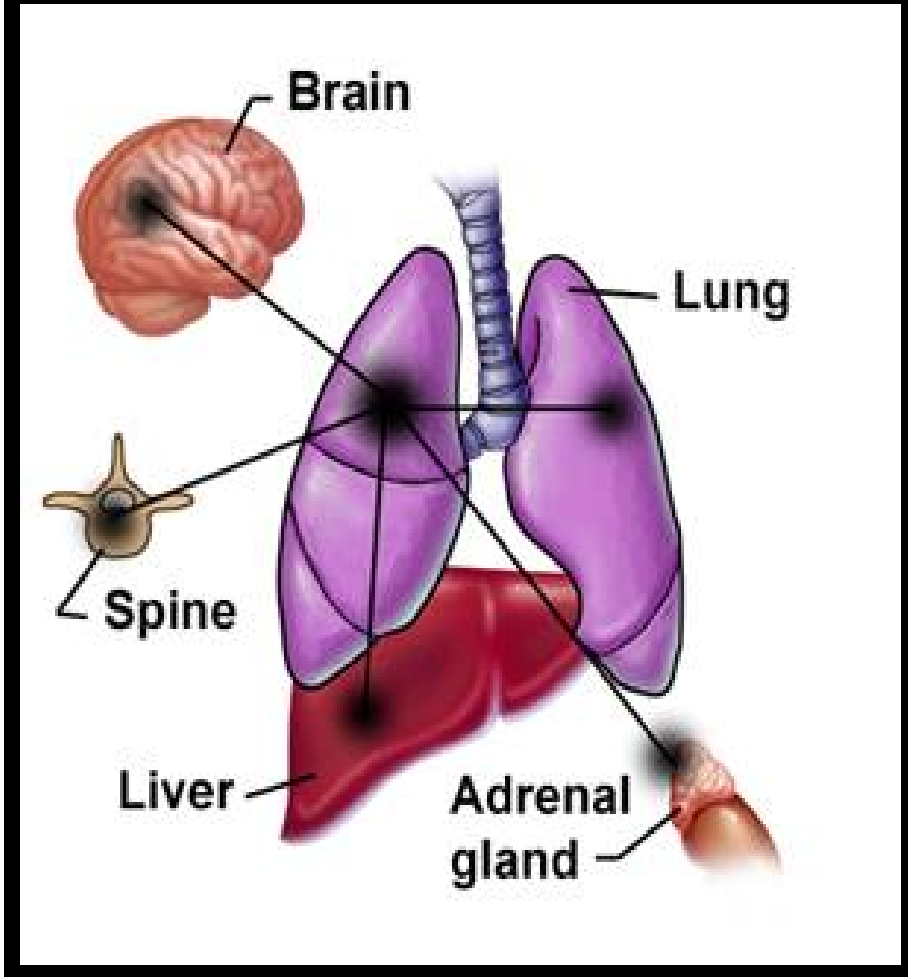
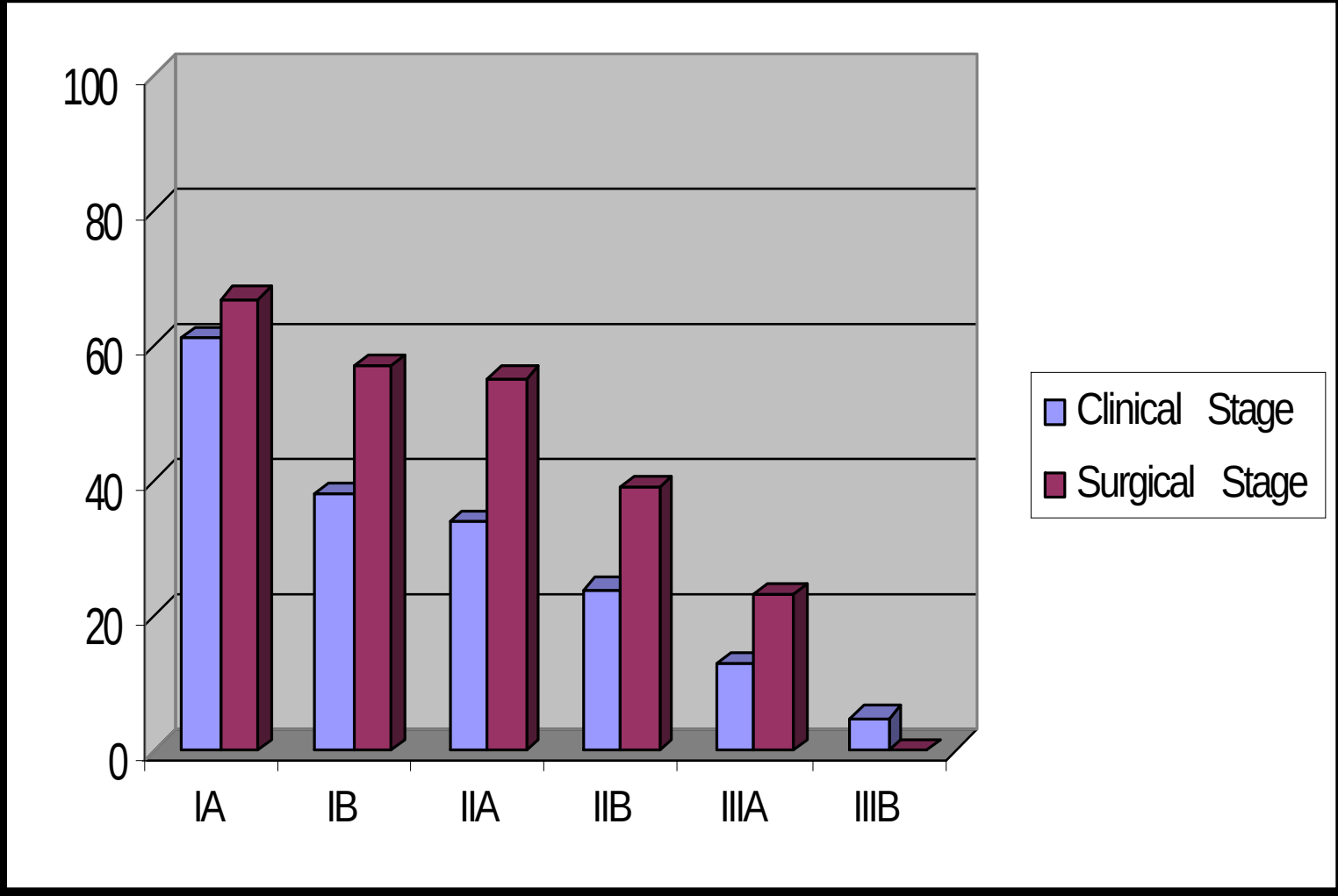
Non small cell lung Cancer



Every patient with *locoregional* NSCLC should be approached as a potential candidate for surgery

