

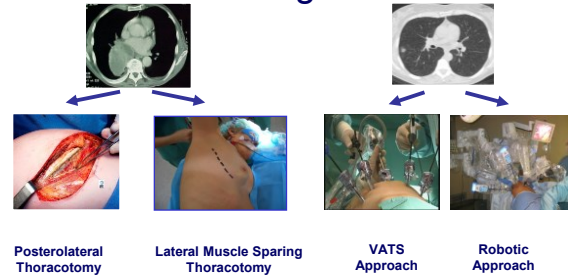
LA LINFOADENECTOMIA MEDIASTINICA NELLA CHIRURGIA DEL TUMORE POLMONARE: QUANTO DEVE ESSERE ESTESA

ROBOTICA

ACOI 2018
Roma, 14 – 18 ottobre 2018

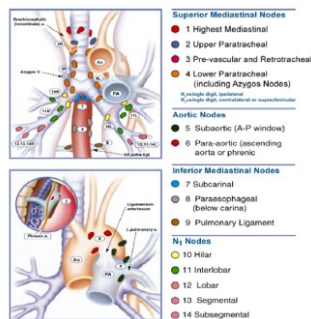
Domenico GALETTA, M.D., Ph.D.
Division of Thoracic Surgery
European Institute of Oncology, Milan - ITALY

Evolution of Surgical Treatment

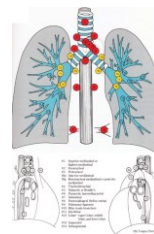


N status Lung Cancer

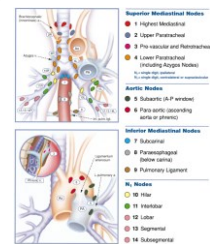
- Fattore prognostico
- Strategia terapeutica
 - Tipo/timing di chirurgia
 - Tipo di terapia adiuvante

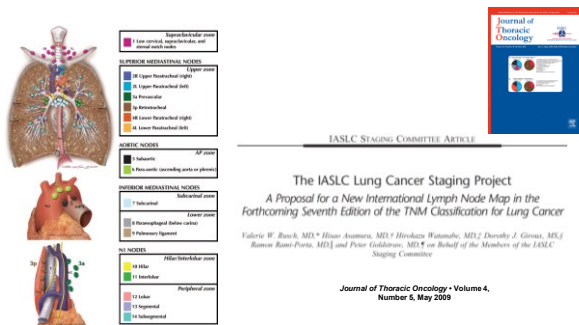


Lymph node mapping and curability at various levels of metastasis in resected lung cancer
Noruko T. Sumatsu K. Ishikawa S.
J Thorac Cardiovasc Surg 1978;76:833- 839



Regional Lymph Node Classification for Lung Cancer Staging
Clifton F. Mountain, and Carolyn M. Dresler
CHEST 1997; 111:1718-23





Definition of Lymph Node Dissection

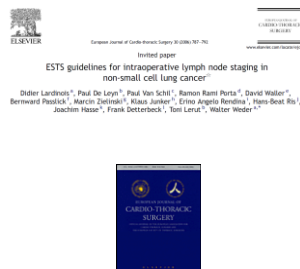
First, the definition of “lymph node dissection” should be reconfirmed. “Dissection” means to remove the tissue from adjacent organs and skeletonize the anatomic structures. Thus, “lymph node dissection” means the en block removal of all tissue that may contain cancer cells, including the lymph nodes and surrounding fatty tissue within anatomic landmarks such as the trachea, bronchus, superior vena cava, and the aorta and its branches, pulmonary vessels, and pericardium

In addition, “sampling” means a lesser excision of certain nodal stations that seem to be representative or abnormal in preoperative evaluations or intraoperative findings



Table 1 Definitions of lymph node dissection for lung cancer (ESTS guidelines) [12]

