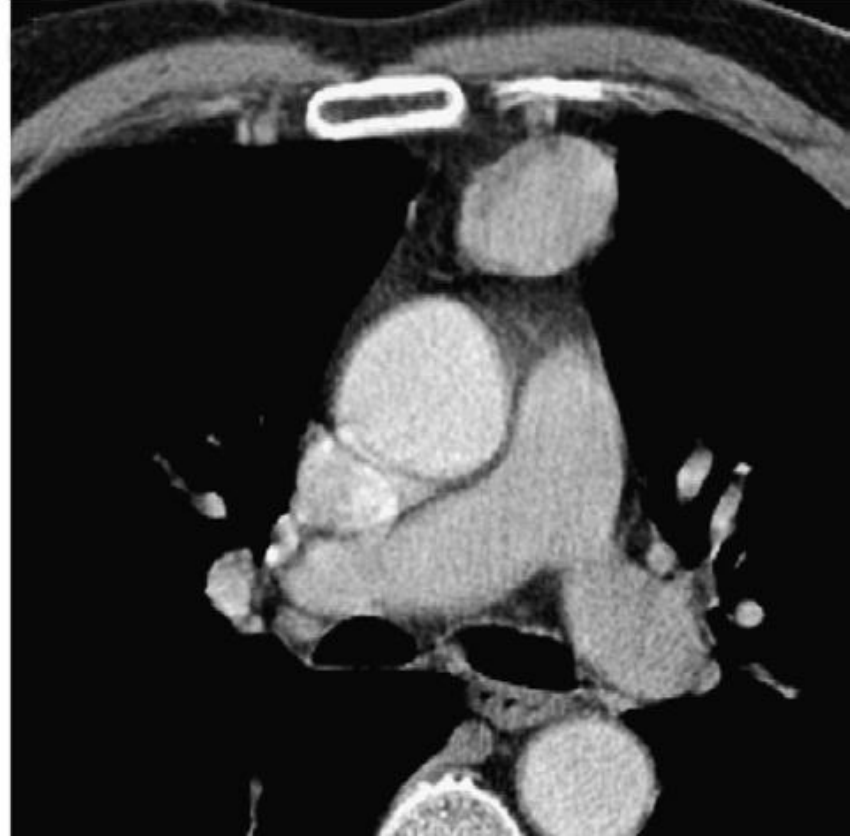




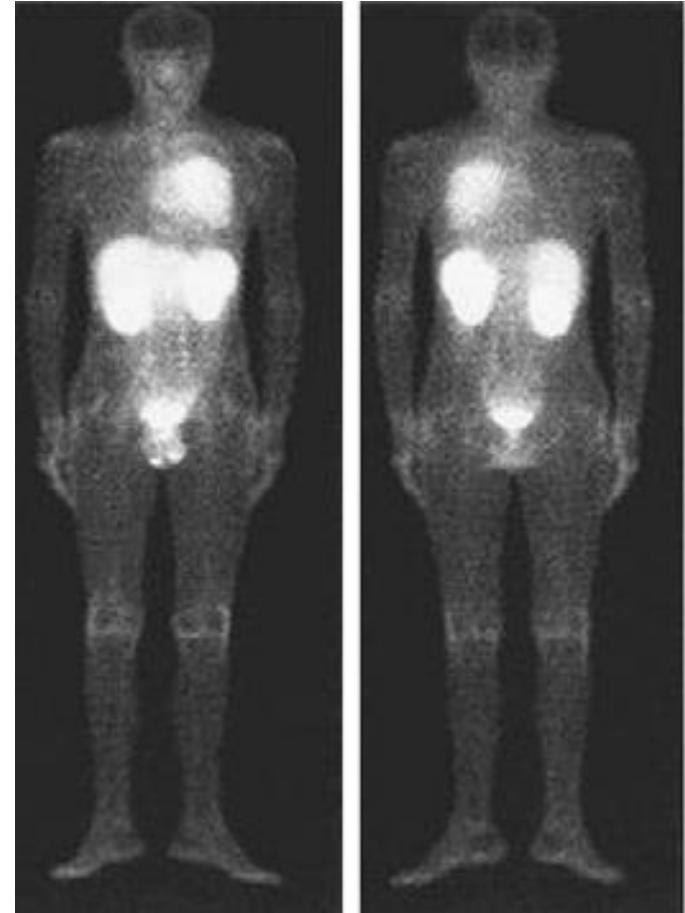
