



PNEUMOLOGIA 2018

Milano, 14 – 16 giugno 2018 · Centro Congressi Palazzo delle Stelline



Ospedale
San Giuseppe
MultiMedica SpA

Sistema Sanitario

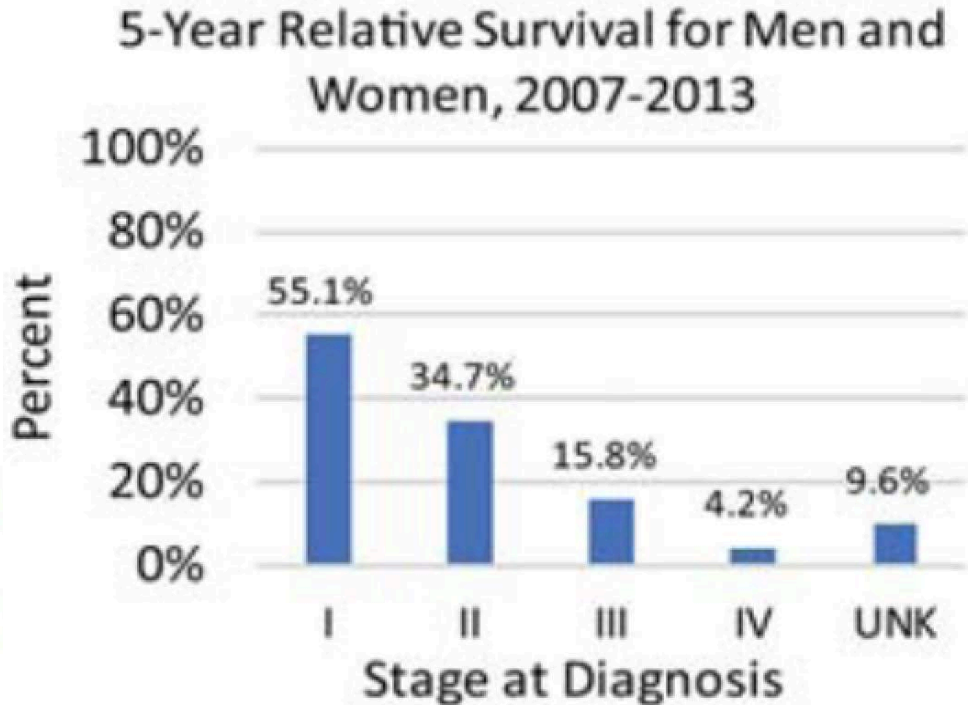
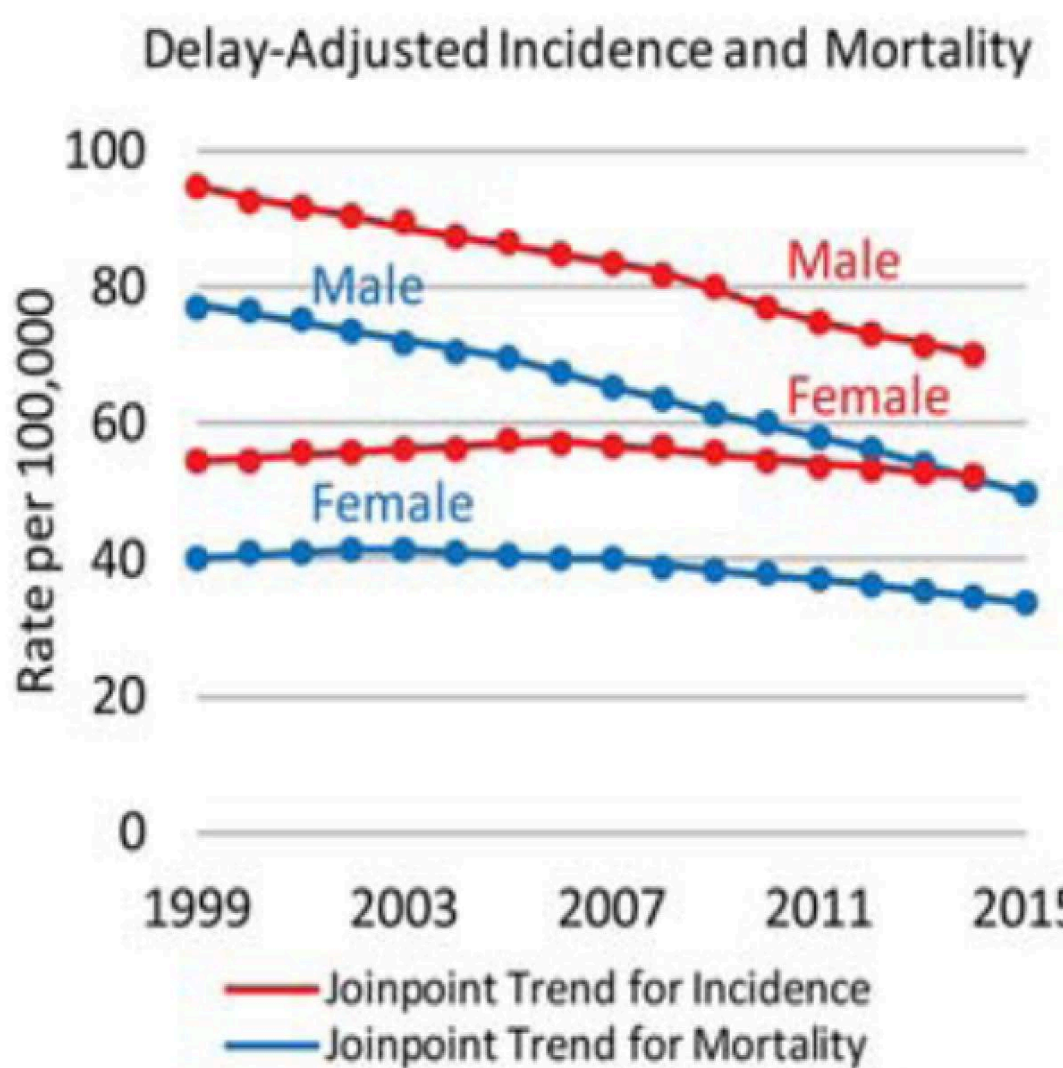


Regione
Lombardia

LA CHIRURGIA POLMONARE NEGLI STADI LOCALMENTE AVANZATI

Ugo Pastorino, Istituto Nazionale Tumori, Milano

Annual Report to the Nation on the Status of Cancer, Part I: National Cancer Statistics



Percent of Cases By Stage at Diagnosis				
I	II	III	IV	Unknown
20.7%	4.6%	23.3%	43.6%	7.9%