Term	Definition
Systematic nodal dissection (SND)	All the mediastinal tissues containing the lymph nodes are dissected and removed systematically within anatomical landmarks.
Selected lymph node biopsy	One or multiple suspicious lymph node(s) are biopsied. This is only justified to prove N1 or N2 disease in patients in whom resection is not possible (exploratory thoracotomy).
Sampling	Removal of one or more lymph nodes guided by preoperative or intraoperative findings which are thought to be representative.
Systematic sampling (SS)	Predetermined selection of the lymph node stations specified by the surgeon.
Lobe-specific systematic node dissection	The mediastinal tissue containing specific lymph node stations are excised, depending on the lobar location of the primary tumor.
Extended lymph node dissection	Bilateral mediastinal and cervical lymph node dissection is performed through median sternotomy and cervicotomy.



Quale linfadenectomia? Sampling vs SND

Prospettici
NON randomizzati

Prospettici
randomizzati

Author	Year reported	Patient	Number of patient (SND/sampling)	Median follow-up time	Results (SND/sampling)
Keller [14]	2000	Completely resected stage II-IIIa NSCLC	773 (36/147)	64 months	Median survival 27.5/29.2 months, $p = 0.008$
Lundquist [40]	2005	Clinical T1-T2a NSCLC	180 (20/55)	89 months	Median survival 61.7/60.9 months, $p = 0.4$
Author	Year reported	Patient	Number of patient (SND/sampling)	Median follow-up time	Results (SND/sampling)
Lefebvre [46]	1998	Operable NSCLC	169 (76/93)	47.3 months	HR = 0.76, $p = 0.273$
Sugi [47]	1998	Preoperative NSCLC less than 2 cm in size	115 (15/100)	65 months	5-year survival rate 81.4 %/80.9 %, $p = NS$
Wu [48]	2002	Clinical stage I-IIa NSCLC	471 (38/213)	NA	5-year survival rate 48.4 %/37.0 %, $p = 0.0003$
Darling [34]	2011	N0 or non-biopsy N1 NSCLC	1023 (525/498)	6.5 years	Median survival 8.5/8.1 years, $p = 0.522$

Quale linfadenectomia? Sampling vs SND

Prospettici
NON randomizzati

Author	Year reported	Patient	Number of patient (SND/sampling)	Median follow-up time	Results (SND/sampling)
Keller [16]	2005	Completely resected stage II-IIIa NSCLC	373 (186/187)	65 months	Median survival: 57.3/29.2 months, $p = 0.008$
Lundquist [40]	2005	Clinical T1-T2b-N0 NSCLC	100 (50/50)	89 months	Median survival: 81.5/69.9 months, $p = 0.4$

Author	Year reported	Patient	Number of patient (SND/sampling)	Median follow-up time	Results (SND/sampling)
Isobe et al [46]	1998	Operable NSCLC	169 (76/93)	47.3 months	RR = 0.76, $p = 0.273$
Sugi [47]	1998	Pathological NSCLC less than 2 cm in size	118 (58/60)	65 months	5-year survival rate: 81.4 %/83.9 %; $p = NS$
Wu [48]	2002	Clinical stage I-IIIa NSCLC	471 (240/231)	NA	5-year survival rate: 48.4 %/37.0 %; $p = 0.0003$
Darling [34]	2011	N0 or non-lobar N1 NSCLC	1023 (525/498)	6.5 years	Median survival: 8.5/8.1 years, $p = 0.25$

Prospettici
randomizzati

Quale linfadenectomia? Sampling vs SND

Prospettici
NON randomizzati

Author	Year reported	Patient	Number of patient (SND/sampling)	Median follow-up time	Results (SND/sampling)
Keller [16]	2005	Completely resected stage II-IIIa NSCLC	373 (186/187)	65 months	Median survival: 57.3/29.2 months, $p = 0.008$
Lundquist [40]	2005	Clinical T1-T2b-N0 NSCLC	100 (50/50)	89 months	Median survival: 81.5/69.9 months, $p = 0.4$