5-year Survival



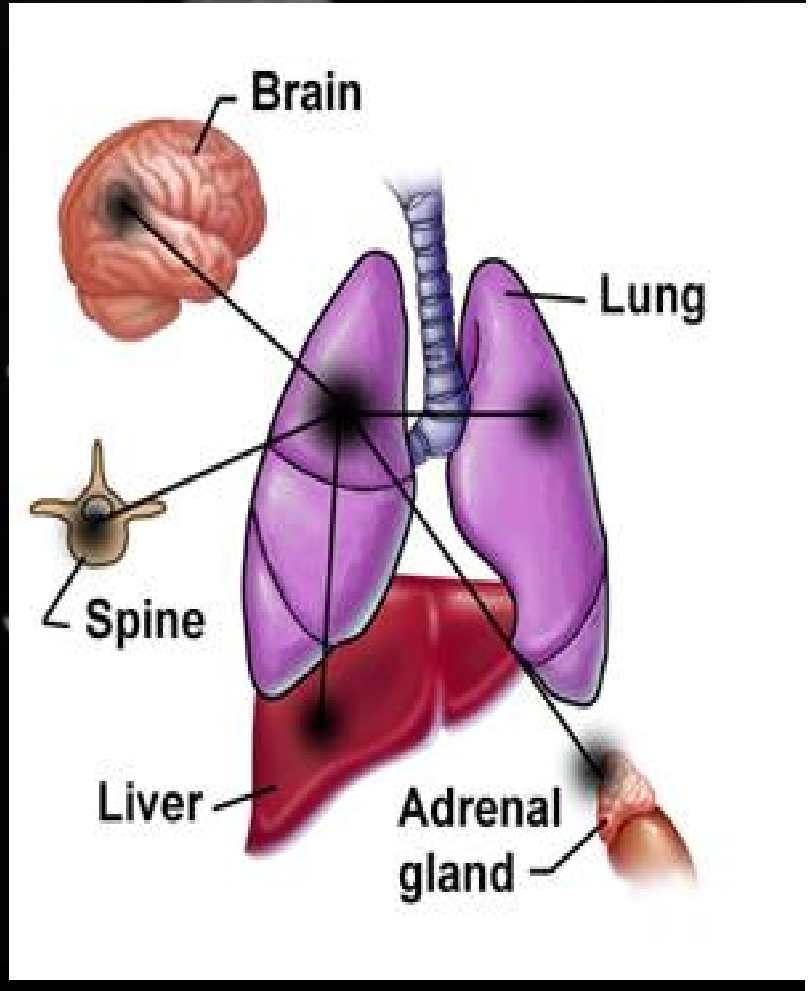
Mountain CF, 2001

Lung Cancer

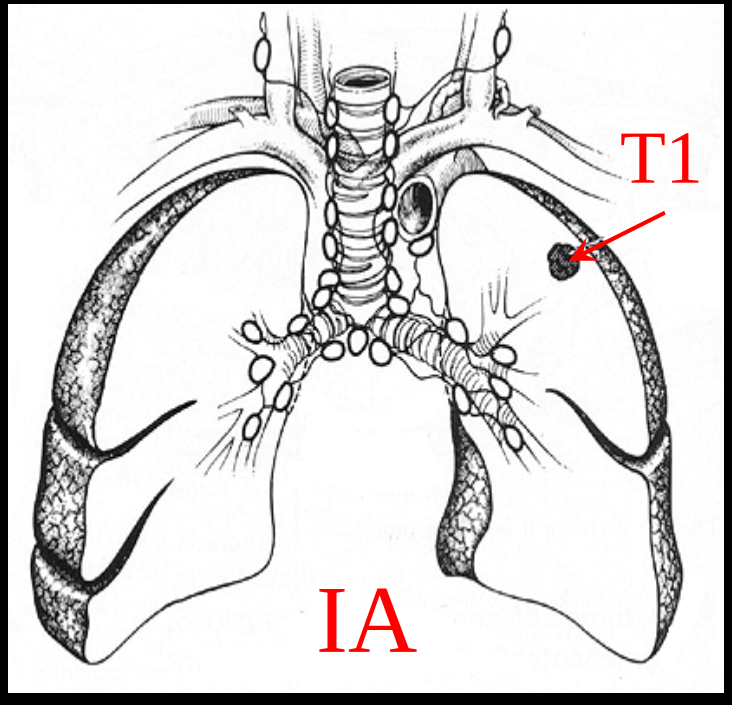
T= Primary Tumor

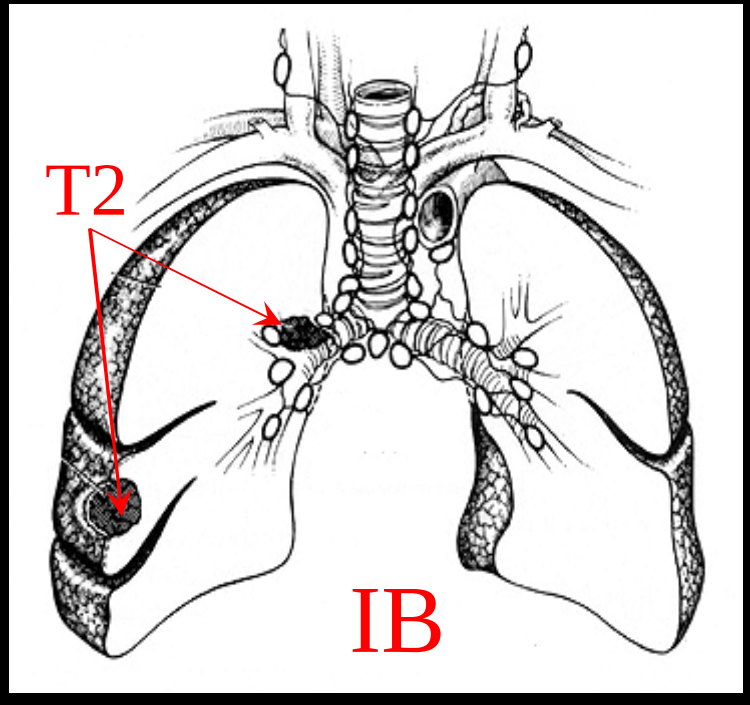
N= Lymph Node

M= Metastasis



pStage I



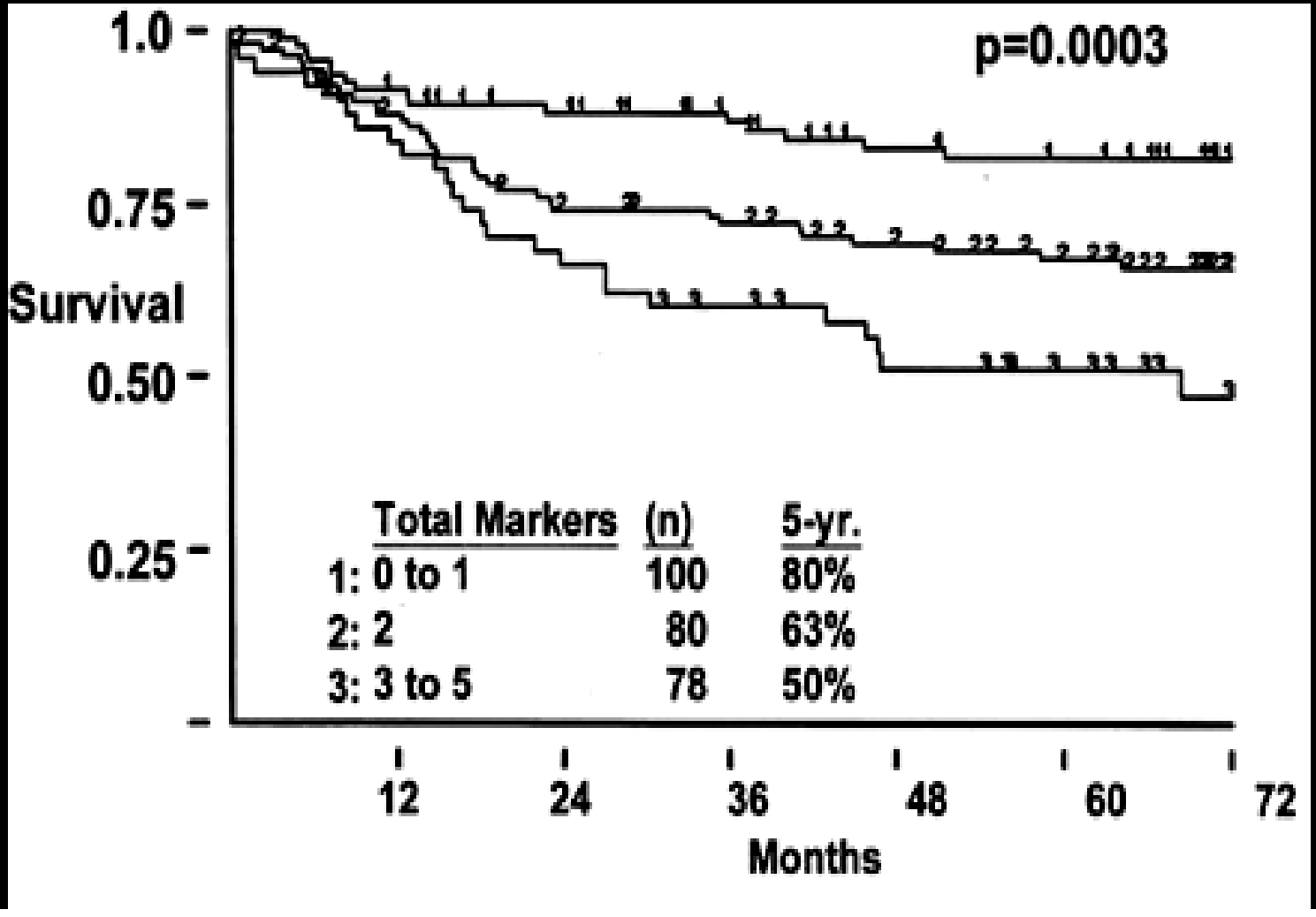


5-yrs survival: 67%

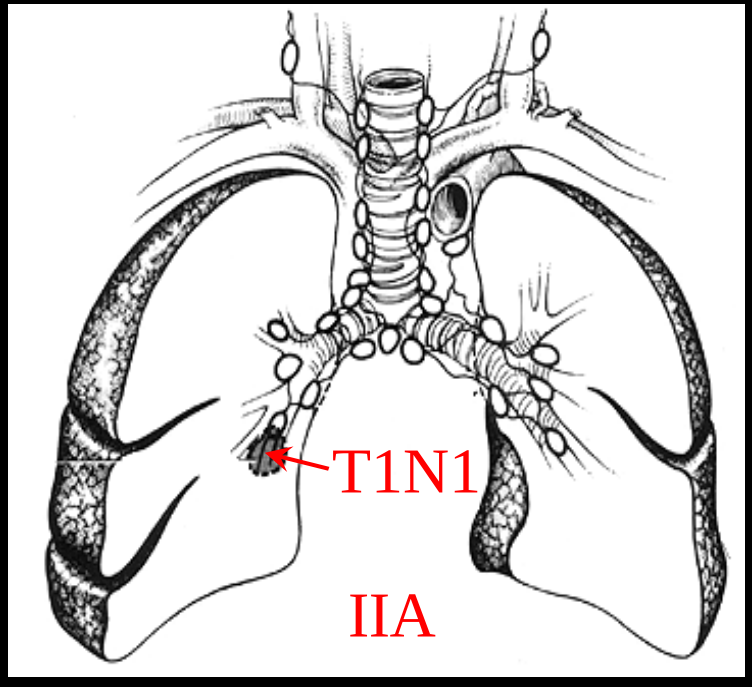
5-yrs survival: 57%

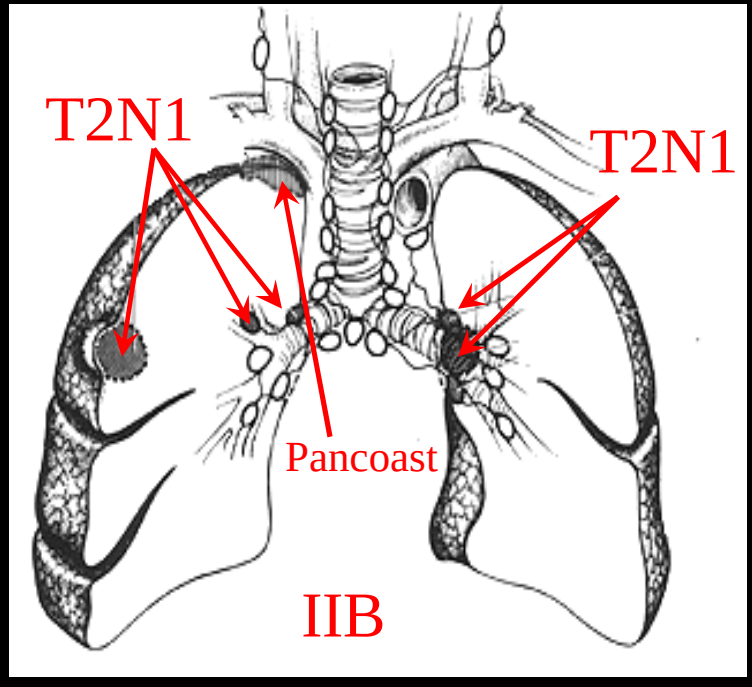
pTNM Staging

Stage I: All T1-T2 and N0 tumors



pStage II



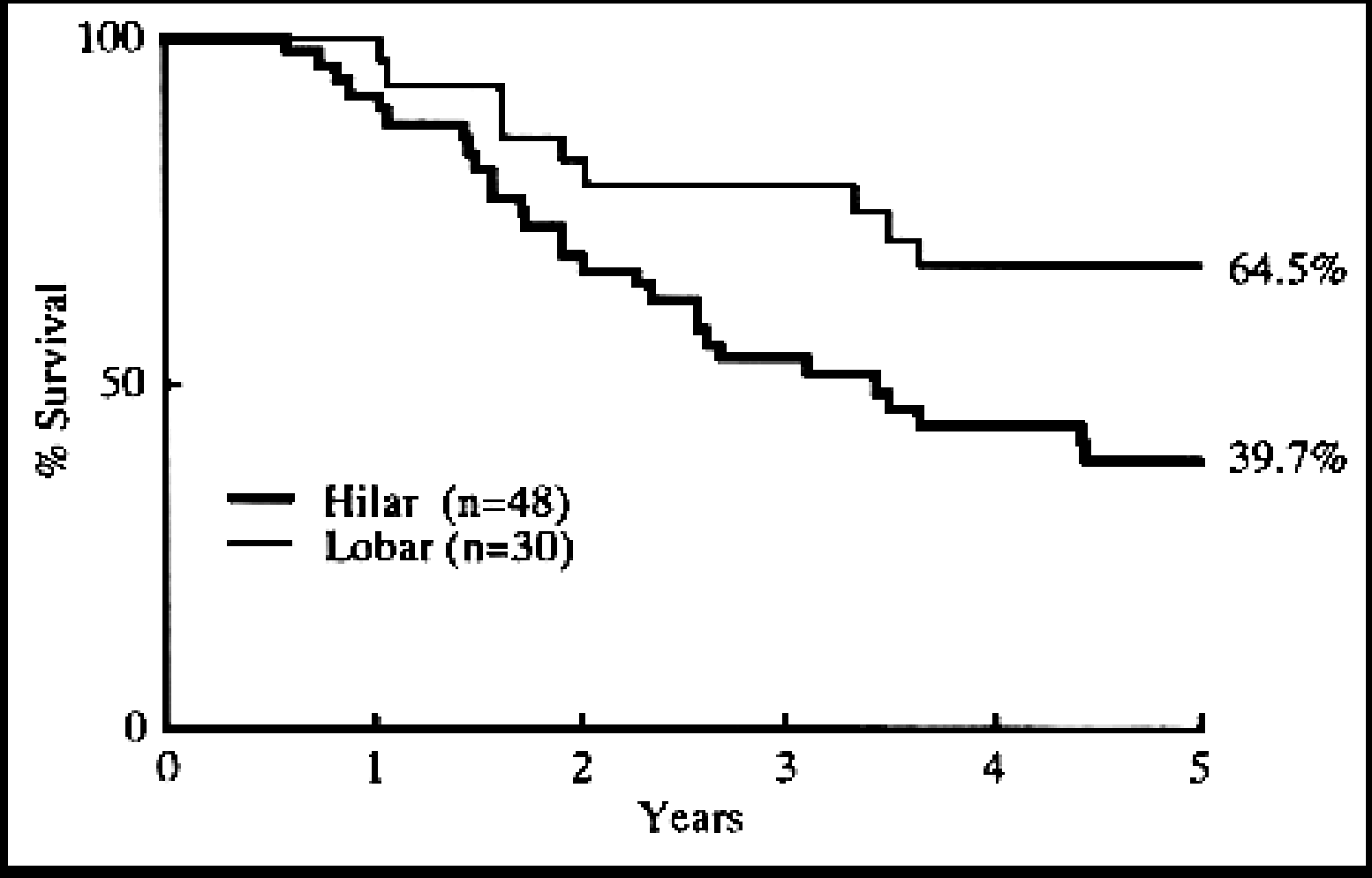


5-yrs survival: 55%

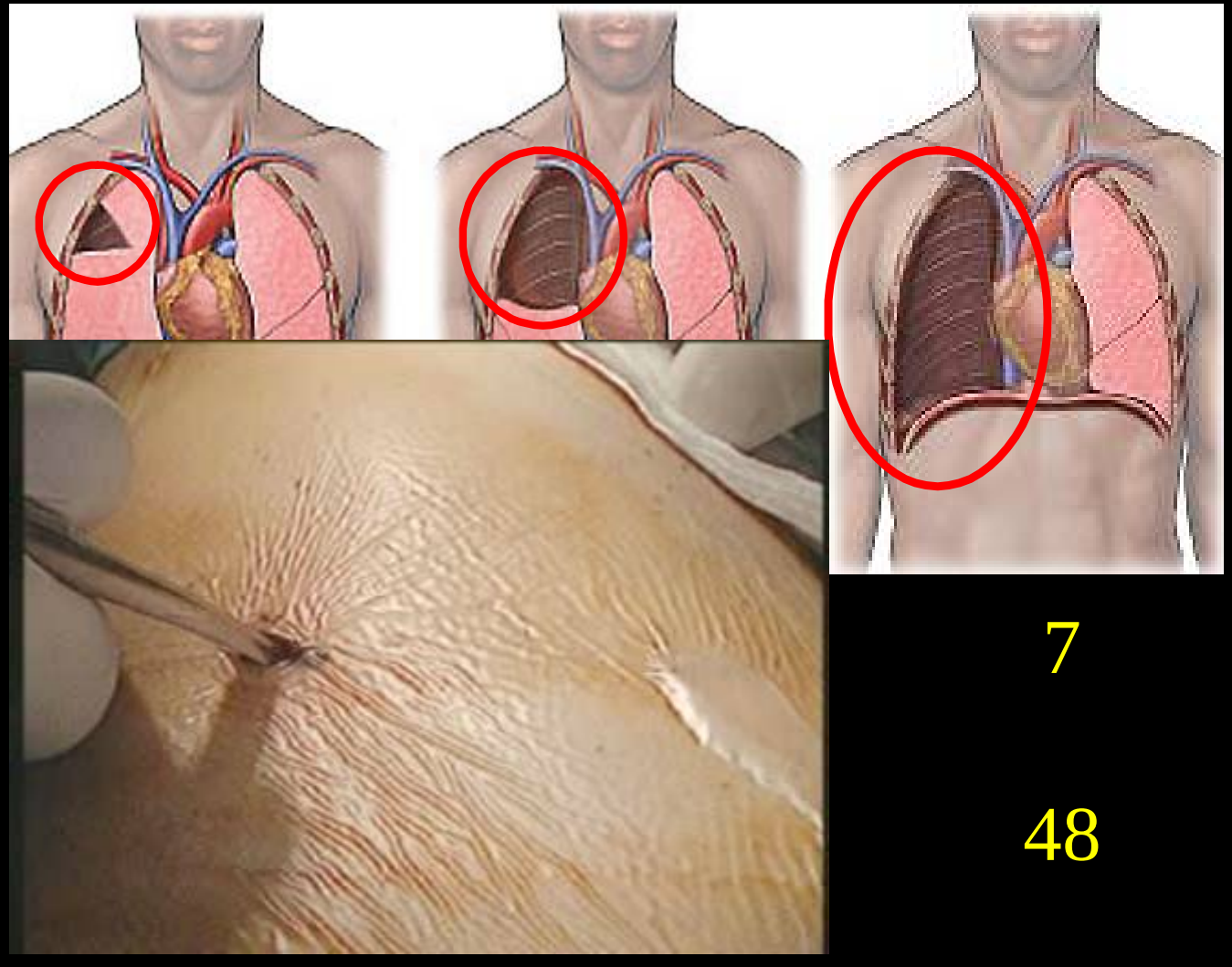
5-yrs survival: 39%