LUNG CANCER SURGERY: CRITICAL ELEMENTS

selection

staging, volume, co-morbidity

access

muscle-sparing, VATS, robot

resection

how much lung, nodes, new energies

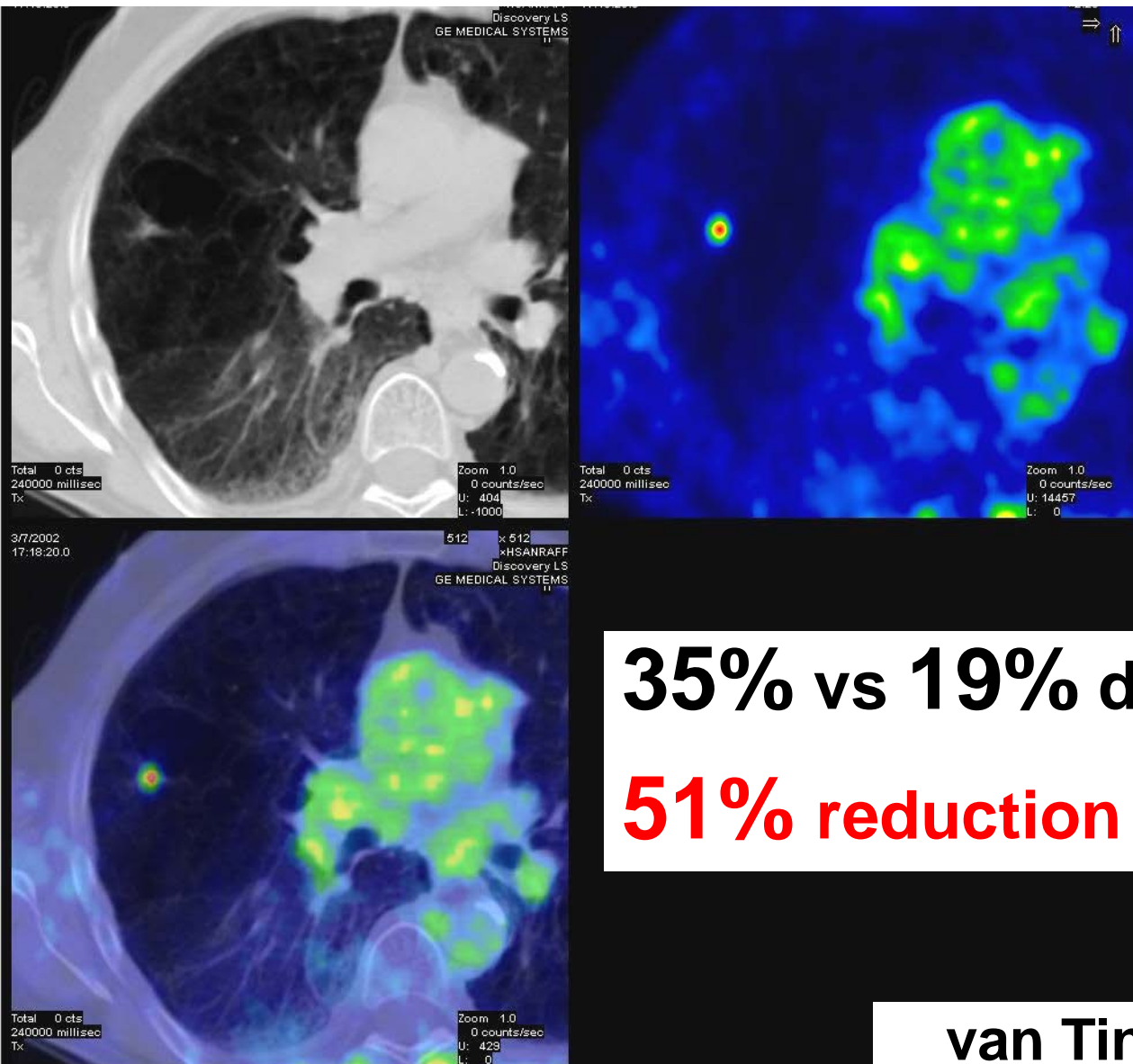
reconstruction

bronchus, vessels, chest wall

multimodality

induction, adjuvant, salvage

LUNG CANCER STAGING: CT/PET MANDATORY



PLUS trial

188 LC patients
randomised to
preop PET + CV vs CV

35% vs 19% distant mets detected

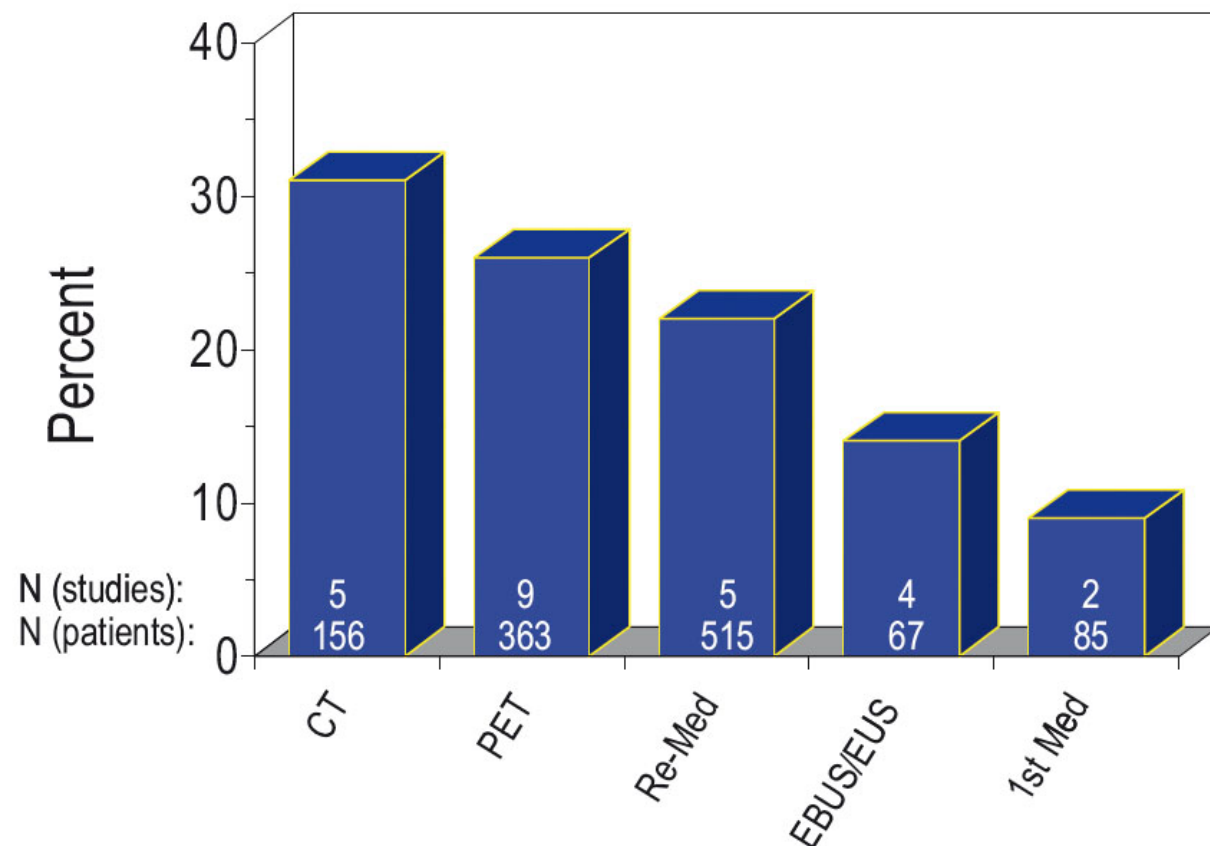
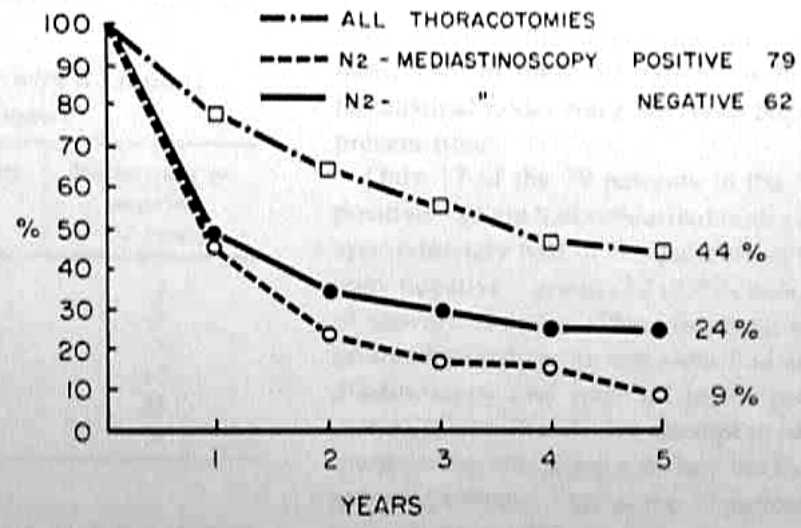
51% reduction of futile thoracotomies

van Tinteren, Lancet 2002; 359:1388

LUNG CANCER STAGING: PET + UBUS MORE EFFECTIVE

systematic review of 25 studies and 1186 pts

False Negative Rate of Mediastinal Restaging (N0,1 vs. N2,3)



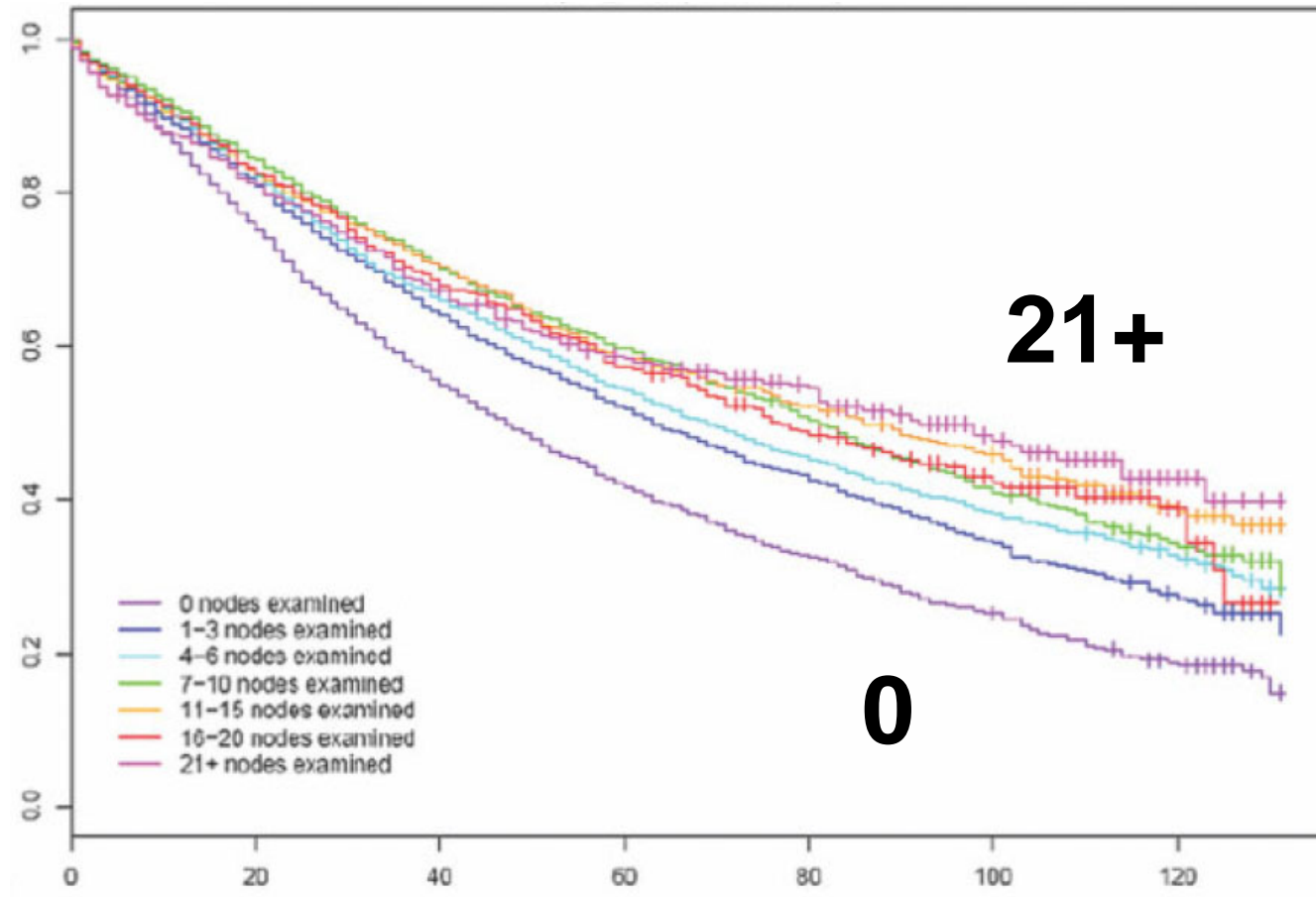
LUNG CANCER SURGERY: NODAL DISSECTION USEFUL

Intra-operative mediastinal staging: SEER data (2)

➤ 24,273 stage I NSCLC

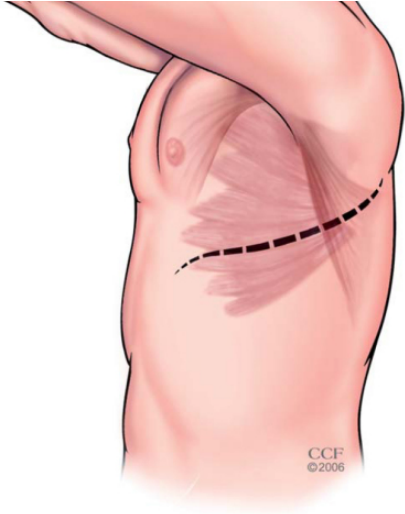
➤ lymphadenectomy = Increased 5-year overall survival from **41.6%** to **58.4%** ($P < .0001$) and in DFS from 58.0% to 73.09%

➤ with a **two-fold increase of 10-year survival** in patients with > 21 resected nodes compared with 0 nodes

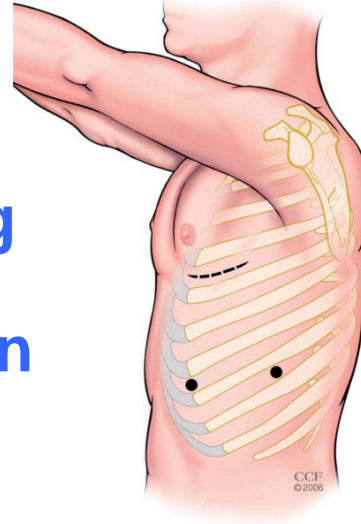


Varlotto JM, Cancer 2009;115:851

LUNG CANCER SURGERY: WHICH IS THE BEST ACCESS ?