Author	Year reported	Patient	Number of patient (SND/sampling)	Median follow-up time	Results (SND/sampling)
Isobe et al [46]	1998	Operable NSCLC	169 (76/93)	47.3 months	RR = 0.76, $p = 0.273$
Sugi [47]	1998	Pathological NSCLC less than 2 cm in size	118 (58/60)	65 months	5-year survival rate: 81.4 %/83.9 %; $p = NS$
Wu [48]	2002	Clinical stage I-IIIa NSCLC	471 (240/231)	NA	5-year survival rate: 48.4 %/37.0 %; $p = 0.0003$
Darling [34]	2011	N0 or non-lobar N1 NSCLC	1023 (525/498)	6.5 years	Median survival: 8.5/8.1 years, $p = 0.25$

Prospettici
randomizzati

Quale linfadenectomia?

Funatsu T, JTCVS 1998 → at least 10 lymph nodes from 2 or more MNL stations

Gajra A, JCO 2003 → at least 6 lymph nodes from 3 or more MLN stations

Whitson, Ann Thor Surg 2007 → at least 10 lymph nodes from 3 or more MLN stations

Quale linfadenectomia?

IASLC Staging Committee standards for adequate lymph node removal based on tumor location (Rami Porta, Lung Cancer, 2005)

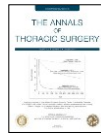
- right upper and middle lobe cancers: #7 and at least 2 of 3 stations from the #2R and #4R
- right lower lobe tumors: #7, and #4R and either #8R or #9R;
- left upper lobe tumors: #7, #8L, #5, and #6
- left lower lobe cancers: #7, #8L, and #9L

The IASLC recommends removal of at least 6 lymph nodes, 3 N1, 3 N2, 1 of which must be the subcarinal station

Morbidity, Survival, and Site of Recurrence After Mediastinal Lymph-Node Dissection Versus Systematic Sampling After Complete Resection for Non-Small Cell Lung Cancer

Didier Lardinois, MD, Hans Suter, MD, Hassan Hakki, MD, Valentin Rousson, PhD, Daniel Betticher, MD, and Hans-Beat Ris, MD

Ann Thorac Surg 2005;80:268-74



- Migliora il DFS negli stadi precoci NSCLC
- Migliora il controllo locale
- Non aumenta significativamente la morbidità

**RADICAL LYMPH NODE
DISSECTION IS THE GOLD
STANDARD FOR THE TREATMENT
OF LUNG CANCER**

ma...

... è fattibile in chirurgia robotica così
come in chirurgia open?

Initial consecutive experience of completely portal robotic pulmonary resection with 4 arms

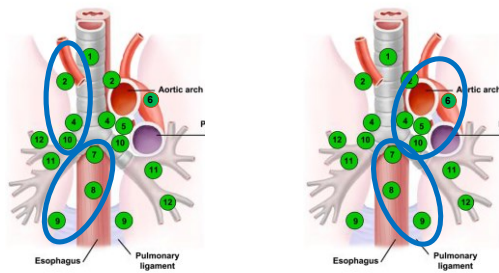
Robert J. Cerfolio, MD, FACS, FCCP, Ayesha S. Bryant, MD, MSPH, Lori Skylizard, MD, and Douglas James Minnich, MD, FACS