pTNM Staging

Stage II: T1-T2 and N1 and T3 N0 tumors



Type surgery & outcome



Mortality (%):	7
Morbidity (%):	48

Higher Stages

Stage IIIA: T3N1 or any T1-3N2

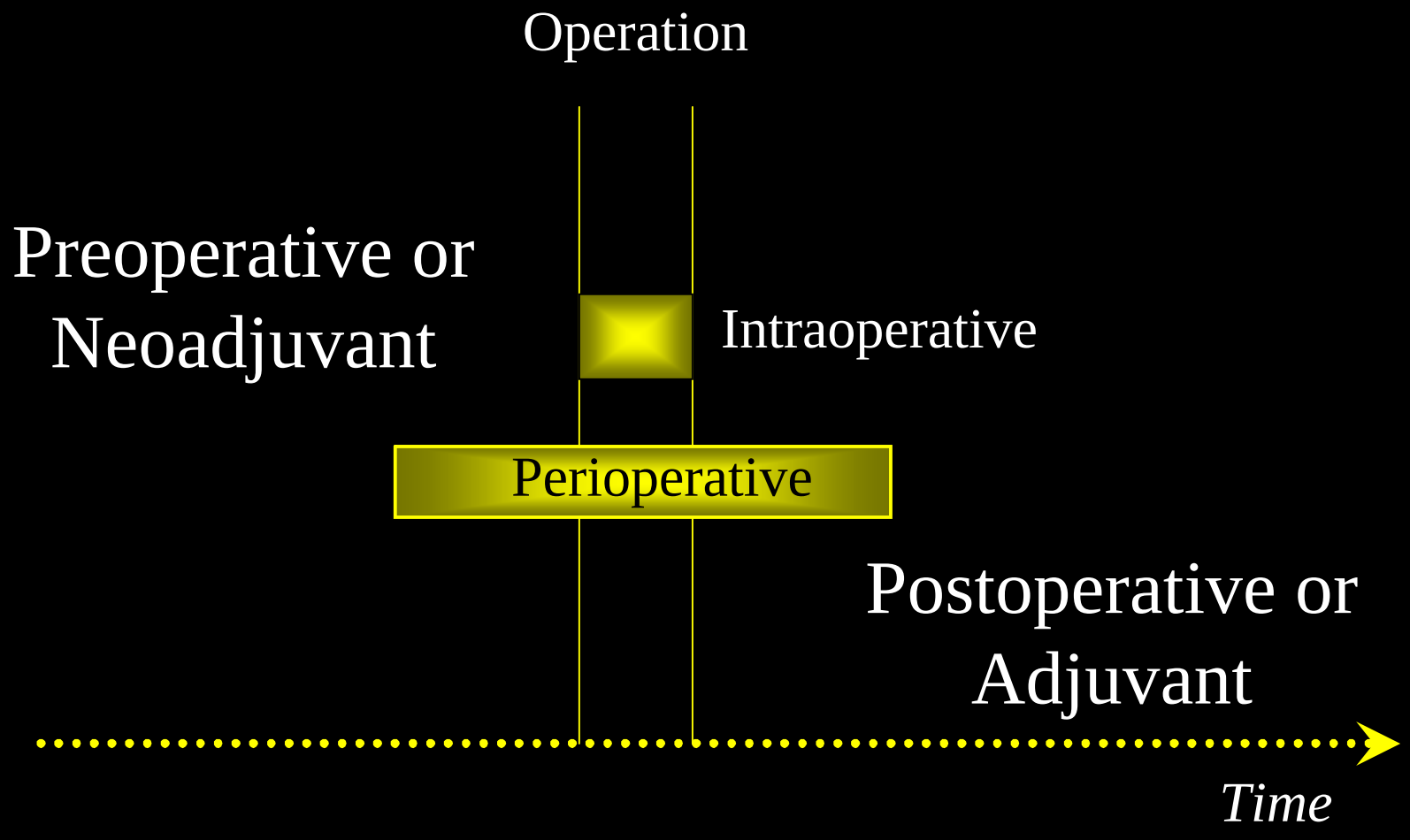
Stage IIIB: T4 or N3

Stage IV: Unresectable disease

(except solitary brain and adrenal mts)

Multimodality Therapy

Multidisciplinary approach



Complete Resection

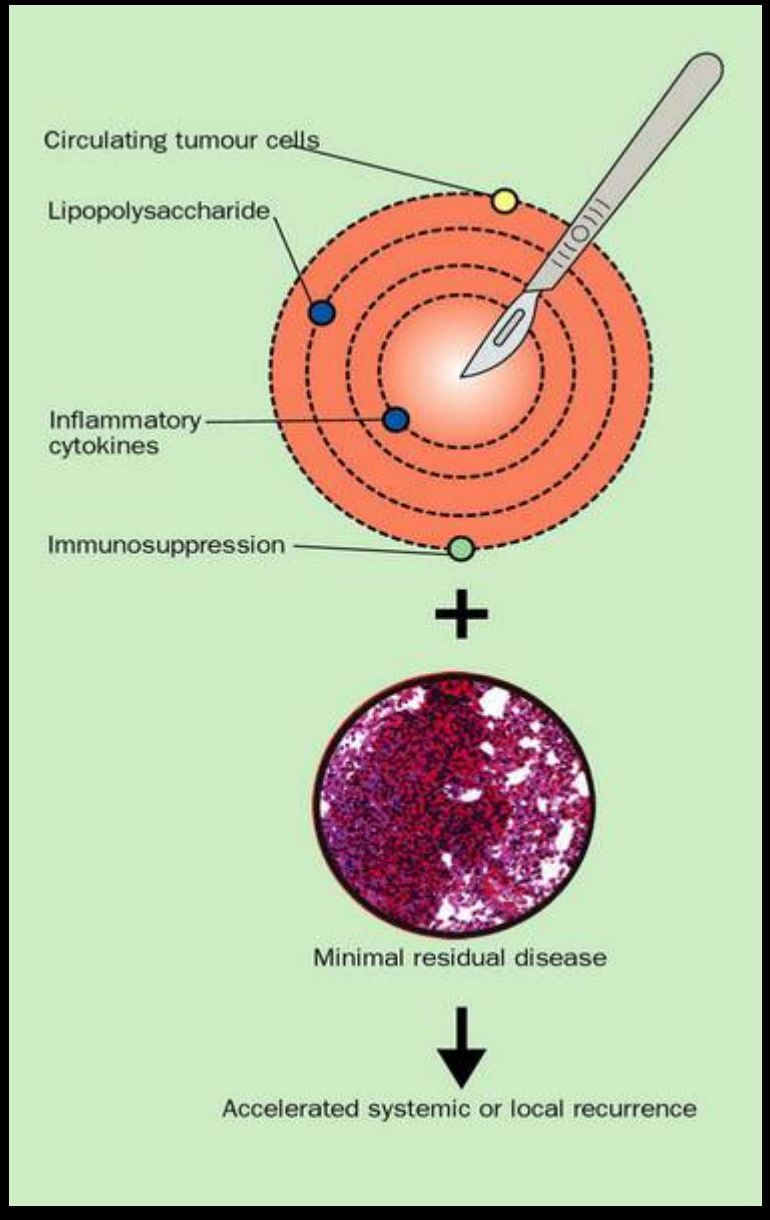
Surgeon is morally certain he or she has encompassed all tumor disease

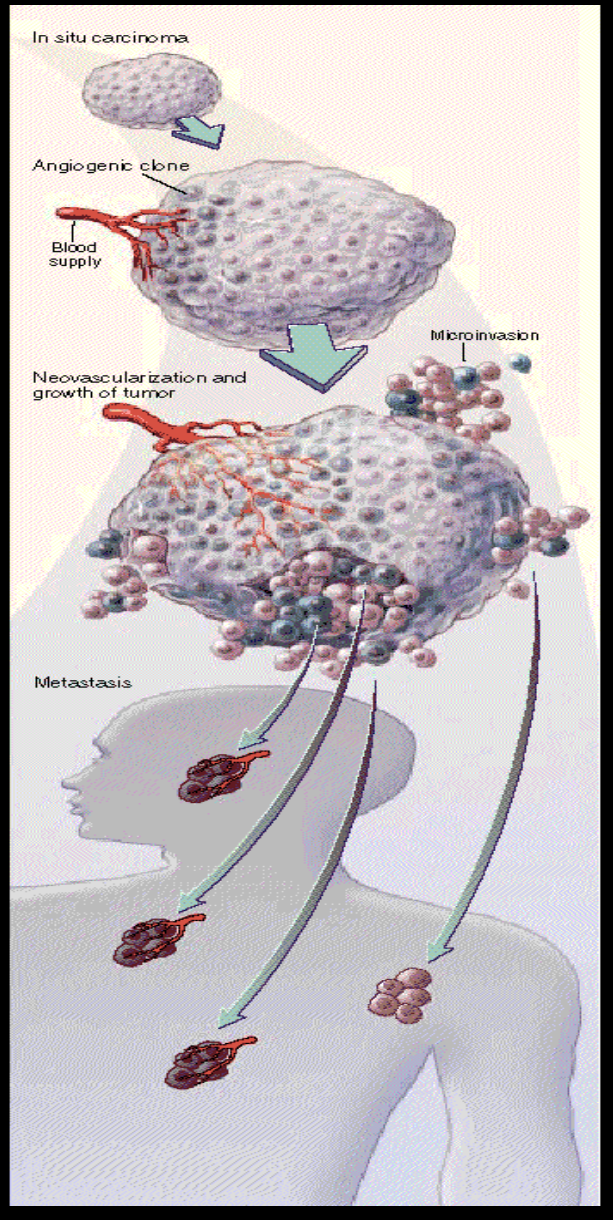
Proximal margins of resected specimen are microscopically free of tumor