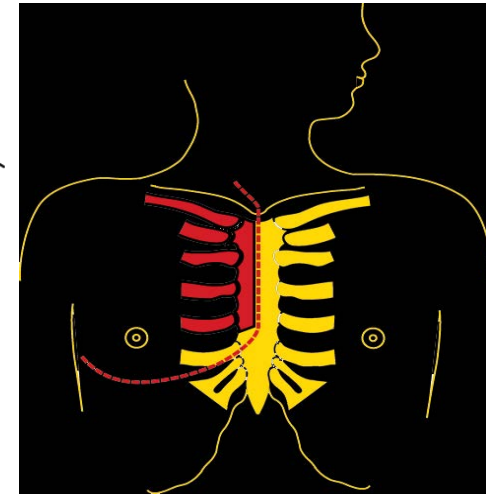
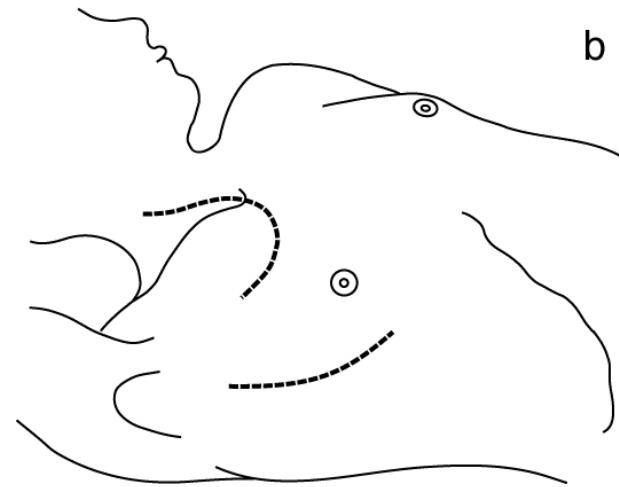
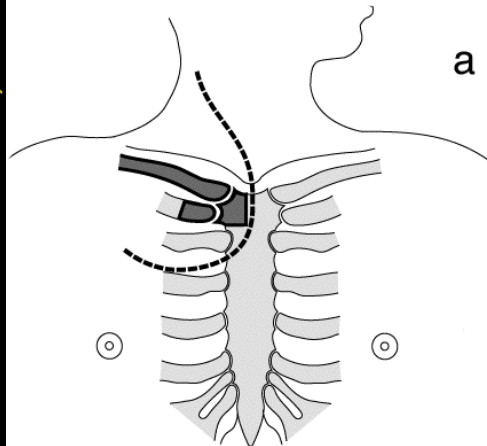
individual modelling
better exposure
function preservation



postero-lateral
thoracotomy



muscle-sparing
VATS
sternotomy
hemi-clamshell
TMA



LUNG CANCER SURGERY: REAL WORLD ACCESS

INTM 2015

postero-lateral	< 5 %
sterno / HC / TMA	10-15 %
<hr/>	
lateral m-s	40 %
3D VATS	40 %

SURGERY FOR HILAR LC: SLEEVE IS BETTER

Table 4 Comparison of survival between sleeve lobectomy and pneumonectomy

Study	Year	Total no. of patients	No. of patients (5-Year survival)	
			Sleeve lobectomy	Pneumonectomy
Gaissert ⁴⁴	1996	128	72 (42.0%)	56 (44.0%)
Yoshino ⁴⁵	1997	58	29 ^a (65.7%)	29 ^a (58.8%)
Suen ⁴³	1999	200	58 (37.5%)	142 (35.8%)
Okada ¹⁴	2000	120	60 (48.0%)	60 (28.0%)
Deslauriers ¹²	2004	1230	184 (52.0%)	1046 (31.0%)
Ludwig ⁴⁶	2005	310	116 (39.0%)	194 (27.0%)
Kim ³¹	2005	249	49 (53.7%)	200 (59.5%)
Takeda ⁴⁷	2006	172	62 (54.0%)	110 (33.0%)

^aThree-year survival figures

operative mortality 1.6% vs 5.3% p=0.036

Deslaurier, Gen Thorac Cardiovasc Surg 2009;57: 3-9

SURGERY FOR T3 – 4 LC: **yes or no ?**

T3

Chest wall
Diaphragm
Phrenic n.
Med ple
Pericard

T4

Heart
Great vessels
Trachea
Recurr n.
Oesophagus
Vertebra
Carina

Alotta Am Frazin MD ©2008

Goldstraw JTO, 2:706, 2007

Alotta Am Frazin MD ©2008

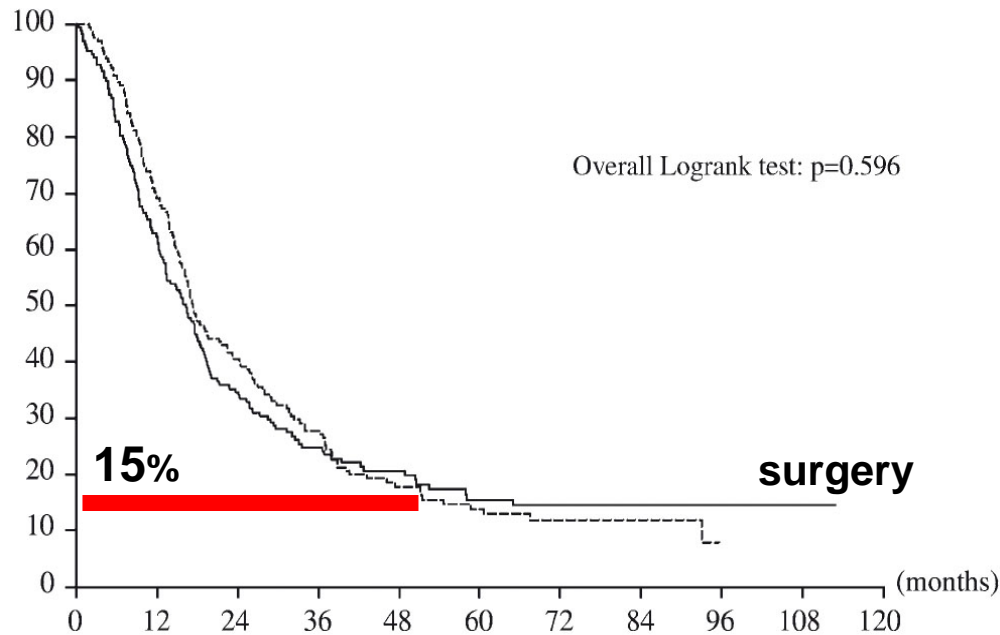
**satellite nodule
same ipsilateral lobe**