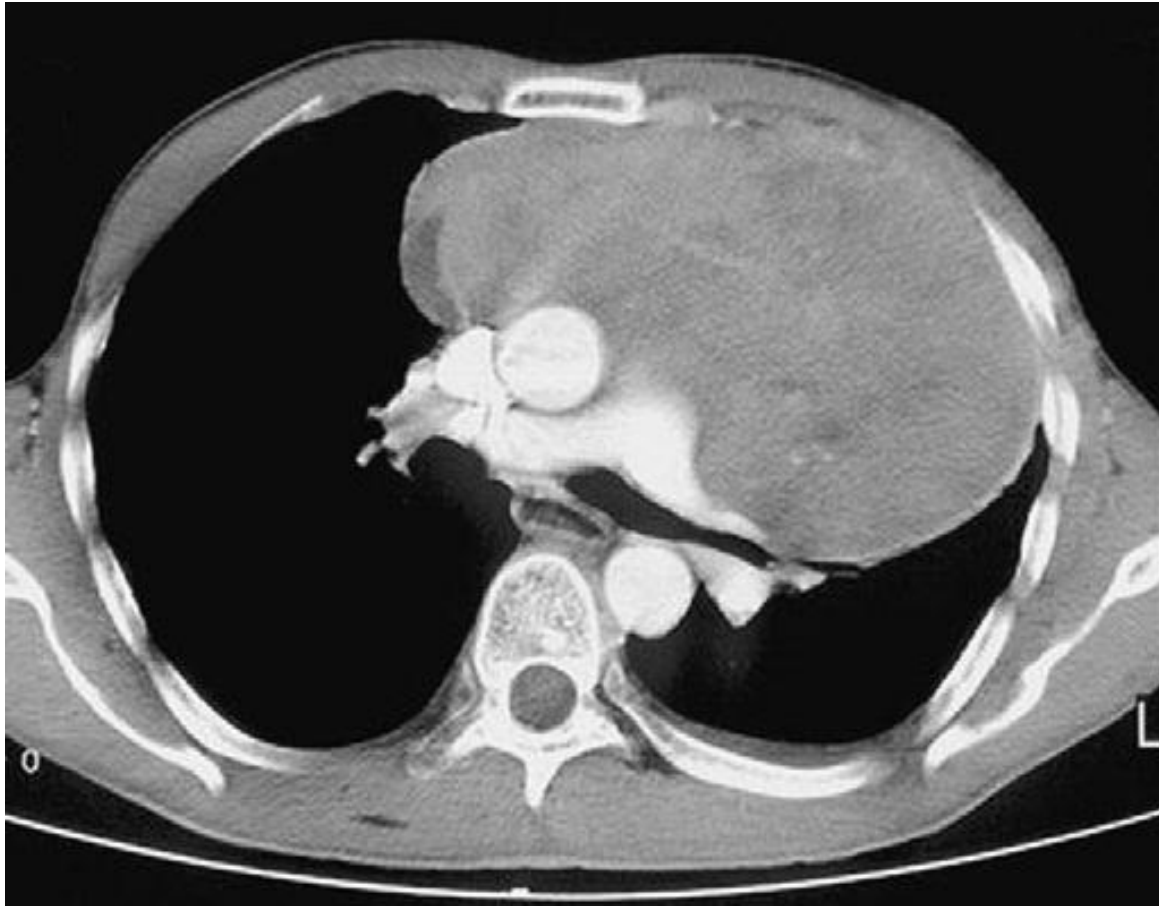
Incidence by Race and Gender