Within each major lymphatic drainage region, the most distal node is microscopically tumor free

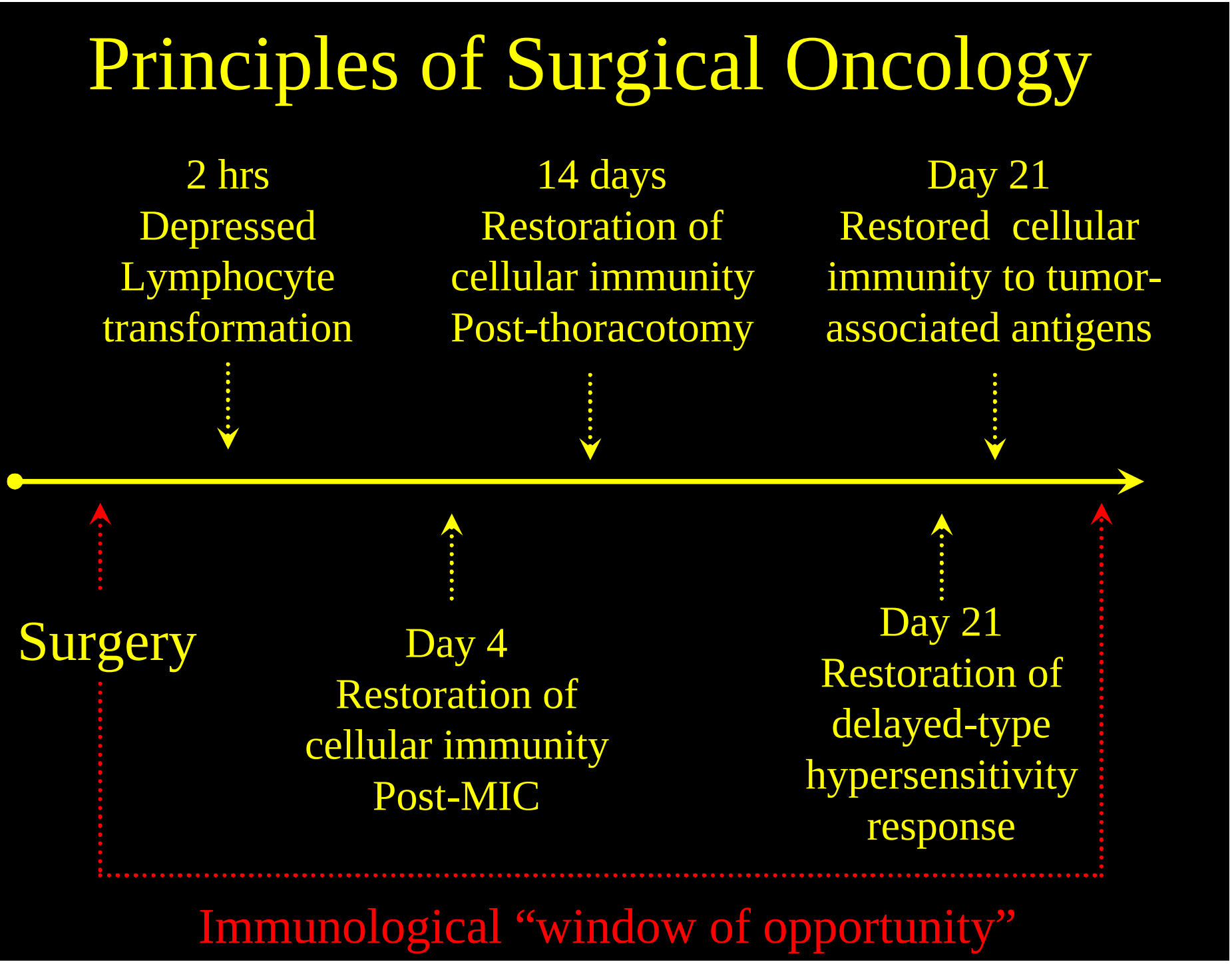
Capsules of resected nodes are intact

Principles of Surgical Oncology





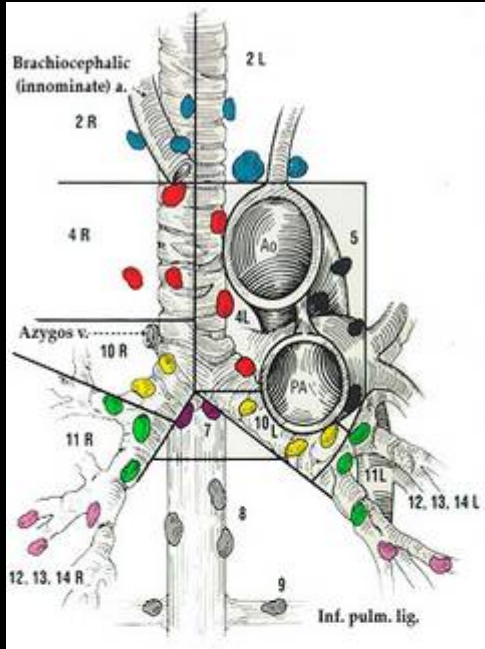
Principles of Surgical Oncology

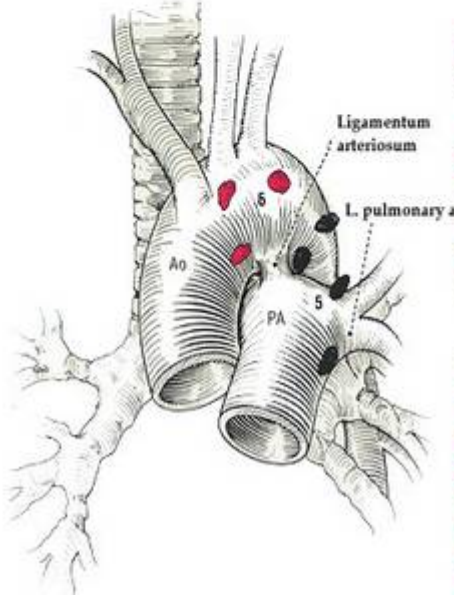


N2 Tumors

Cure Rate

N0	N2
50-80%	10-30%





Regional Nodal Stations For Lung Cancer Staging

N_1 NODES

SUPERIOR MEDIASTINAL NODES	LOCATION
2R Right upper paratracheal nodes	Between intersection of caudal margin of innominate a. with trachea and the apex of the lung (supra-innominate nodes).
2L Upper left paratracheal nodes	Between top of aortic arch and apex of the lung (supra-aortic nodes).
4R Right lower paratracheal nodes	Between intersection of caudal margin of innominate a. with trachea and cephalic border of azygos v.
4L Left lower paratracheal nodes	Between top of aortic arch and carina (medial to ligamentum arteriosum)
10R Right tracheo-bronchial angle nodes	From cephalic border of azygos v. to origin of RUL bronchus.
10L Left tracheo-bronchial angle nodes	Between carina and LUL (medial to ligamentum arteriosum).

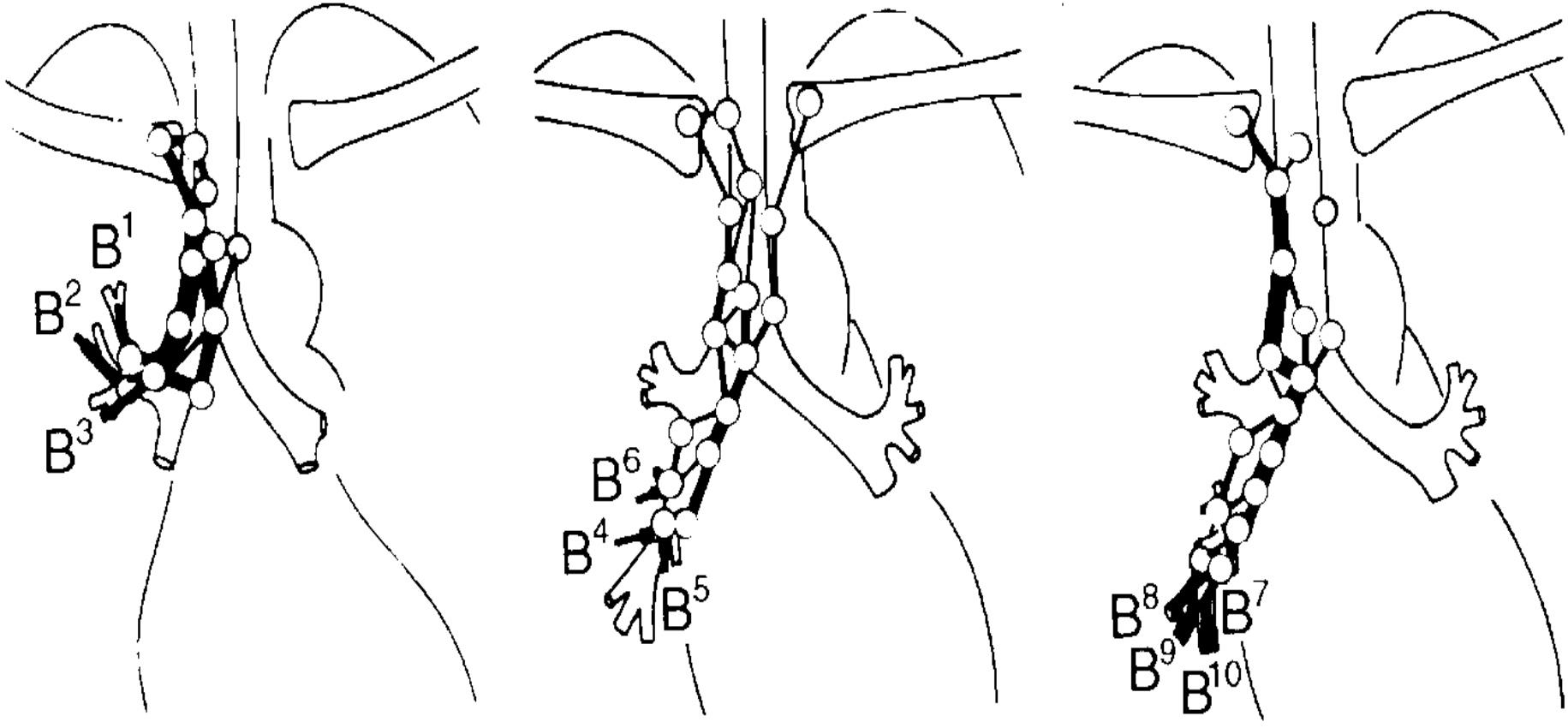
AORTIC NODES	
5 Aorto-pulmonary nodes	Subaortic and para-aortic nodes lateral to the ligt. art. (proximal to first branch of left PA).
6 Anterior mediastinal nodes	Anterior to ligamentum arteriosum.

INFERIOR MEDIASTINAL NODES	
7 Subcarinal nodes	Caudal to the carina of the trachea.
8 Paraesophageal nodes	Dorsal to the posterior wall of the trachea and to the right or left of the midline of the esophagus.
9 Pulmonary ligt. nodes	Nodes within the pulmonary ligt.