**satellite nodule
different ipsilateral lobe**

Stage III NSCLC: surgery vs RT

EORTC trial

332 patients / 41 inst, 1994-2002, 0.6 pts / yr / inst

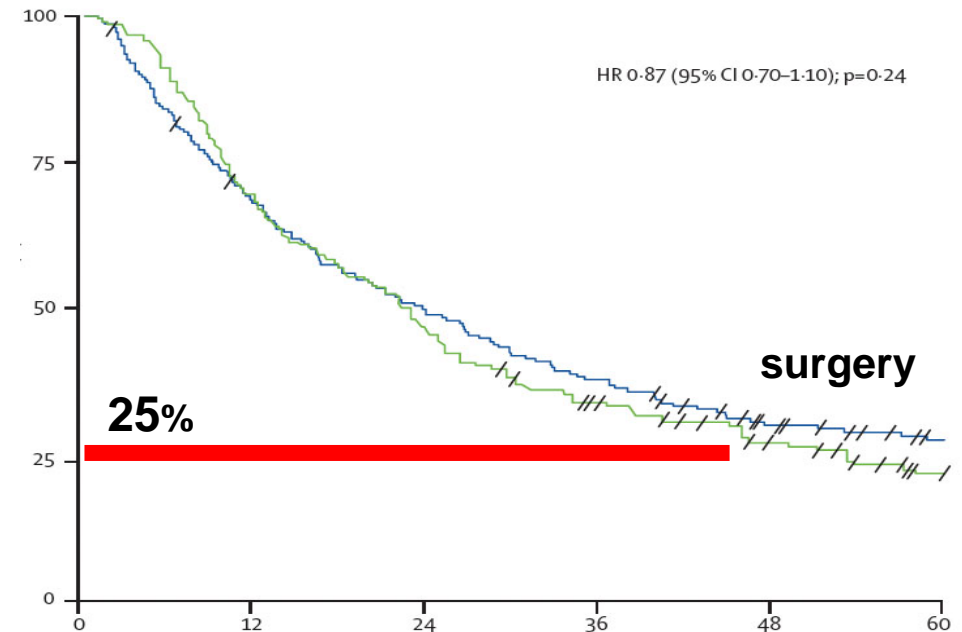


47% pneumonectomy
50% incomplete resections

Van Meerbeeck, J Natl Cancer Inst 2007; 99 : 442-50

NCI trial

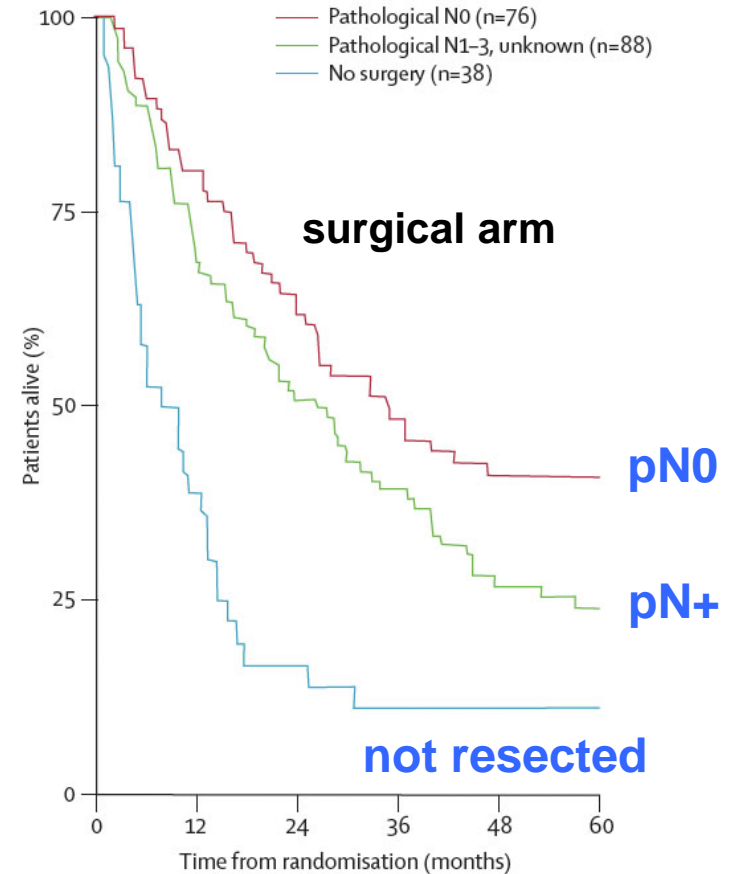
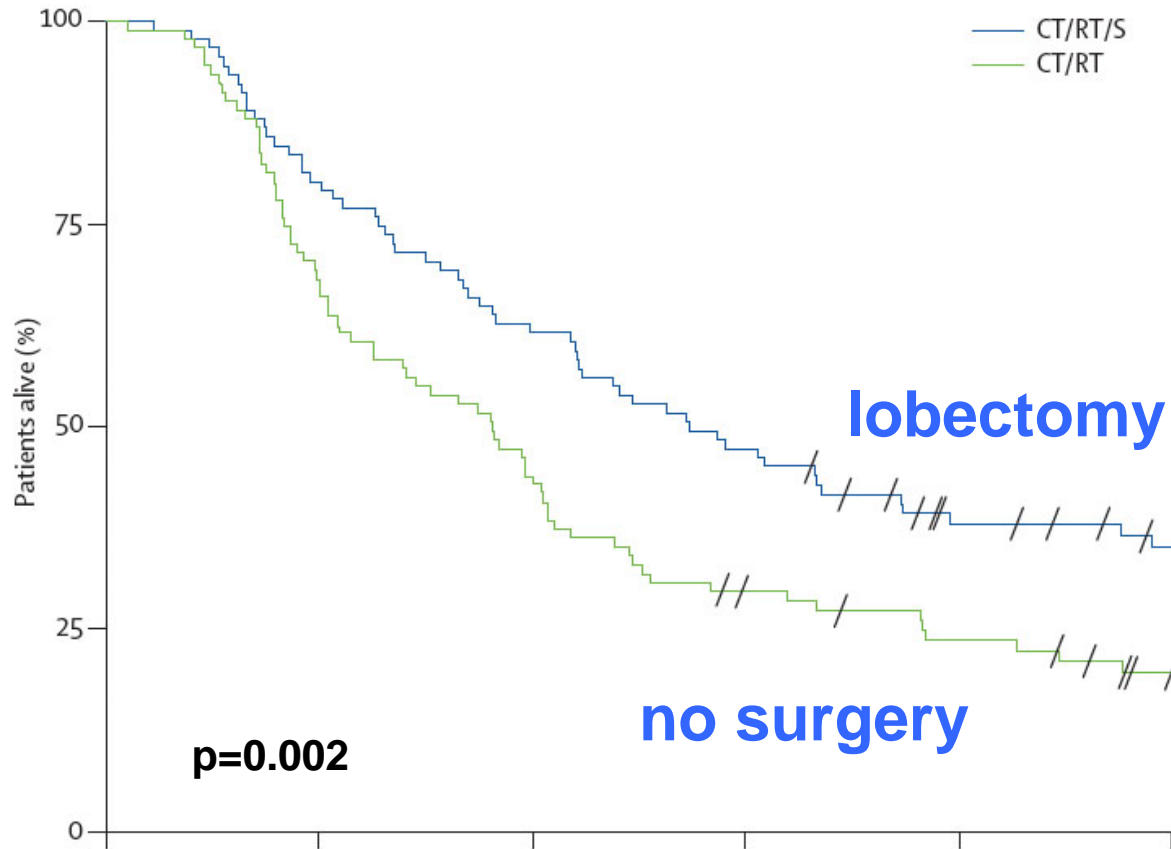
396 patients, 1994-2001, 30 pts / yr



Albain, Lancet 2009; 374 : 379-386

Stage III NSCLC: RT + lobectomy vs RT

NCI trial



LUNG CANCER SURGERY: IS PNEUMONECTOMY ACCEPTABLE ?

	years	#	mortality
Martin 2001 right	1993-99	97/470 46/470	11% 24%
Weder 2010	1998-06	176/827	3%
Barnett 2011 right	2000-06	70/549	4% 3%

Treatment of Stage III Non-small Cell Lung Cancer

Diagnosis and Management of Lung Cancer,
3rd ed: American College of Chest Physicians
Evidence-Based Clinical Practice Guidelines

Neoadjuvant therapy followed by surgery is neither clearly better nor clearly worse than definitive chemoradiation.

Most of the arguments made regarding patient selection for neoadjuvant therapy and surgical resection provide evidence for better prognosis but not for a beneficial impact of this treatment strategy; however, weak comparative data suggest **a possible role if only lobectomy is needed in a center with a low perioperative mortality rate**

Future trials are needed to investigate the roles of individualized chemotherapy, surgery and adaptive radiation

Stage III NSCLC: treatment strategy at INTM

- limited N2, no bulky or N3
fit for resection and stopped smoking

induction chemotherapy
3 - 4 cycles (based on response)
(bi) lobectomy or **left** pneumo
PORT for residual yN2

- bulky or unfit for surgery
chemo - radiotherapy
possibly concurrent

SURGERY FOR T4 LC: WHEN, HOW AND WHERE?

- **technically feasible (R0) in few cases**
- **with acceptable morbidity / mortality**
- **for carefully selected patients**
- **multi-disciplinary decision / planning**
- **in highly specialized centres**

SURGERY FOR T3 – 4 LC: **VASCULAR RECONSTRUCTION**

SVC

● **end-to-end anastomosis**

● **pericardial patch**

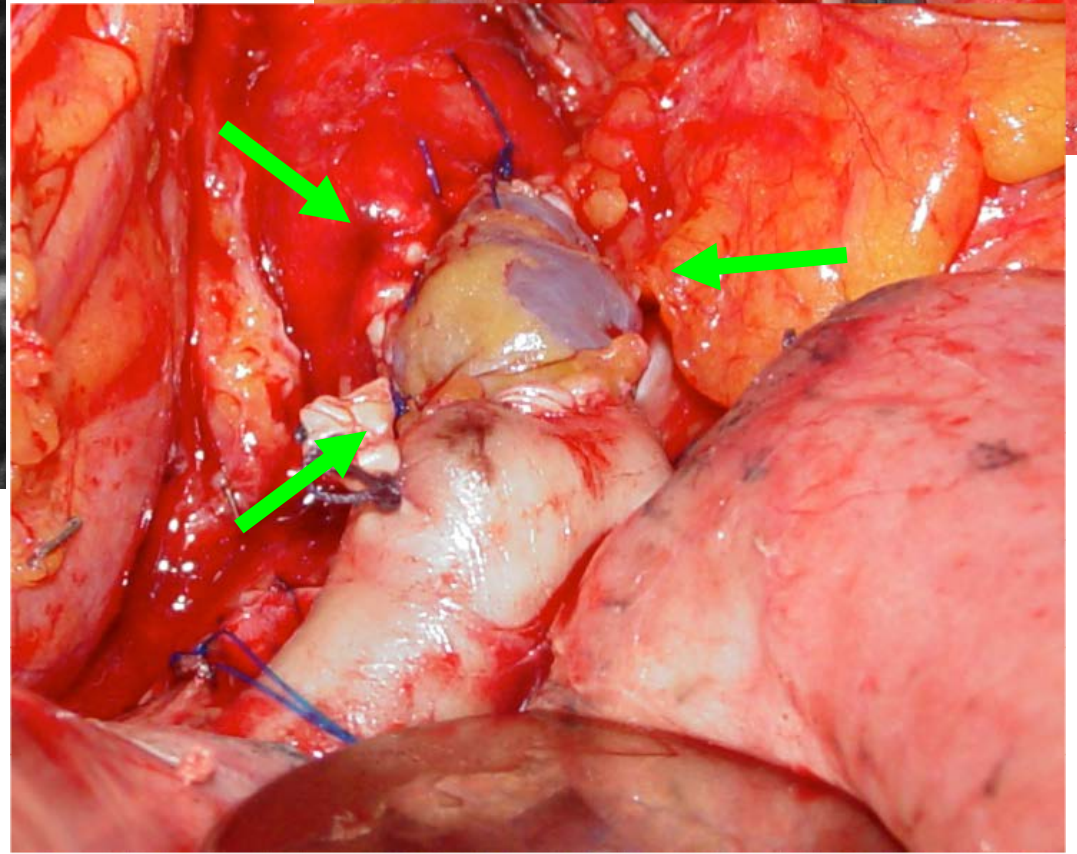
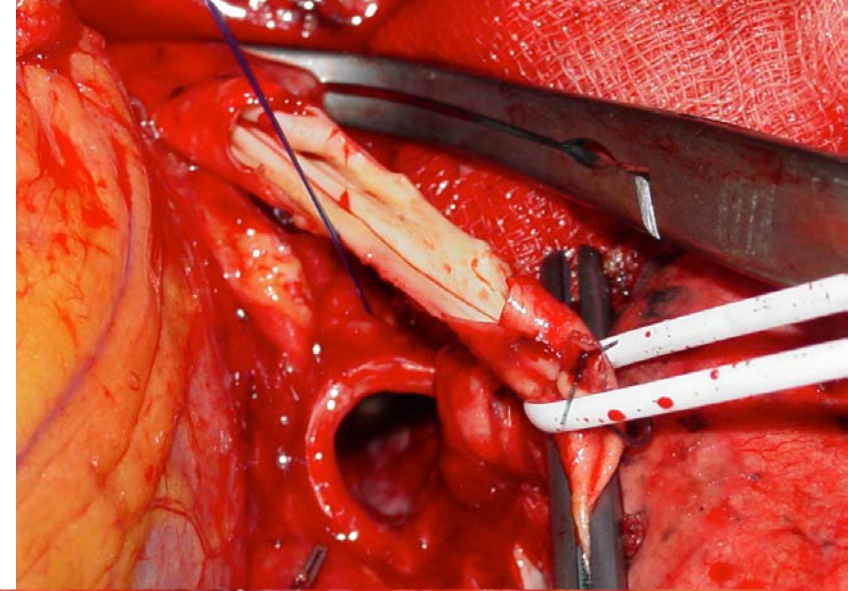
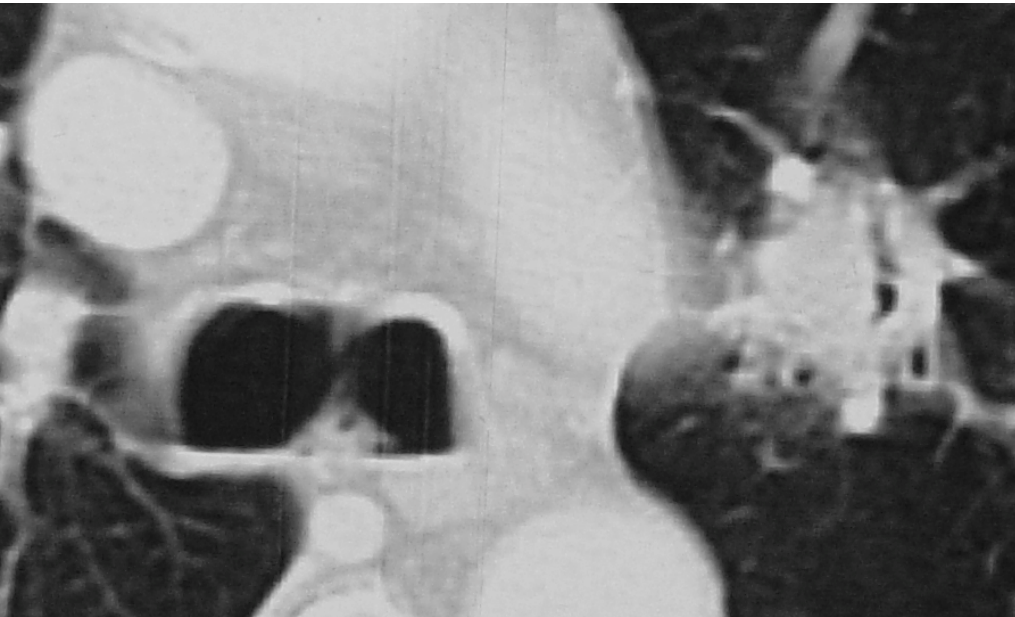
PA