Thymoma



Thymic NET



Differential Diagnosis - Thymic NET

Congenital or acquired thymic cysts

True thymic hyperplasia

Thymic lymphoid hyperplasia

Thymolipoma

Thymoma

Thymic lymphoma

Thymic carcinoma

Seminomatous thymoma

Nonseminomatous germ cell tumor

Teratoma



Thymic Tumor Classification

Subtype	Risk	Summary
Type A	Low-risk	Spindle cell; medullary
Type AB		Mixed (type A and type B)
Type B1		Lymphocyte-rich; lymphocytic; predominantly cortical; organoid
Type B2	High-risk	Cortical
Type B3		Epithelial; atypical; squamoid; well-differentiated thymic carcinoma
Thymic carcinoma (type C)		Nonorganotypic malignant epithelial neoplasms; lack immature T lymphocyte



Subtypes of Thymic Carcinoma

	TSCC (%)	LELC (%)	NEC (%)	UTC (%)	Other (%)
Chalabreysse et al	29	12	23	6	30
Chen et al	60	10	16	12	2
Dorfman et al	38	17	30	8	7
Hsu et al	40	5	10	35	10
Kuo et al	46	15	15	NA	24
Suster & Rosai	27	32	13	12	16



Distribution by Gender

Tumour site and histological subtype	Male : female ratio
<hr/>	
Lung	
Typical carcinoid	1 : 1
Atypical carcinoid	1 : 1
Large cell neuroendocrine carcinoma	8 : 1
Small cell carcinoma	9.5 : 1
Thymus	
Typical carcinoid	9.5 : 1
Atypical carcinoid	9.5 : 1