N_2 NODES

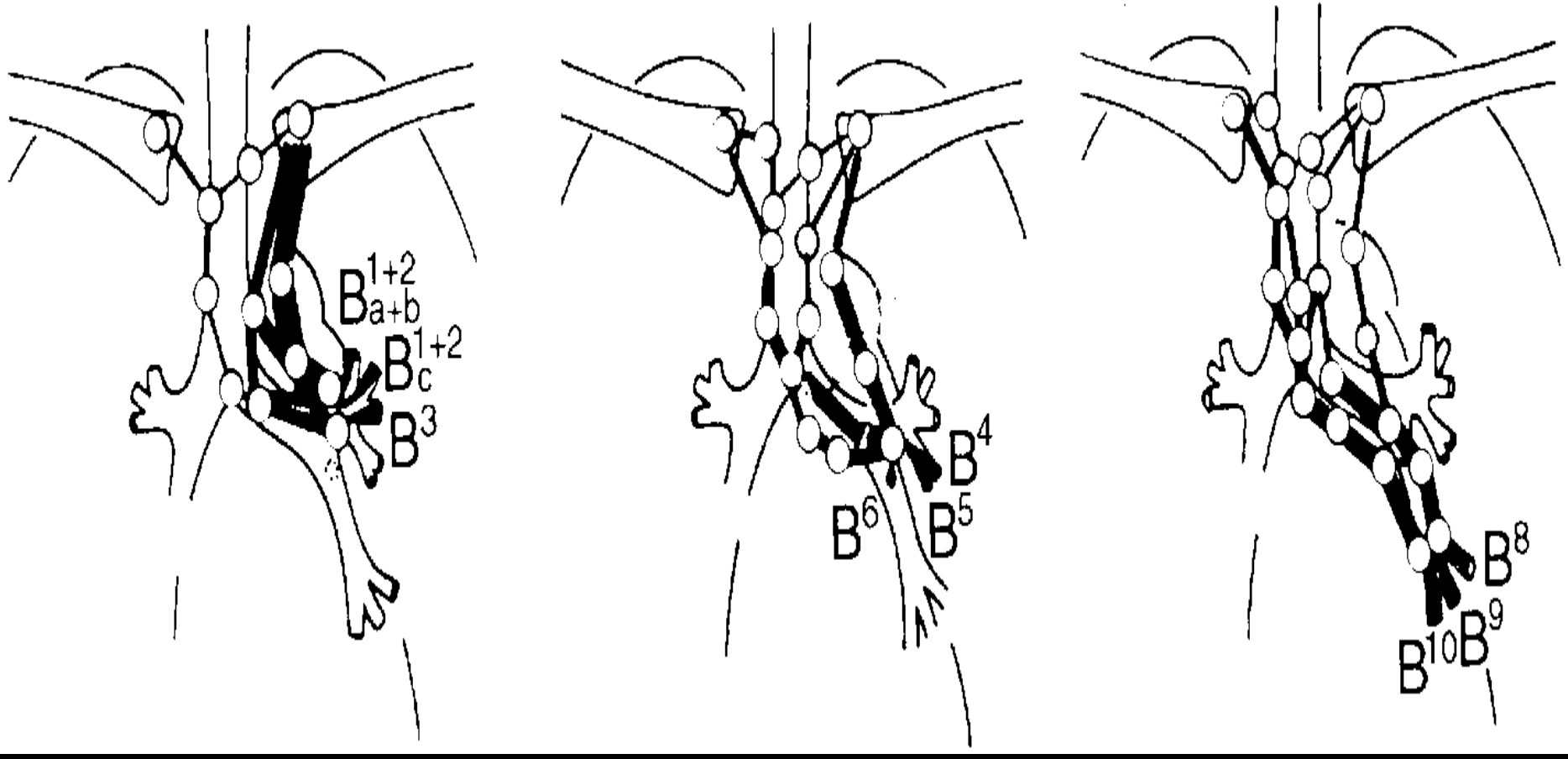
- 11 Interlobar nodes
- 12 Lobar nodes
- 13 Segmental nodes
- 14 Subsegmental nodes

Nodes Mets Pathway (Right)



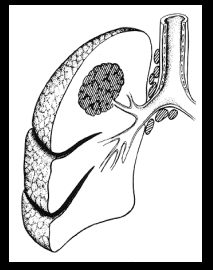
Hata et al., 1990

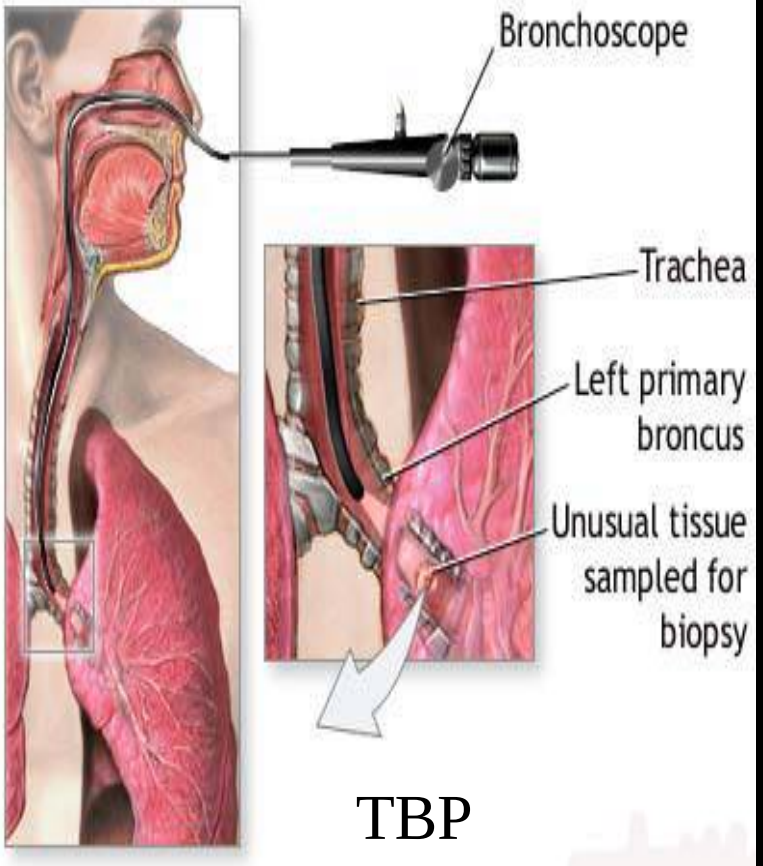
Nodes Mets Pathway (Left)



Hata et al., 1990

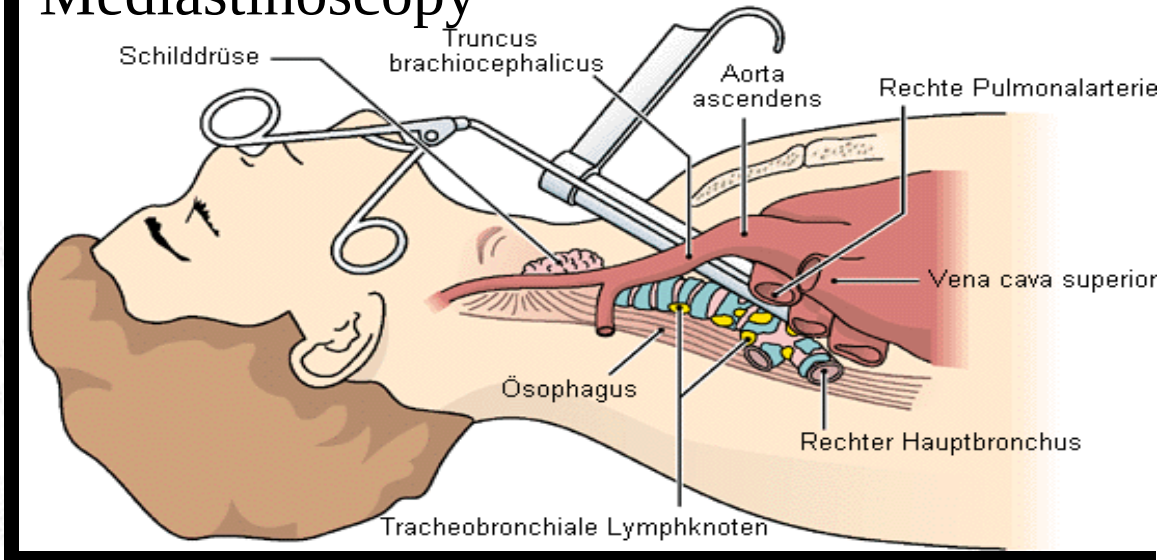
N2 Tumors





TBP

Mediastinoscopy

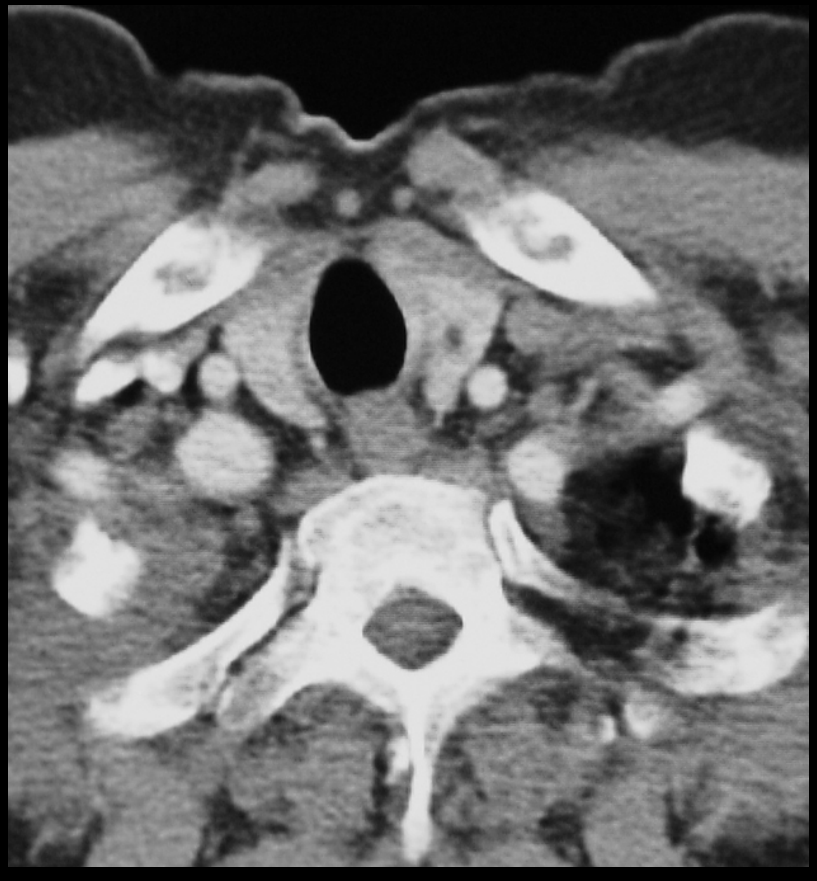


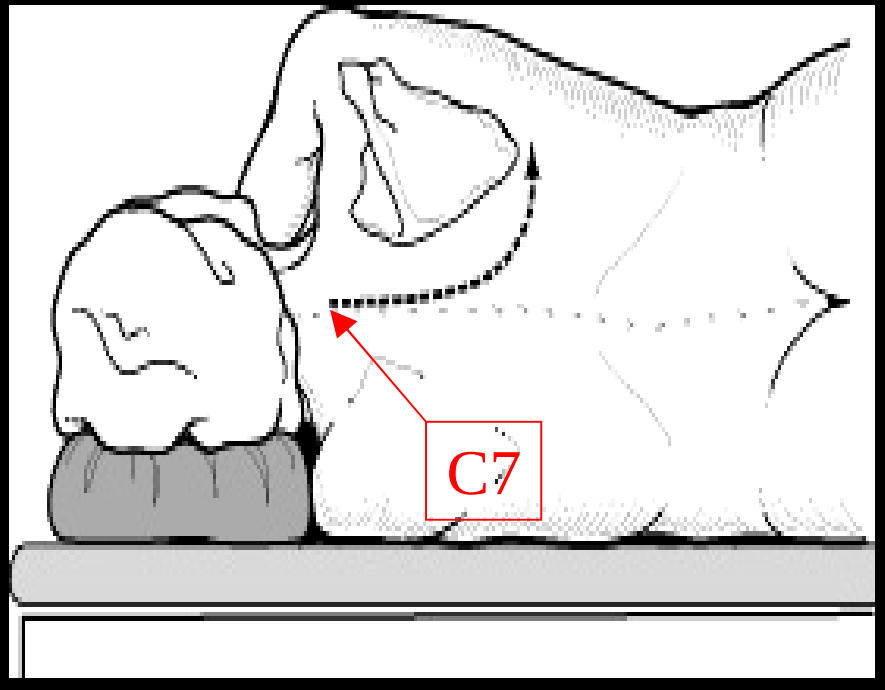
Multiple levels of involvement
Nodal *vs.* extranodal disease
Superior *vs.* inferior mediastinum
Bulky clinical *vs.* minimal CT nodes
Only 20% of N2 are resectable