● **PTFE**

● **cadaveric graft**

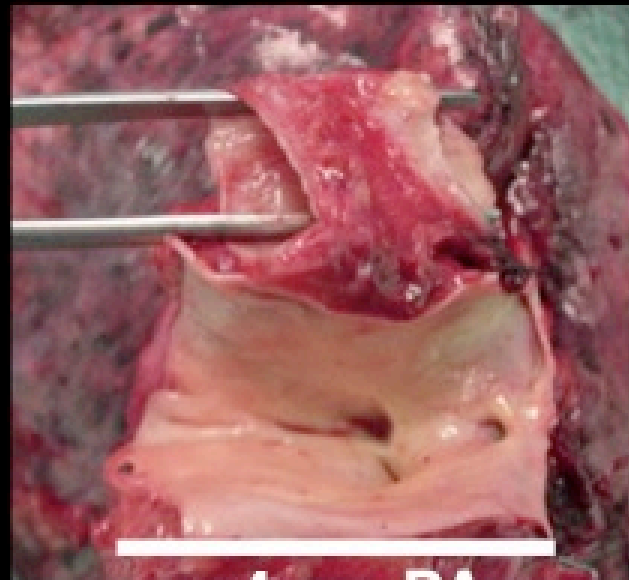
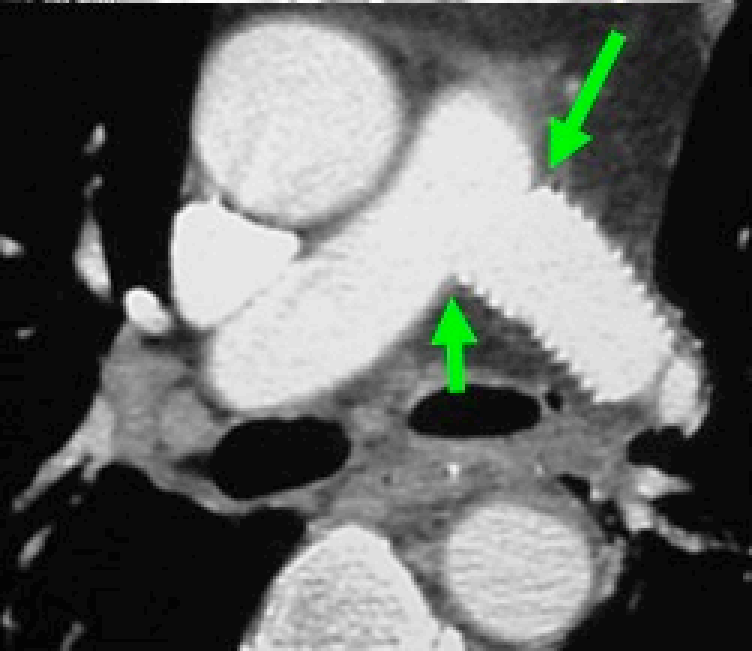
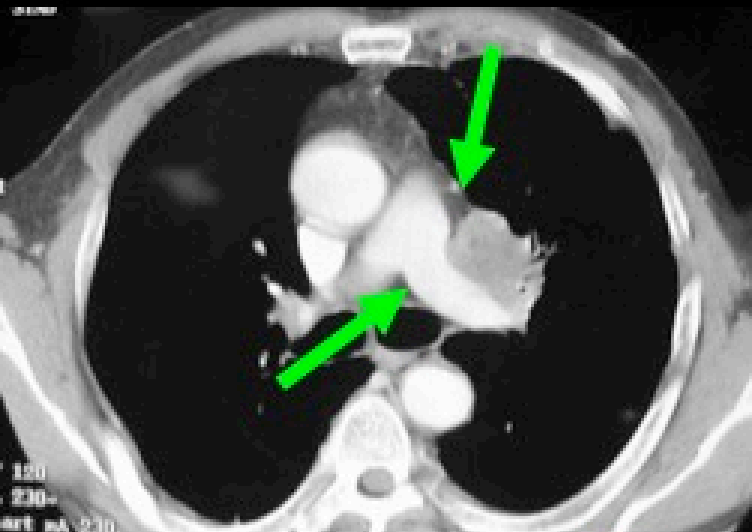
● **autologous venous graft**

sleeve lobectomy + PA resection + pericardial patch

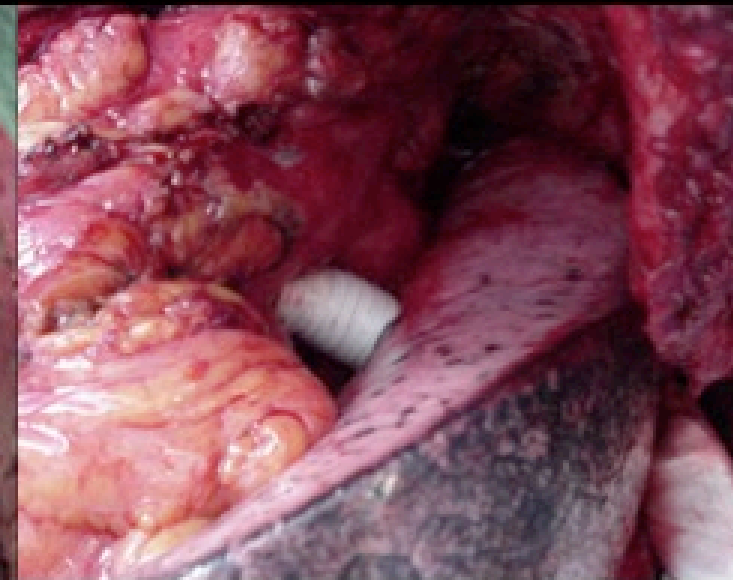


sleeve lobectomy + PA resection + PTFE graft

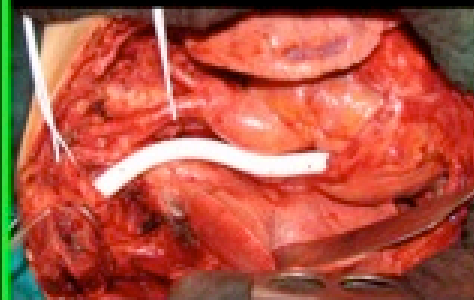
57-yr old LUL squamous ca
9-yr after RUL + I-III rib + RT
induction CDDP-GEM x 4



> 4 cm PA



SVC resections + - PTFE



JTCS 94:361, 1987
JTCS102:259, 1991
ATS 70:1172, 2000
EJTCS 20:1045, 2001
EJTCS 21:1080, 2002
EJTCS 37:1764, 2010

SURGERY FOR T3 – 4 LC: **safety of ptfe replacement**



EUROPEAN JOURNAL OF
CARDIO-THORACIC
SURGERY

European Journal of Cardio-thoracic Surgery 37 (2010) 764–769

www.elsevier.com/locate/ejcts

Superior vena cava resection in thoracic malignancies: does
prosthetic replacement pose a higher risk?☆

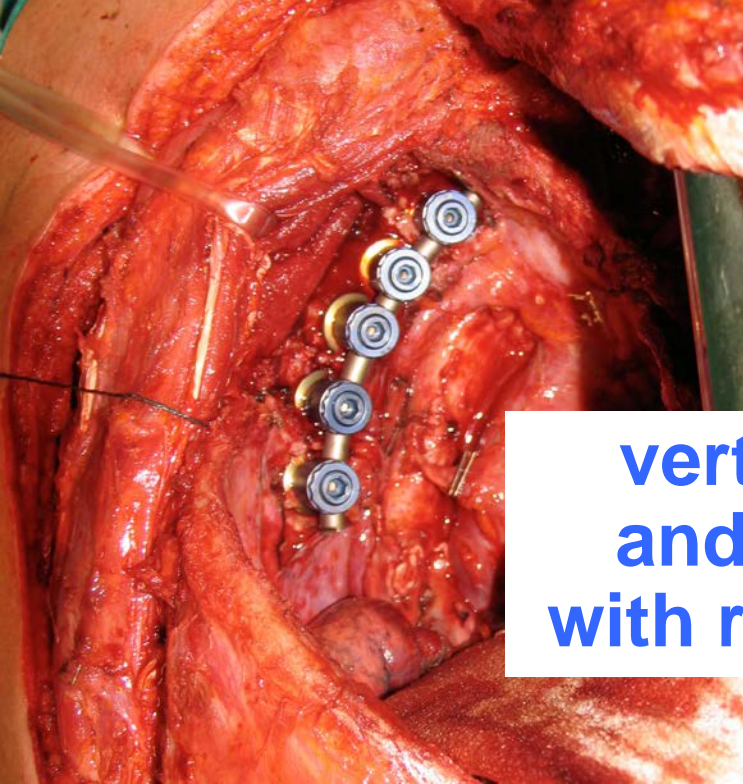
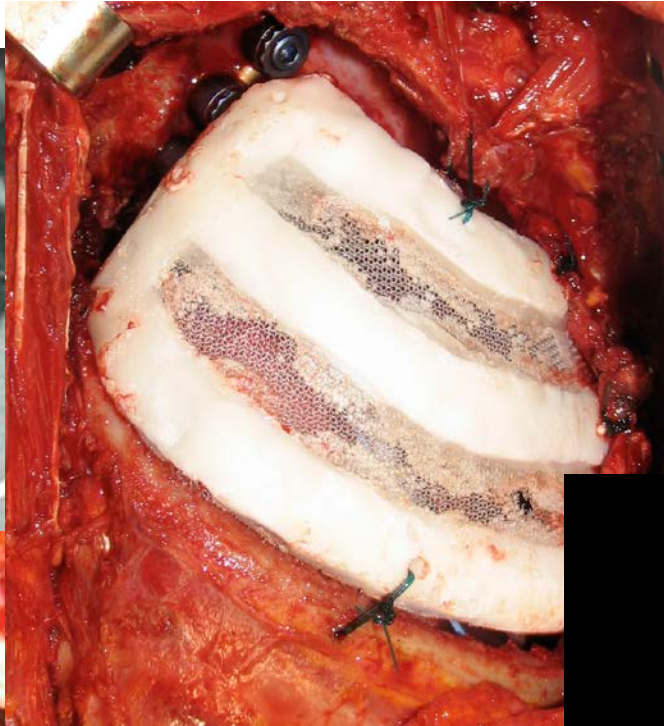
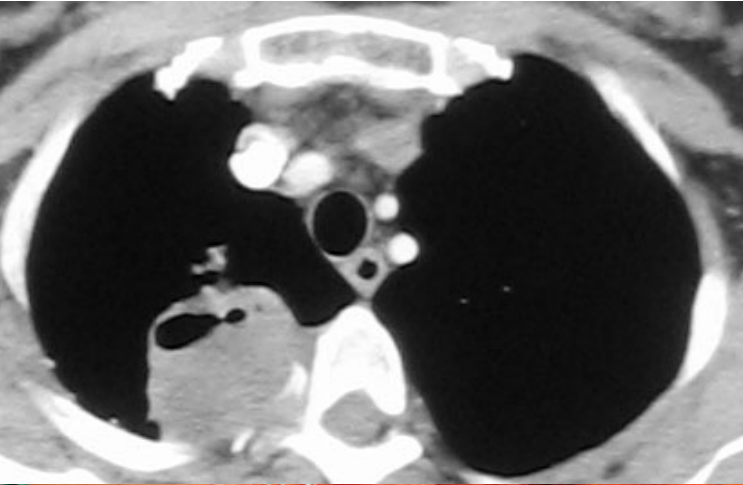
Francesco Leo^{*}, Roberto Bellini, Barbara Conti, Vincenzo Delledonne,
Luca Tavecchio, Ugo Pastorino