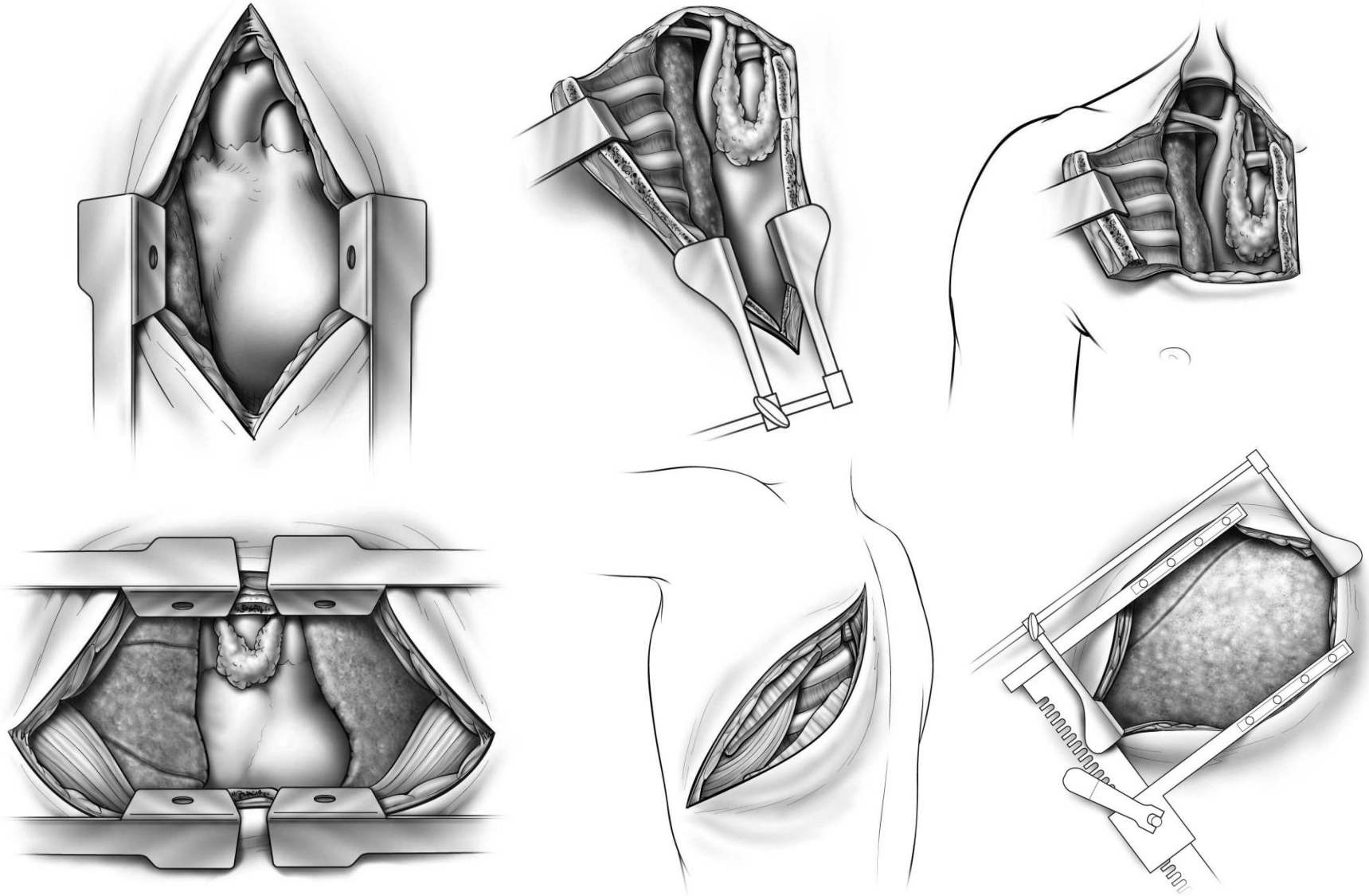


Staging (Masaoka System)

Stage I	Macroscopically encapsulated and no microscopic invasion
Stage II	Macroscopic invasion into surrounding fatty tissue of mediastinal pleura or microscopic invasion into capsule
Stage III	Macroscopic invasion into neighboring organ(s)
Stage IVa	Pleural or pericardial dissemination
Stage IVb	Lymphogenous or hematogenous metastasis



Approaches to Resection



Treatment Outcomes

Author (Year)	Mean Age (y) (Range)	Associated Disease	Complete Resection (Number) (%)	Histology	5-y Survival (Number) (%)	10-y Survival (Number) (%)
de Montpreville et al (1996)	53 (35–71)	1 MEN-1; 1 NF-1	4 (28.5)	14 AC	4/13 (31%)	0/13 (0%)
Fukai et al (1999)	51 (19–73)	2 CS; 1 MG	13 (86.7%)	1 TC; 9 AC; 5 SCC	5 (33%)	1 (7%)
Moran and Suster (2000)	58 (16–100)	4 CS	NA	29 TC; 36 AC; 15 SCC	12/42 (28%)	4/42 (10%)
Gal et al (2001)	52 (26–77)	3 CS; 1 MEN-1	9 (90%)	2 TC; 6 AC; 2 SCC	NA	NA
Tiffet et al (2003)	58 (35–78)	2 MEN-1; 1 CS	9 (75%)	3 TC; 6 AC; 2 LCNC; 1 SCC	50%	NA
Cardillo et al (2009)	49 (31–69)	5 CS	19 (100%)	8 TC; 6 AC; 5 LCNC	18 (91.6%)	13 (69.8%)