T3-4 Tumors

Tumors invading any mediastinal structures or organs

Pancoast Tumors





Shaw-Paulson

Pancoast Results

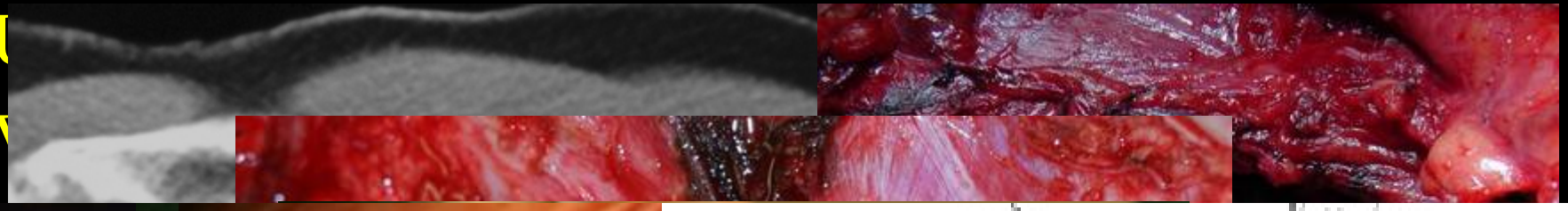
Authors	№	5-yrs survival (%)	Mortality
Paulson *et al.* (1986)	79	35	3
Ginsberg *et al.* (1994)	100	26	4
Dartevelle *et al.* (1998)	70	34	-
Rusch *et al.* (2001)	111	70 CR (2-yr)	2.7
Wright *et al.* (2002)	35	84 (4-yrs)	-

Hannover Intrathoracic Study Group: Phase II study

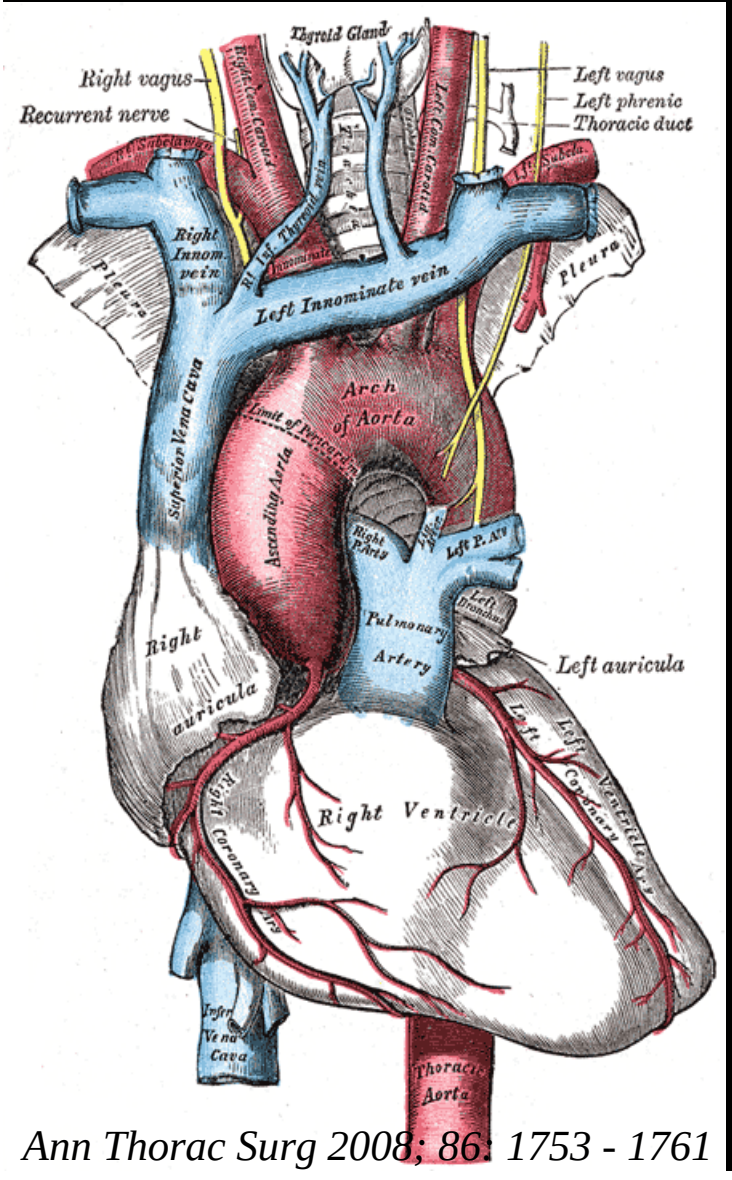
- Carboplatin (AUC2) and paclitaxel (40 mg/m^2 days 1, 8, 15, 22, 29) & RT (45 Gy week 1-5, day 1-5);
- 30 patients were evaluable;
- Complete resection in 100%, 43% of them pathological CR to induction treatment;
- The actuarial 3-year survival is 52% and the median survival has not been reached yet