similar morbidity & mortality

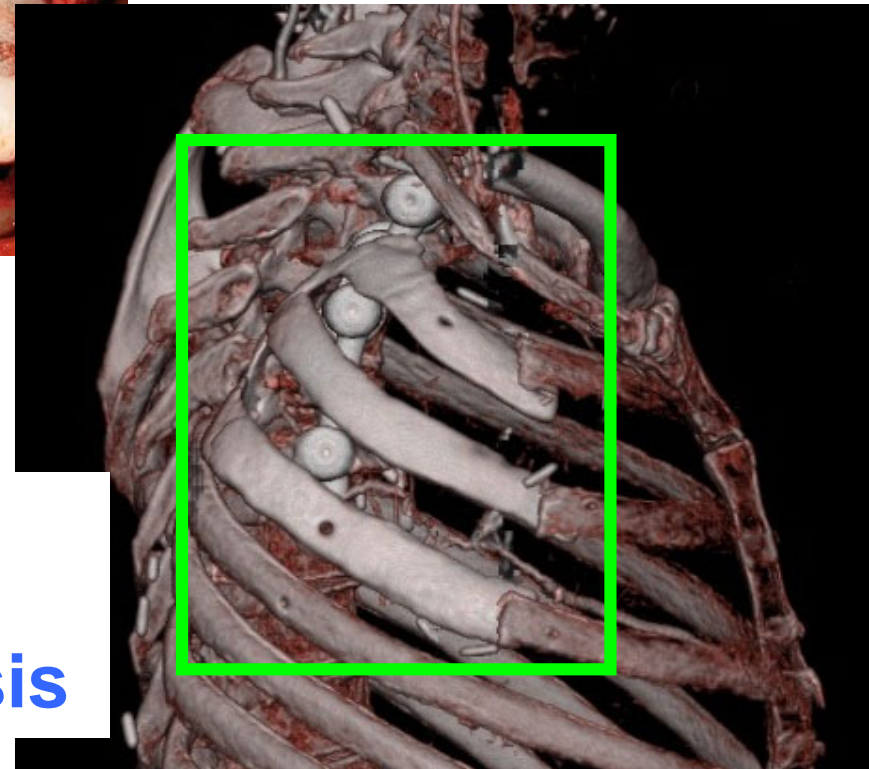
2.2% for partial SVC resection (44 pts)
3.5% for total replacement (28 pts)

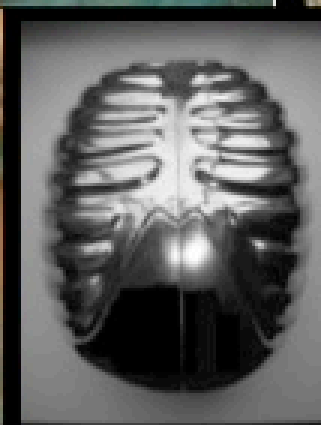
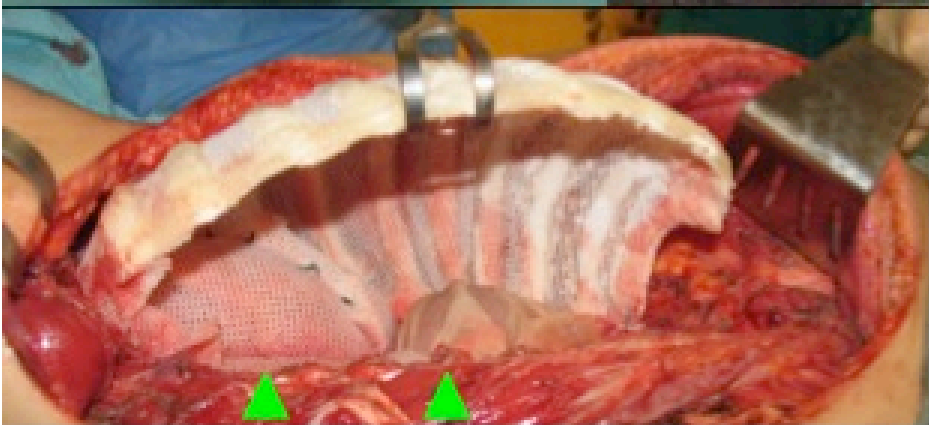
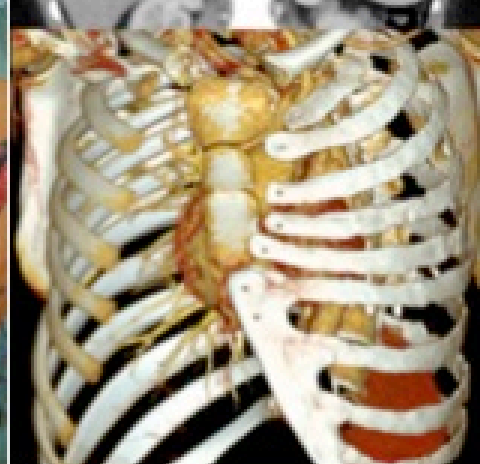
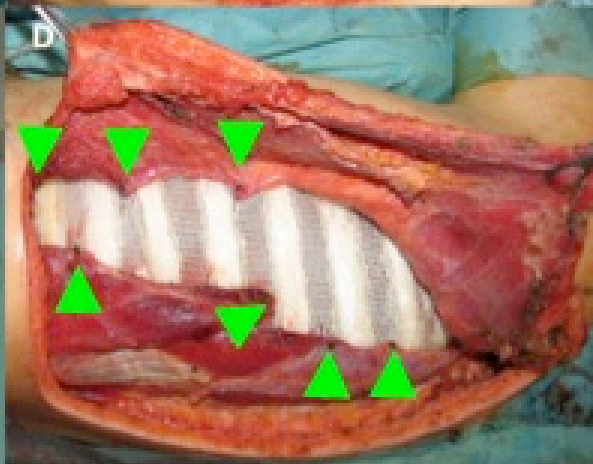
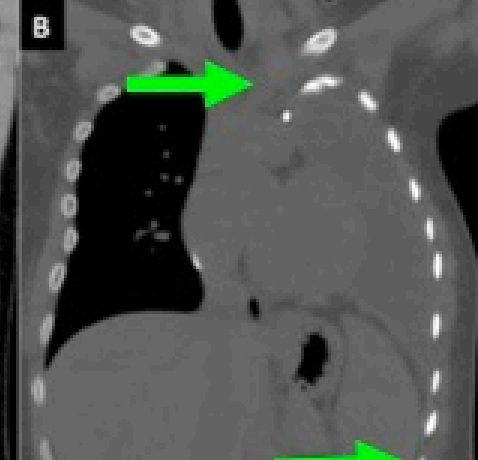
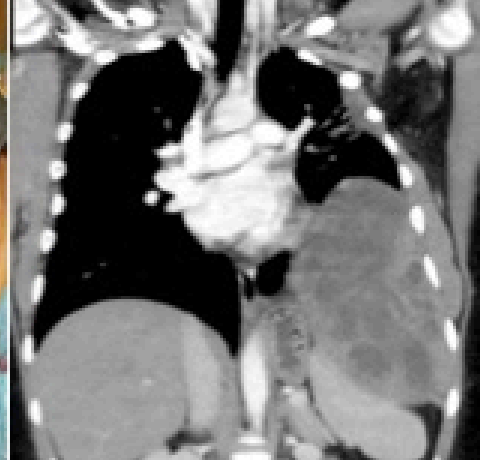
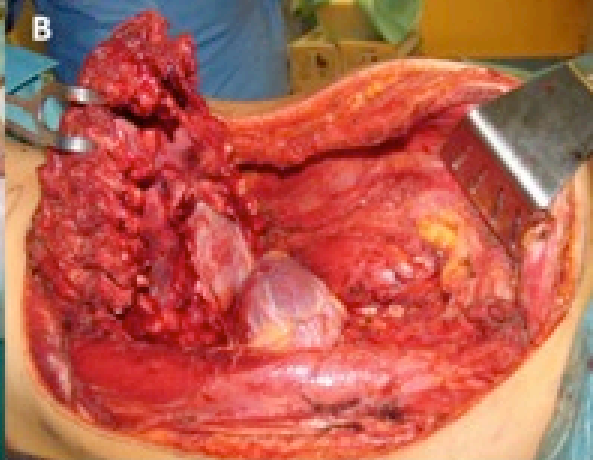
Eur J Thorac Cardiothoracic Surg 2010;37:1764-9