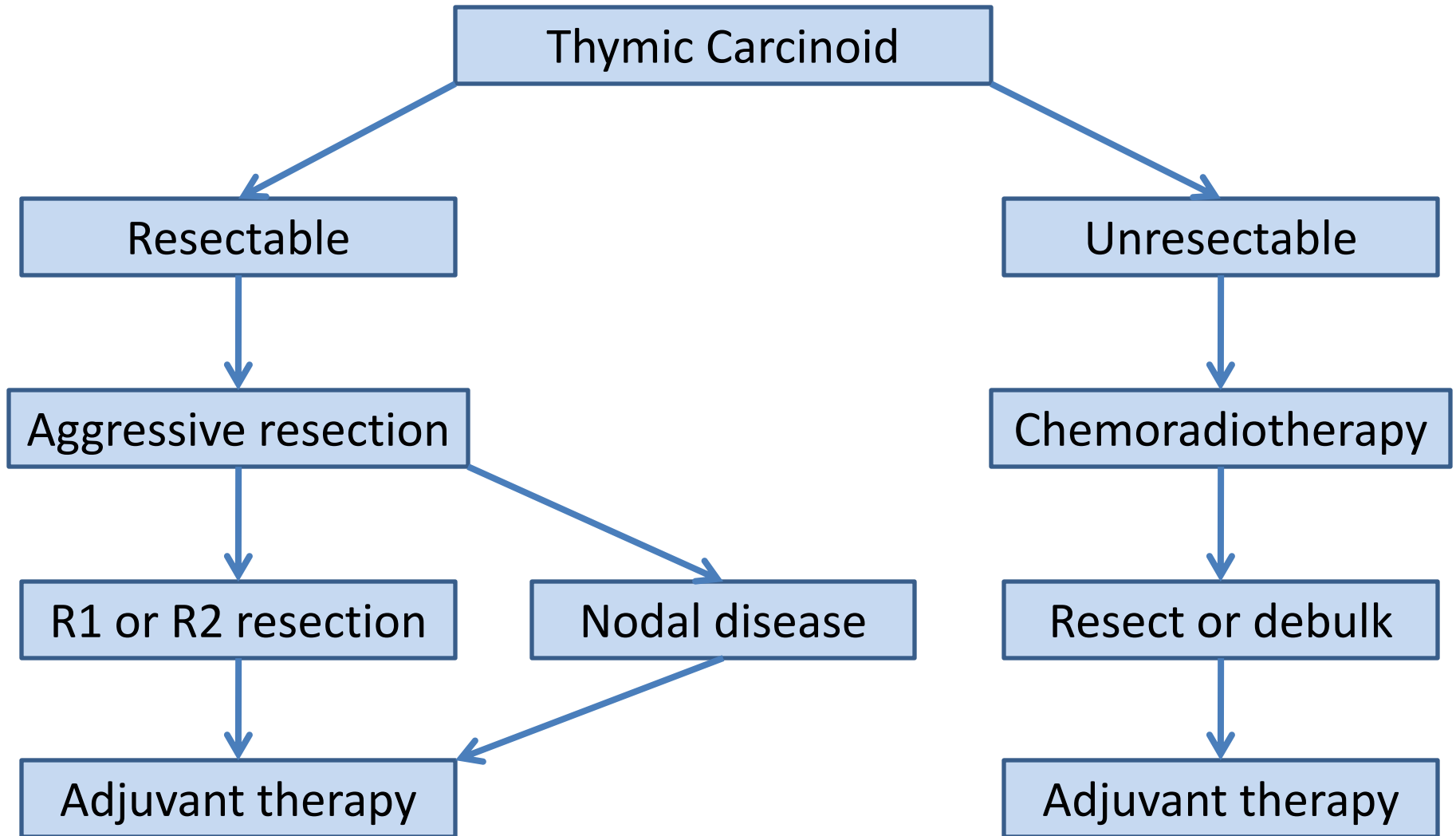


Recurrence Patterns

Author (Year)	Recurrence (%)
de Montpreville et al (1996)	3 loc (25); 7 dist (58.3)
Fukai et al (1999)	0 loc; 10 dist (76.9)
Moran and Suster (2000)	18 loc (22.5); 20 dist (25)
Gal et al (2001)	8 dist (80)
Tiffet et al (2003)	1 loc (8.3); 3 distant (25); 6 loc + dist (50)
Cardillo et al (2009)	2 loc (10.5); 0 dist



Suggested Management Algorithm



Considerations for MEN1

- 20% incidence of MEN1 in thymic NET
- Thymic NETs do not have LOH of *MEN1*
- Familial clusters are common; mutations in different *MEN1* exons have been reported
- Identification of subpopulation at risk remains elusive
- Prevention with routine thymectomy at time of subtotal parathyroidectomy should be considered