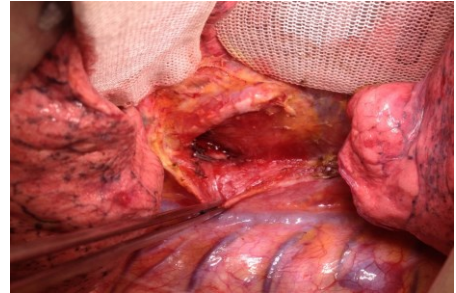
J Thorac Cardiovasc Surg 2011;142:740-6

	Robotic operation (N = 186)	Rob- and nerve-sparing thoracotomy (N = 218)	P value
Estimated blood loss (mL, median $\pm$ SD)	30 $\pm$ 36	90 $\pm$ 122	.03
Operative time (h, median $\pm$ SD)	2.2 $\pm$ 1.0	1.5 $\pm$ 0.8	<.001
No. of mediastinal (N2) lymph node stations removed (median)	5	5	>.999
No. of mediastinal (N2) lymph nodes removed (median)	12	11	.906
No. of N1 lymph node stations removed (median)	3	3	>.999
No. of N1 lymph nodes removed (median)	5	4	.89
Clamp time duration (d, median and range)	1.3 (1-4)	3.0 (1-40)	<.001
Hospital stay (d, median and range)	2.0 (1-7)	4.0 (1-47)	.01
Morbidity (no.)	28 (27%)	120 (38%)	.05
Operative mortality (no.)	0	11 (3%)	.11
Verbal pain score 3 wk postoperatively (median and range)	2.5 (0-7)	4.4 (0-8)	.04