SURGERY FOR T3 – 4 LC: chest wall RECONSTRUCTION



**vertebral resection
and reconstruction
with rib-like prosthesis**





TPP / CW resections + rib-like prosthesis

ATS 92:1208, 2011

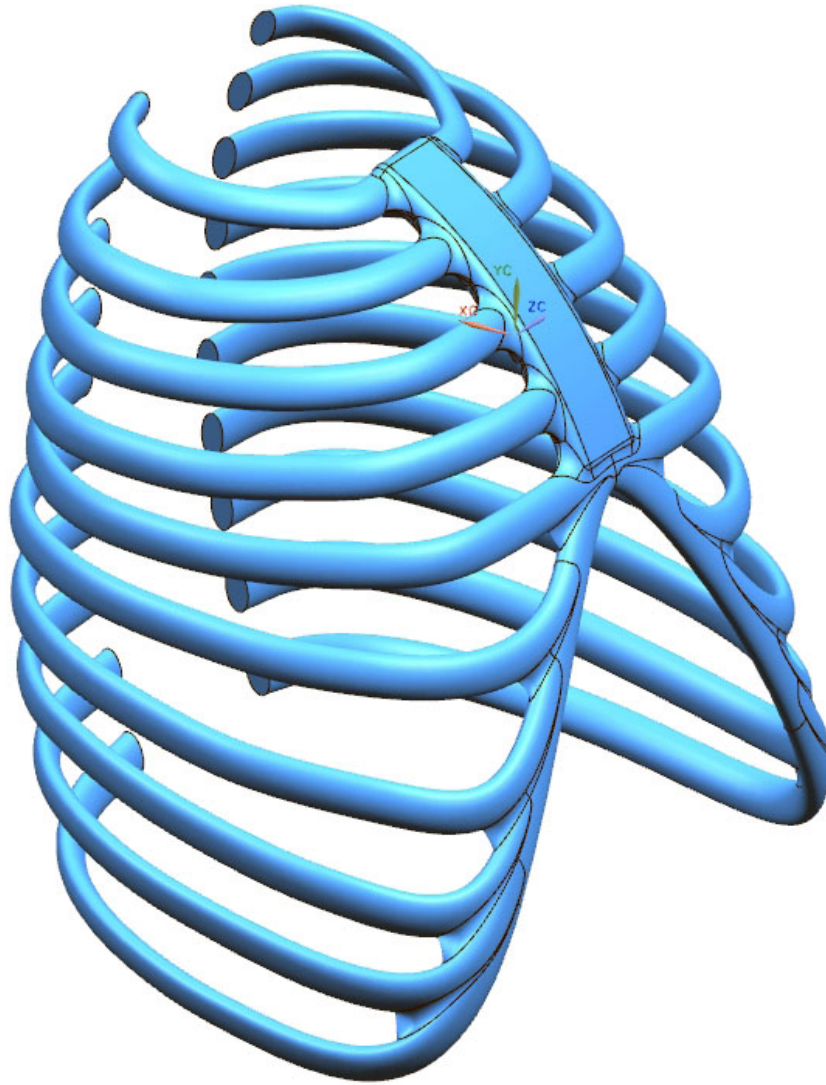
EJC 49:2689, 2013

ASO 21:1610 2014

TJ 102:89, 2016

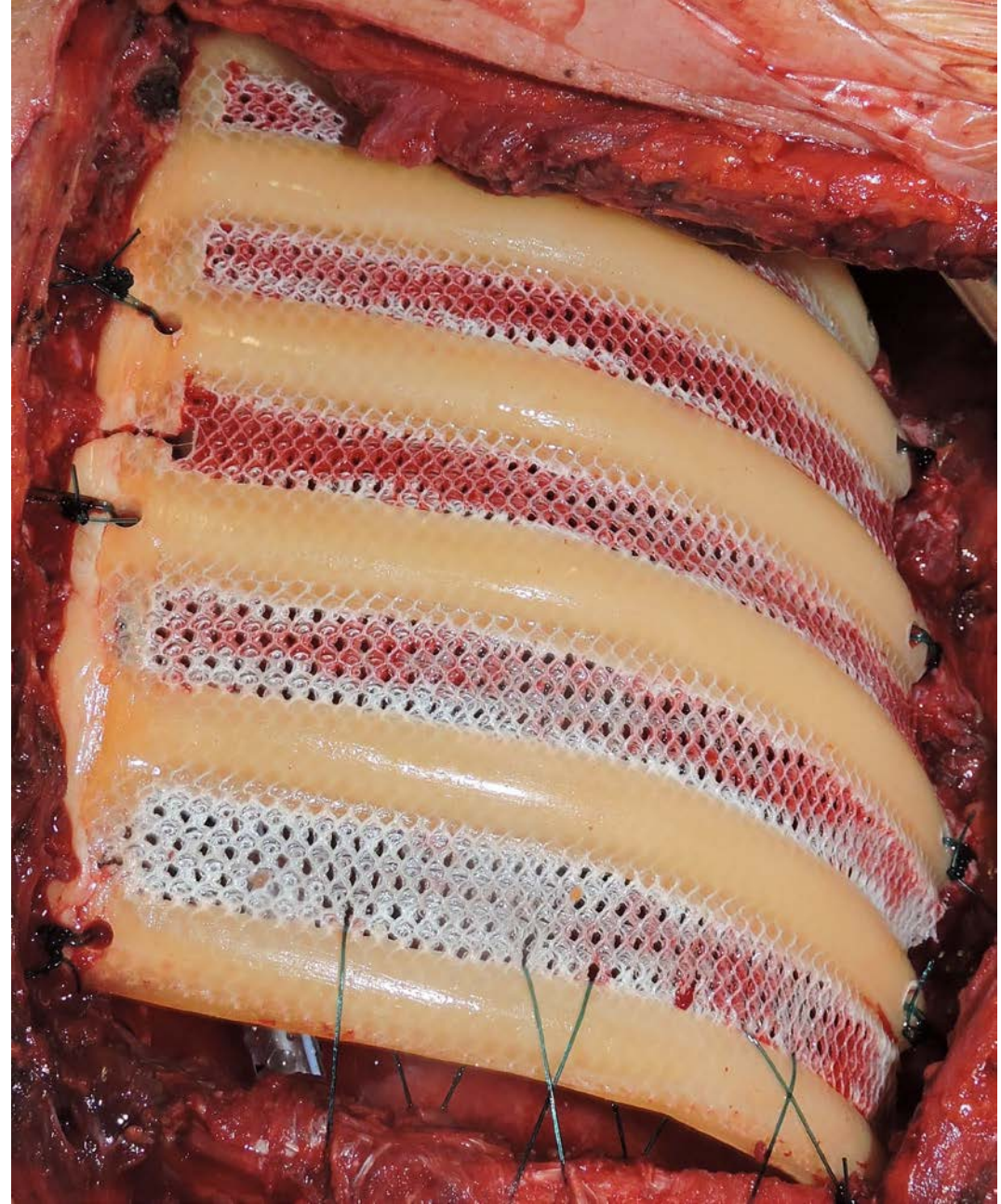
17-yr old boy with recurrent Ewing SA

SURGERY FOR T3 – 4 LC: chest wall RECONSTRUCTION



custom - made prosthesis

SURGERY FOR T3 – 4 LC: chest wall RECONSTRUCTION



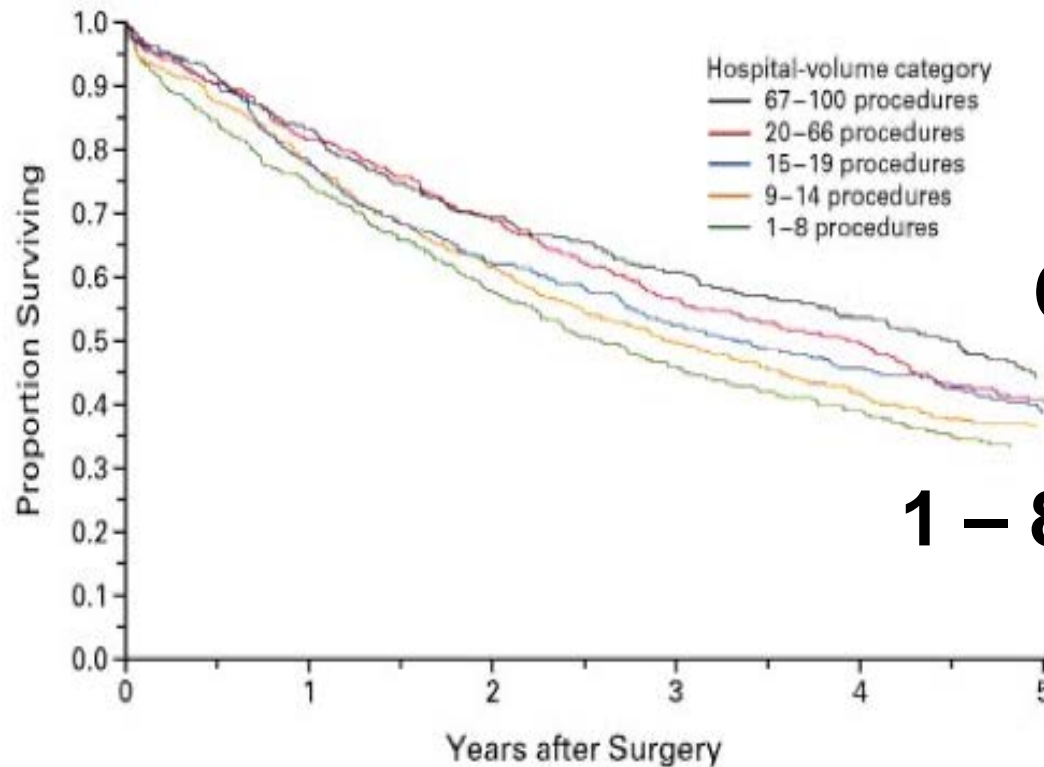


Special Treatment Issues in Non-small Cell Lung Cancer

**Diagnosis and Management of Lung Cancer,
3rd ed: American College of Chest Physicians
Evidence-Based Clinical Practice Guidelines**

Carefully selected patients with **central T4 tumors that do not have mediastinal node involvement are uncommon**, but **surgical resection appears to be beneficial** as part of their treatment rather than definitive chemoradiotherapy alone.