Recent technical advances

- Lobectomy can be done via anterior approach alone
- U
- V
-
-
-
-
-

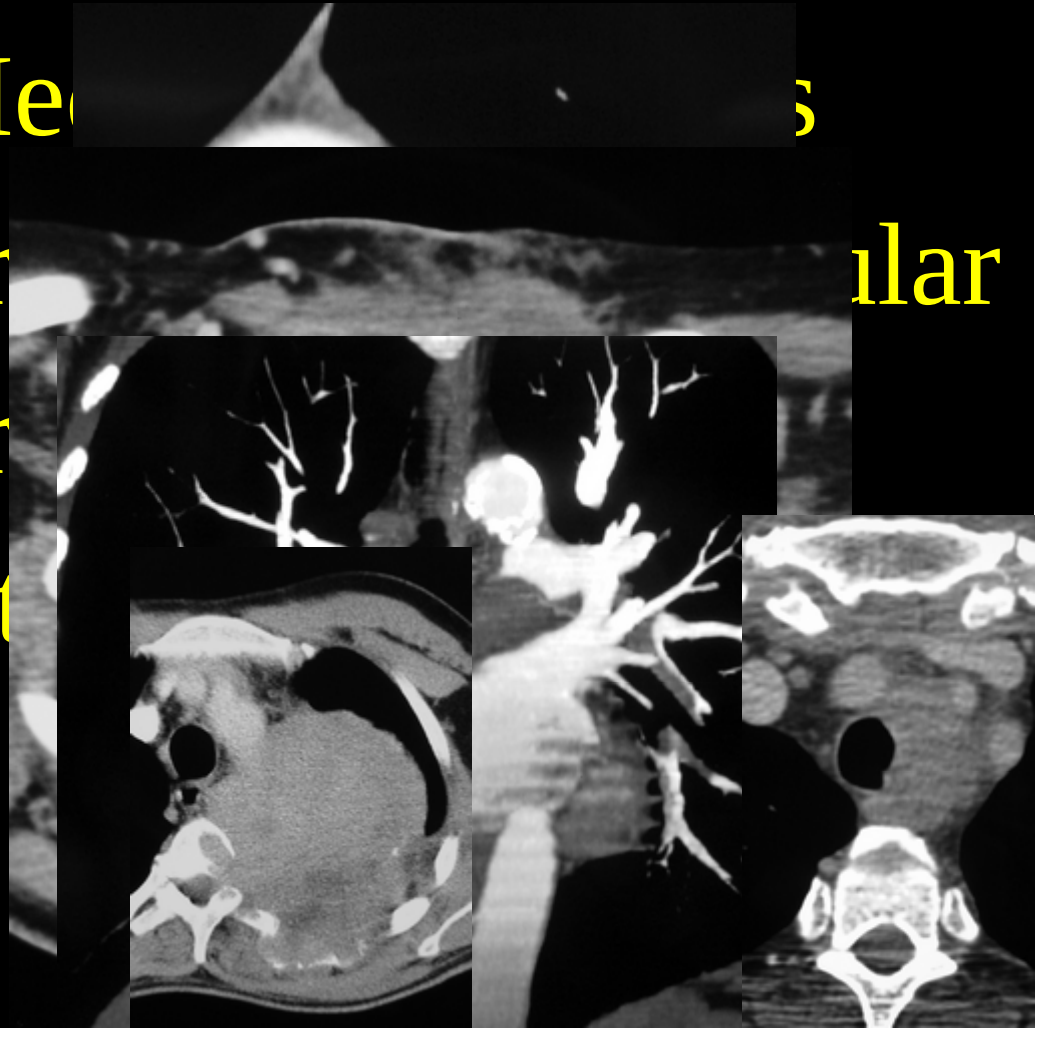



Operations for intrathoracic vessels

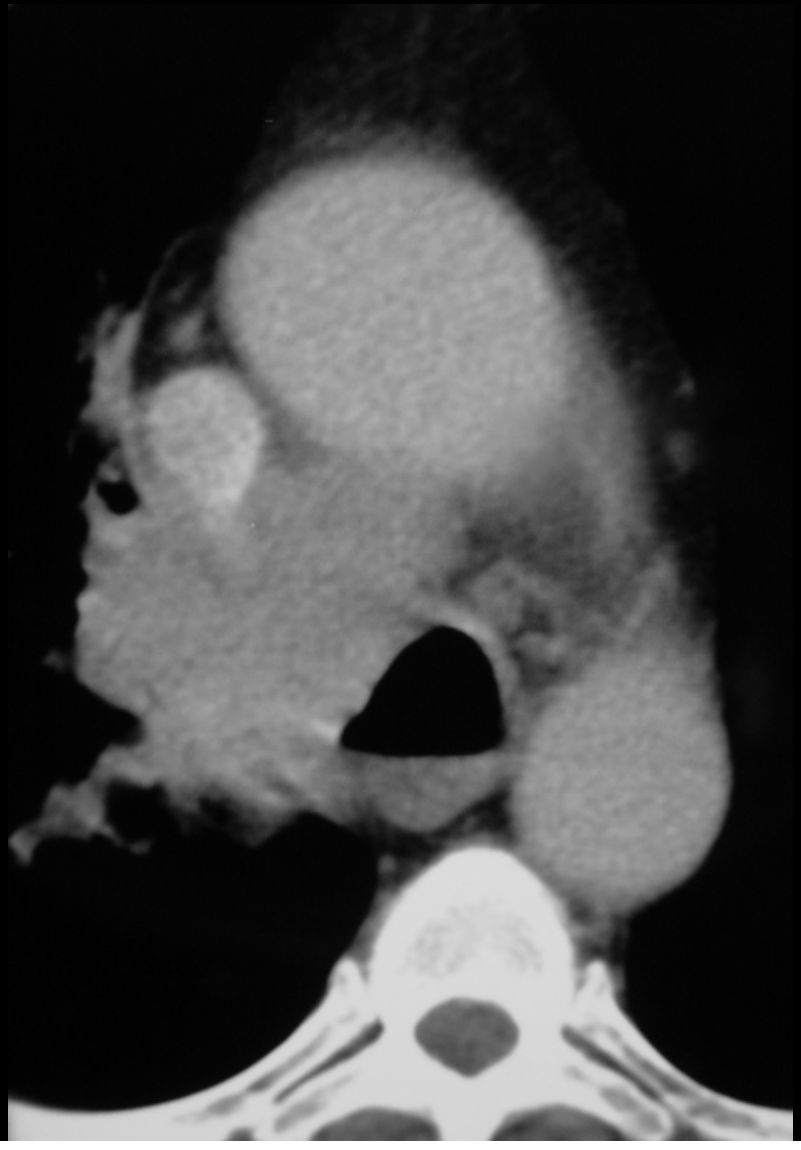


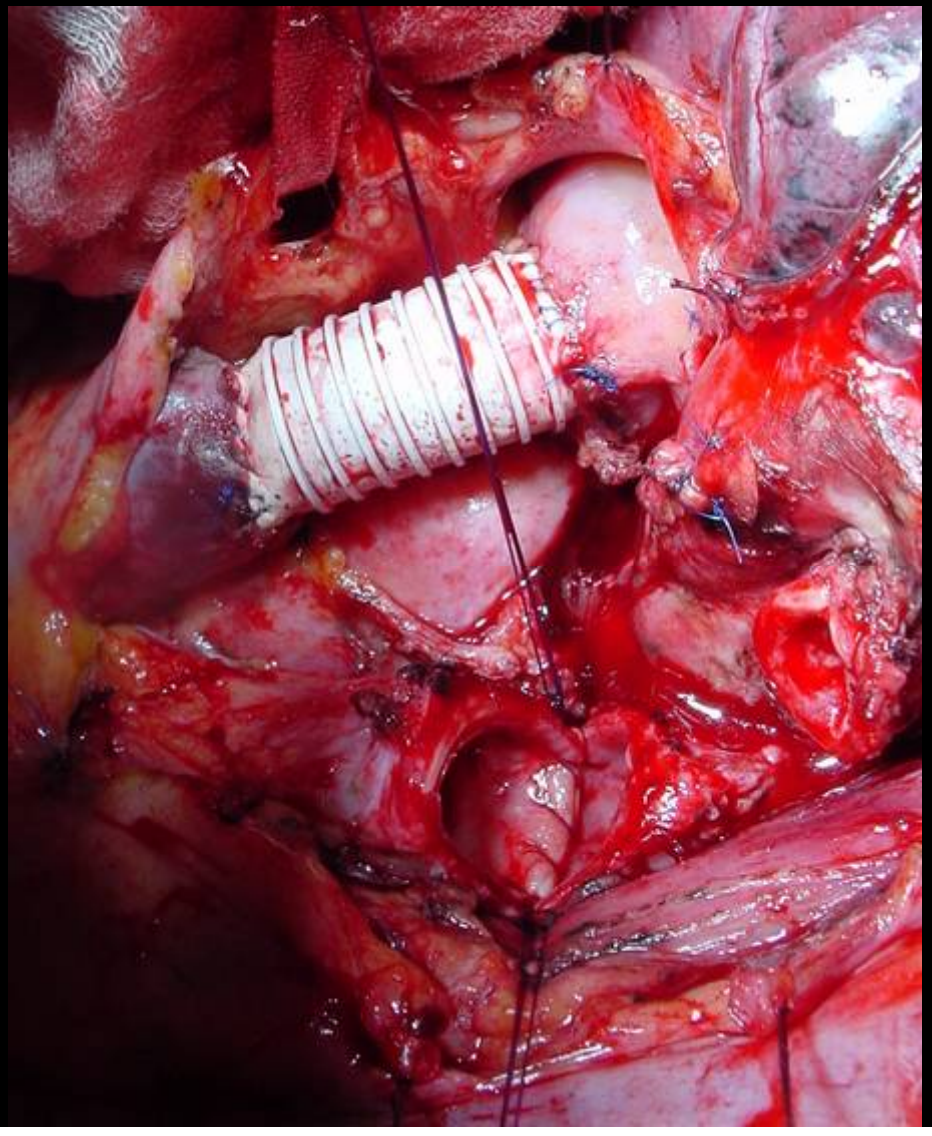
Ann Thorac Surg 2008; 86: 1753 - 1761

- NSCLC (Stage IIIB)
- Me[illegible]s
- Pr[illegible]ular
- Pr[illegible]
- Ot[illegible]