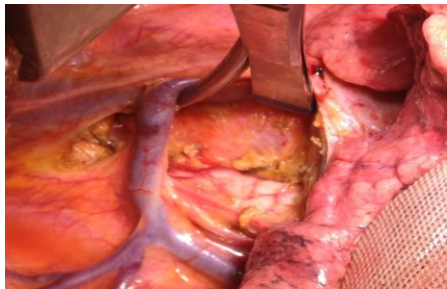
No difference in lymph node dissection



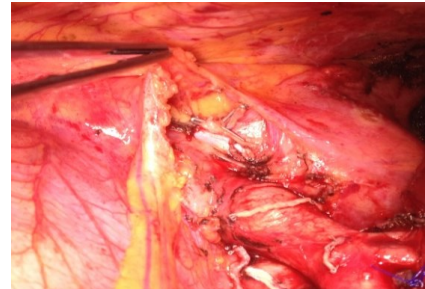
Linfoadenectomia sottocarenale



Linfoadenectomia paratracheale dx

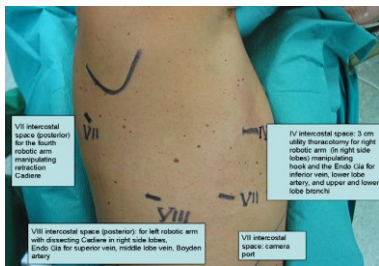


Linfoadenectomia finestra Ao-P



Linfoadenectomia Robotica

POSIZIONE



Linfoadenectomia Robotica

Da Vinci Robotic System



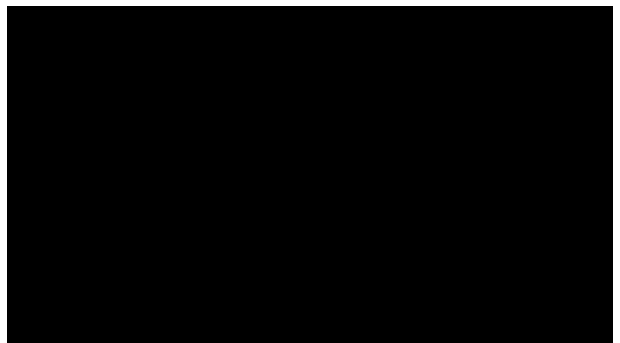
Da Vinci Si

Da Vinci Xi



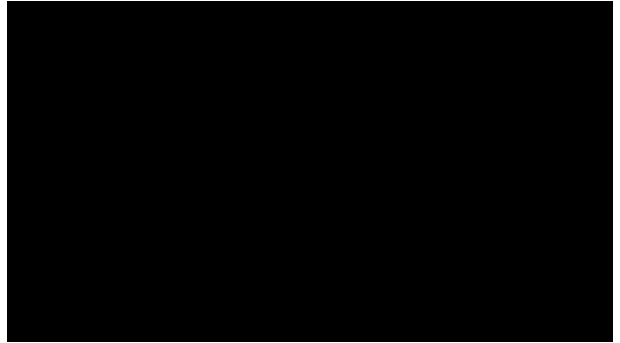
Linfoadenectomia Robotica

Ilo-mediastinica sinistra



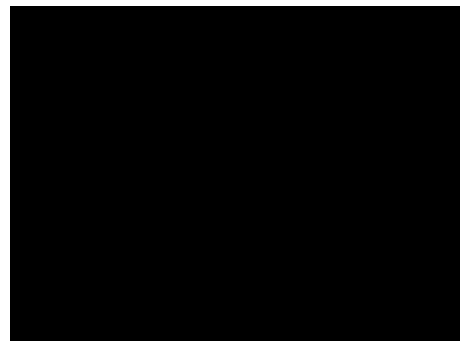
Linfoadenectomia Robotica

Sottocarenale sinistra



Linfoadenectomia Robotica

**Mediastinica destra
(#R2, #R4, #7)**



The Prevalence of Nodal Upstaging During Robotic Lung Resection in Early Stage Non-Small Cell Lung Cancer

Jennifer L. Wilson, MD, Brian E. Louie, MD, Robert J. Cerfolio, MD, Bernard J. Park, MD, Eric Vallieres, MD, Ralph W. Aye, MD, Ahmed Abdel-Razek, MD, Ayesha Bryant, MD, and Alexander S. Farivar, MD

Ann Thorac Surg 2014;97:1901-7

302 patients

Pathologic nodal upstaging occurred in 33 patients (10.9%)

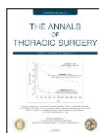
pN1 6.6%;

pN2 4.3%

Hilar (pN1) upstaging

	Robot	Vats	Thoracotomy
cT1a	3.5	5.2	7.5
cT1b	8.6	7.1	8.8
cT2a	10.8	5.7	11.5

The rate of nodal upstaging for robotic resection appears to be superior to VATS and comparable to thoracotomy



Ten Years' Experience in Robotic-Assisted Thoracic Surgery for Early Stage Lung Cancer

Monica Casiraghi¹, Domenico Galetta¹, Alessandro Boni¹, Adele Tessitore¹, Rosalia Romano¹, Cristina Diotti¹, Daniela Brambilla¹, Patrick Maisonneuve², Lorenzo Spaggiari^{1,3}

Thorac Cardiovasc Surg 2018;Apr;doi: 10.1055/s-0038-1639575

339 patients underwent RATs for clinical stage I (n=318) or II (n=21) NSCLC

Overall median N1+N2 station resected was 5 (range 1-8)
Overall median N1+N2 lymph nodes resected was 15 (1-55)

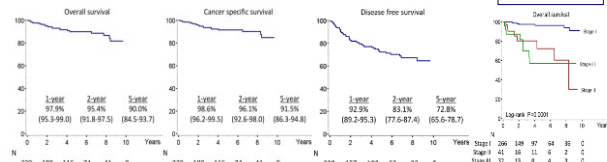
Pathological upstaged → 17.6% (56/317)

Ten Years' Experience in Robotic-Assisted Thoracic Surgery for Early Stage Lung Cancer

Monica Casiraghi¹, Domenico Galetta¹, Alessandro Boni¹, Adele Tessitore¹, Rosalia Romano¹, Cristina Diotti¹, Daniela Brambilla¹, Patrick Maisonneuve², Lorenzo Spaggiari^{1,3}

Thorac Cardiovasc Surg 2018;Apr;doi: 10.1055/s-0038-1639575

Median follow-up of 2.4 years (0.1-9.7)



Conclusioni

- La moderna medicina e la diffusione dei programmi di screening richiedono un trattamento meno invasivo per i tumori polmonari in stadio precoce
- L'approccio robotico consente di eseguire una corretta e completa linfadenectomia ilo-mediastinica come in toracotomia e VATS
- La lobectomia robotica con la dissezione linfonodale è sicura ed è associata ad un tasso di upstaging maggiore rispetto alla VATS