LUNG CANCER SURGERY: NUMBERS AND OUTCOME



67 - 100 procedures / year

1 – 8 procedures / year

No. AT RISK

67–100 procedures	381	320	266	209	162	102
20–66 procedures	457	379	319	233	182	117
15–19 procedures	407	323	256	194	140	94
9–14 procedures	466	374	290	216	163	115
1–8 procedures	407	309	242	173	128	83

**Bach P, N Engl J Med
2001;345:181**

SURGERY FOR LOCALLY ADVANCED NSCLC: MORTALITY (INTM)

2003 – 2015	#	30-day mortality
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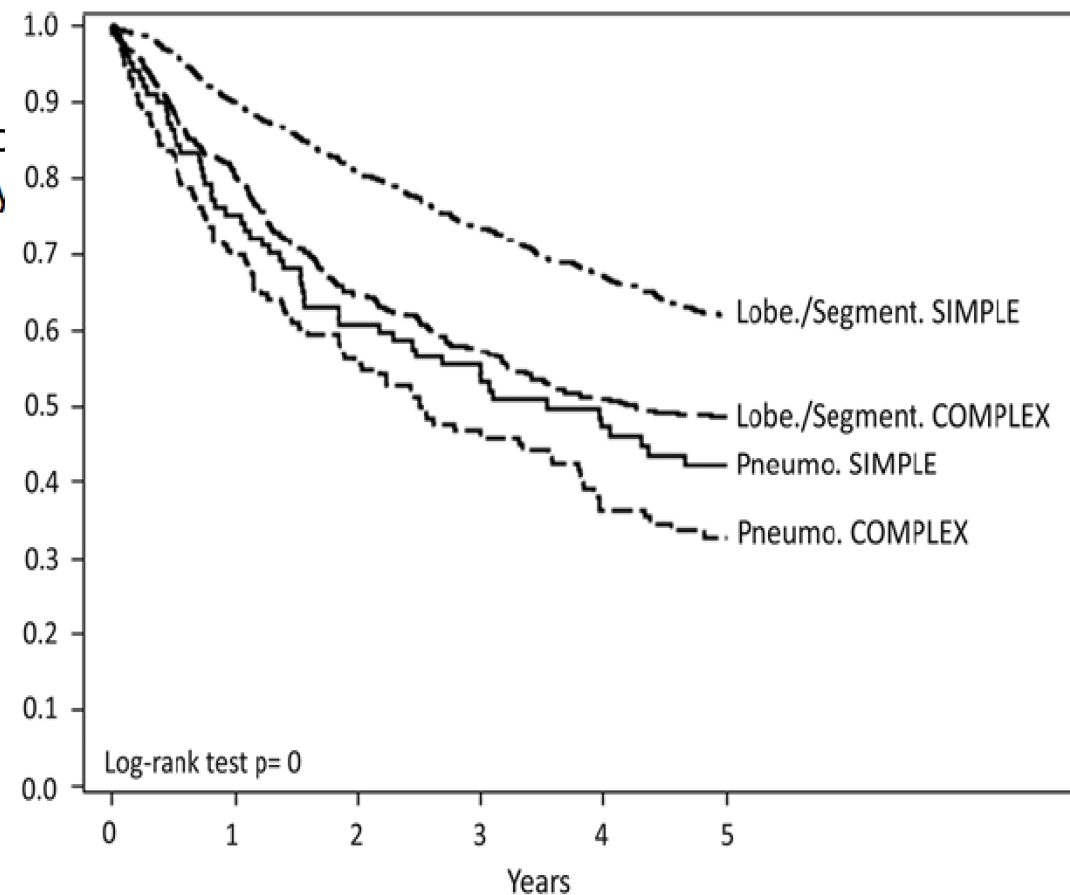
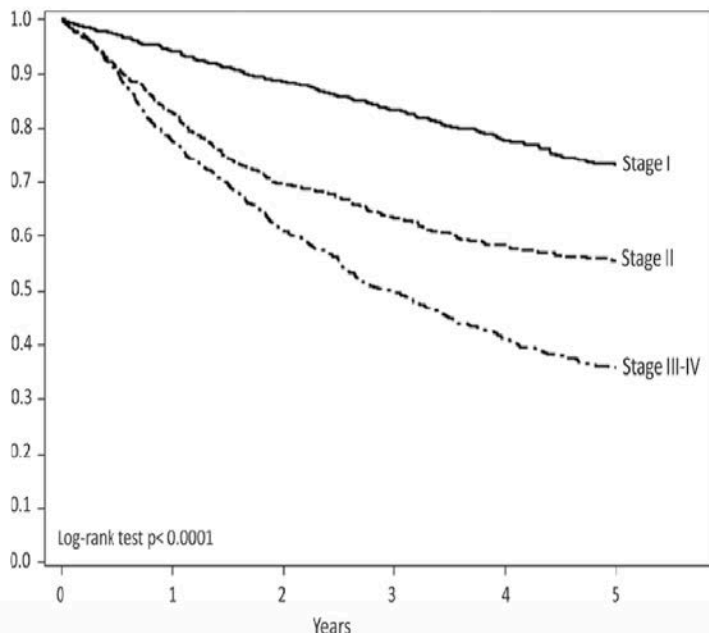
overall *	2548	1.4%
lobectomy	1916	1.1%
pneumonectomy	287	3.1%
right / extended	184	3.8%
simple lobe/segment	1800	0.7%
vascular reconstruction	99	2%
chest wall reconstruction	130	2.3%
other extended	164	4.3%

15%

* anatomical only: segment, lobe or pneumo

Thirty-day mortality and five-year survival in thoracic surgery: “real-world” assessment of outcomes from a single-institution audit

Methods: We analyzed the results of 4,234 first pulmc cancer (2,636), lung metastases (1,080), other primary follow-up of cancer patients was 4.1 years.



Thirty-day mortality and five-year survival in thoracic surgery: “real-world” assessment of outcomes from a single-institution audit

TABLE V - Thirty-day mortality (%) from large-scale and hospital series of lung cancer resections

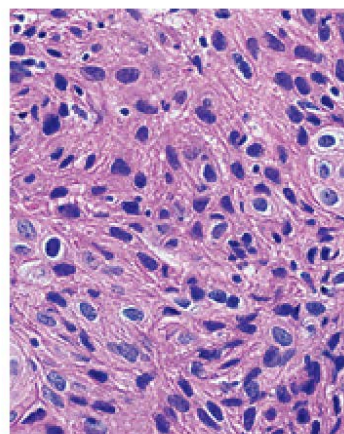
First author (ref.)	Years	Number	Lobectomy	Pneumonectomy
Birkmeyer (3)	1994-1999	16,785	6.4	17
Pastorino (19)	1998-2002	1,418	1.7	3.7
Kozower (16)	2002-2008	18,800	-	-
Falcoz (9)	2005-2010	19,556	6.1	12.9
Hu (1)	2006-2010	11,787	-	-
Brunelli (18)	2007-2015	47,960	2.3	6.8
INTM 2018	2003-2015	2,636	1.1	3.1

ORIGINAL ARTICLE

A Patient 1

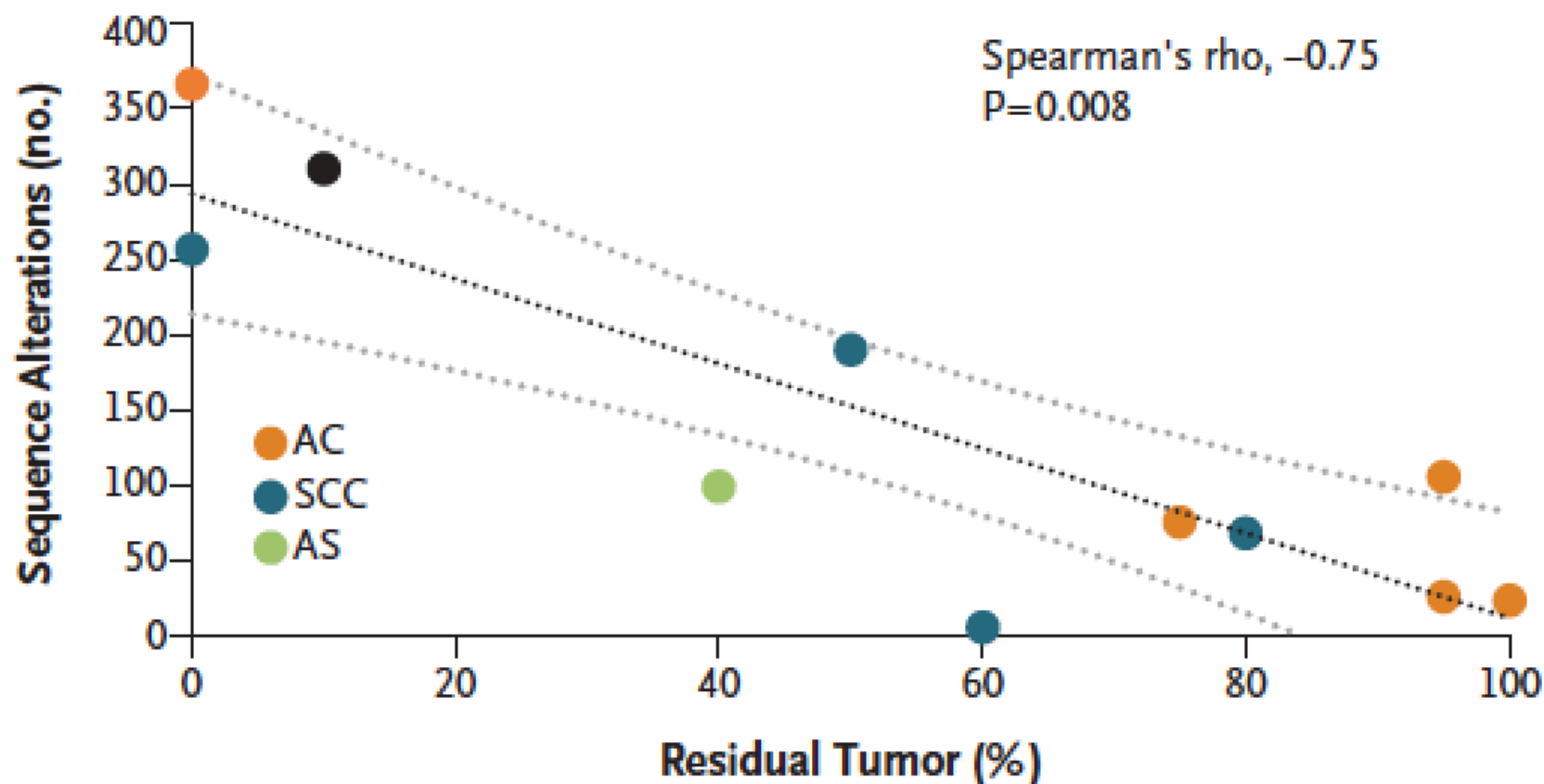


Pretreatment Image



Pretreatment Tumor B

B Correlation between No. of Sequence Alterations and Percentage of Residual Tumor



SURGERY FOR STAGE III NSCLC: SUMMARY

- technically feasible (R0) **in few cases**
- with acceptable morbidity / mortality
- highly selective & biology driven
- expert multi-disciplinary team
- In high-volume specialized centres
- **cost / effective balance vs. CT/RT**

Stage III NSCLC: multi-modality strategy

**how
select
the right
surgical
patient**

- multidisciplinary decision
- tri-modality staging
- response to induction CT or CT/RT
- adequate function & risk profile
- limited resection / reconstruction
- best RT planning / resistance