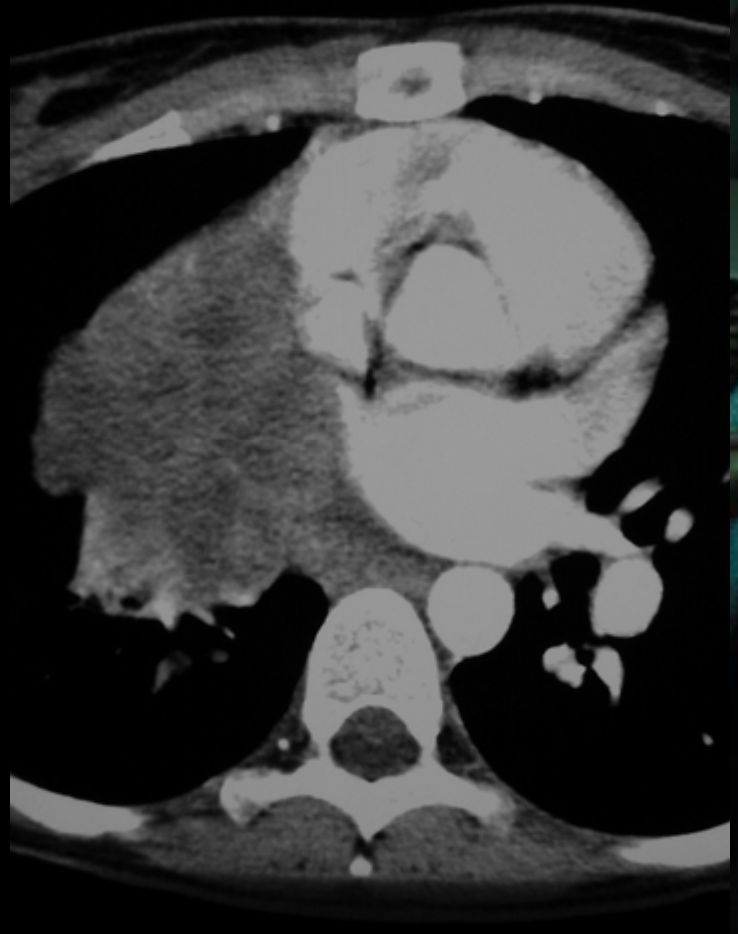


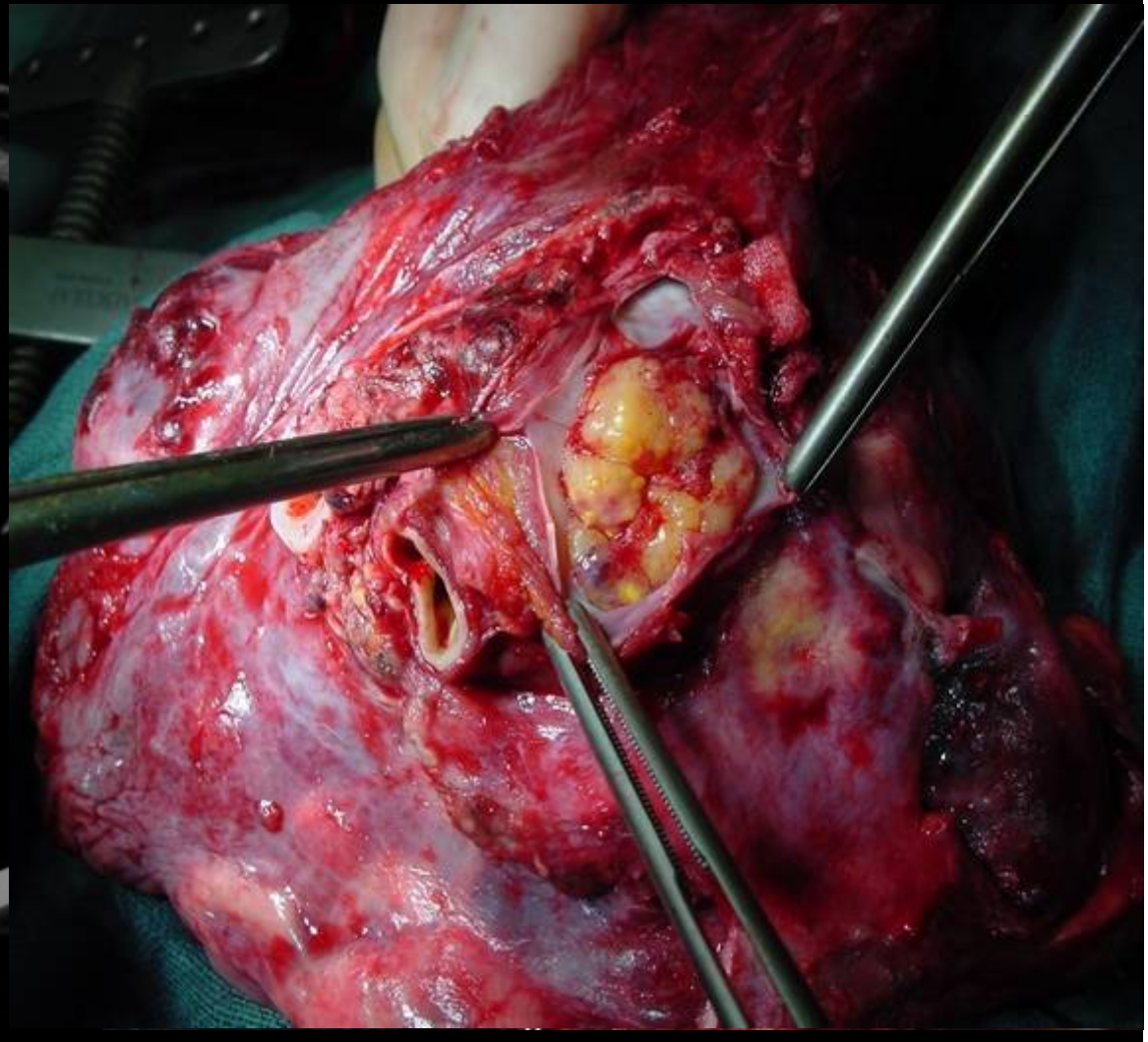
Vascular T4 NSCLC



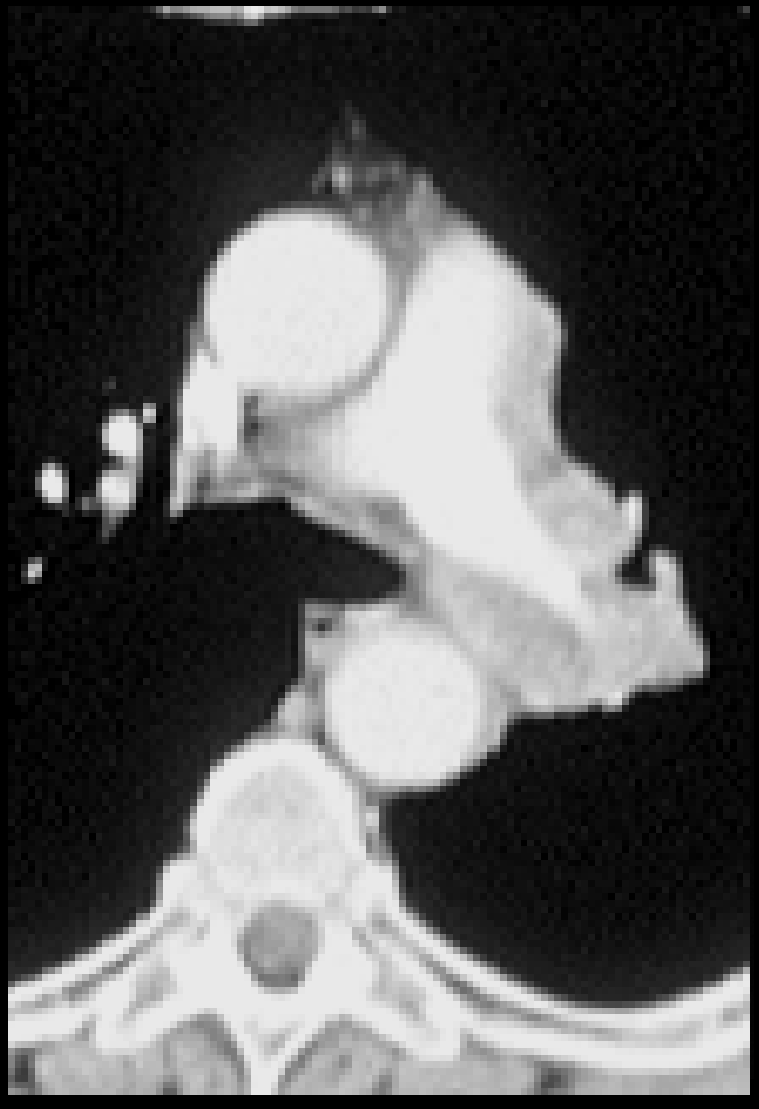


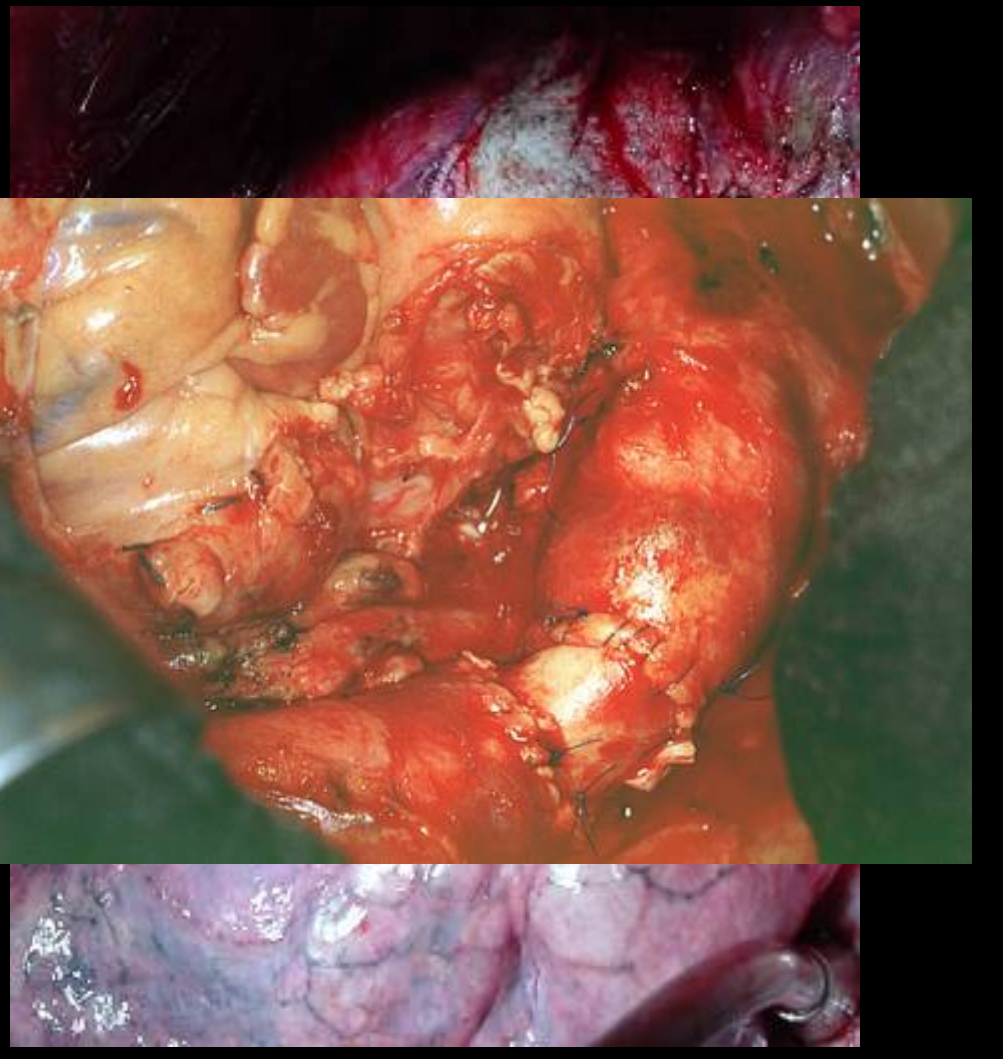
Vascular T4 NSCLC



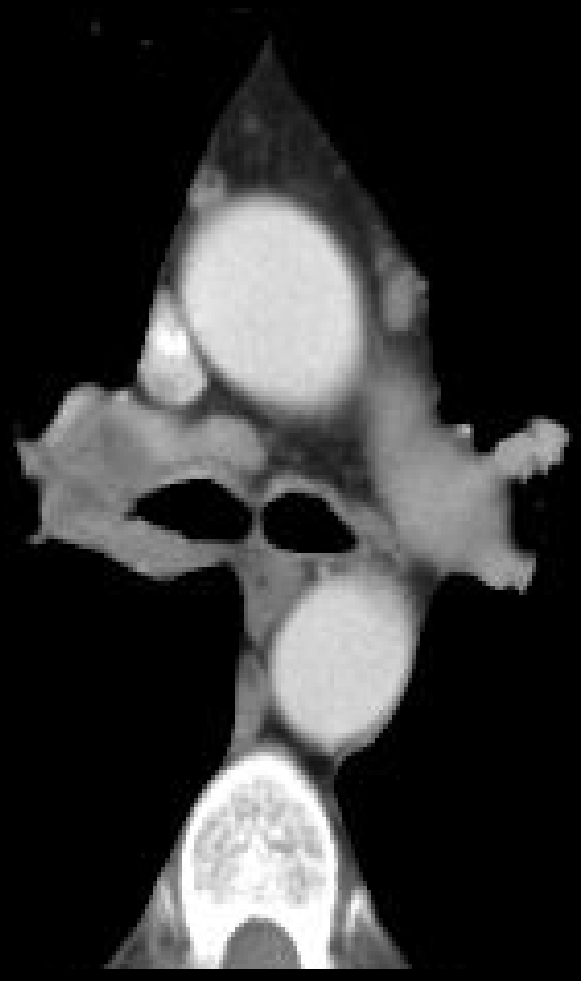


Vascular T4 NSCLC





Airway T4 NSCLC



ORIGINAL ARTICLE: GENERAL THORACIC

Technical Innovations of Carinal Resection for Nonsmall-Cell Lung Cancer

Paolo Macchiarini, MD, PhD, Matthias Altmayer, MD, Tetsuhiko Go, MD, Thorsten Walles, MD, Karl Schulze, MD, Ingeborg Wildfang, MD, Axel Haverich, MD, PhD, Michael Hardin, PhD, and the Hannover Interdisciplinary Intrathoracic Tumor Task Force Group

Department of General Thoracic Surgery, University of Barcelona, Spain; Department of Cardiothoracic and Vascular Surgery, Hannover Medical School, Hannover, Germany; Department of Thoracic Surgery, Fukuiken Saiseikai Hospital, Fukui City, Japan; Departments of Anesthesiology and Radiation Oncology, Siloah Hospital, Hannover, Germany; and Information Systems, Statistics, and Management Science, University of Alabama, Tuscaloosa, Alabama

Background. We present our perioperative management of operable nonsmall-cell lung cancer invading the tracheobronchial bifurcation and the results obtained.

Methods. Fifty consecutive patients undergoing carinal surgery with radical lymphadenectomy over a 5-year period were studied.

Results. Eighteen patients (36%) were N2 and had chemoradiation (48 ± 6 Gy) preoperatively. Surgery included 34 carinal pneumonectomies (24 right, 10 left), 11 carinal lobectomies (n = 6) or bilobectomies (n = 5), and 5 carinal resections, with (n = 3) and without (n = 2) reconstructions. Patients were ventilated through low tidal volume controlled techniques except during airway resection and reconstruction, during which the apneic (hyper)oxygenation techniques were used. High inspiratory oxygen concentrations, multiple collapse and reexpansions, hypoperfusion of the ipsilateral lung, and fluid overload were avoided. All patients but 1 were extubated in the operating room, 7 ± 5 minutes after skin closure. Operative mortality (less than 30 days) and morbidity were 4% (n = 2) and 37% (n = 18), respectively. All R1 resections but 1 (98%) were complete. The number of resected nodes per patient was 9 ± 2, and 7 (22%) of the 32 patients who had negative preoperative positron emission tomography results had micrometastatic mediastinal nodes. With a median follow-up of 38 months, actuarial 5-year and disease-free survivals were 51% and 47%, respectively. Disease-free survival was significantly affected by endobronchial extension (tracheobronchial angle invasion versus less than 0.5 cm from carina, $p = 0.03$) and nodal status (N0 versus N1-2, $p = 0.02$) in the multivariate analysis.

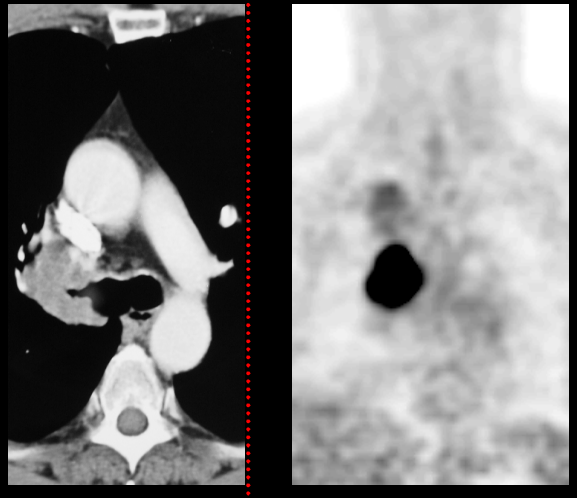
Conclusions. Preoperative chemoradiation, carinal lobectomy, or left pneumonectomy, and radical lymphadenectomy do not worsen the therapeutic index of carinal surgery. The high incidence of micrometastatic nodes in positron emission tomography–negative patients claims routine mediastinoscopy and radical lymphadenectomy. AQ:1

(Ann Thorac Surg 2006;xx:xxx)

Study Design

Eligibility: (Stages IIIB)

Node-negative



Surgery

Node-positive

Mediastinoscopy

Chemoradiation
(Carboplatin/Taxol + 45 Gy)

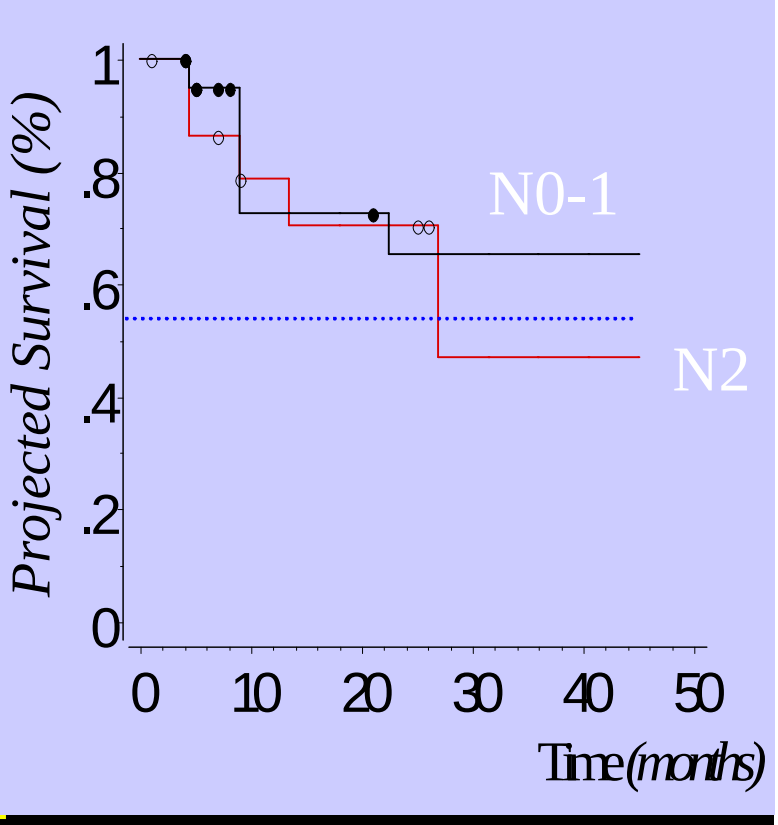
No-Redo
mediastinoscopy

Surgery

Surgical outcome

Operative

Mortality	1 (3%)
Morbidity	14 (39%)
Major	4
Minor	10
Neoadjuvant *vs.* not	*p*=0.027



Oncological outcome

- All but 1 had a R0 resection;
- 39% of pretreated N2 pts were pathologically downstaged to N1 or N0;
- PET scan was false negative in 7 (32%);
- Multivariate DFS analysis: endobronchial extension (<0.5 cm from carina *vs.* tracheobronchial angle) and N status (N0 *vs.* N1 & N2)

Conclusions