

Ten years' experience in robotic thoracic surgery for early stage lung cancer: evolution and lessons learned

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Background

- Minimally-invasive surgery is undoubtedly the future of thoracic surgery
- Despite different studies already demonstrated that robotic assisted surgery (RATS) was associated with reductions in mortality, length of stay, and overall complication rates, only few studies evaluated oncological outcomes such as long-term survival

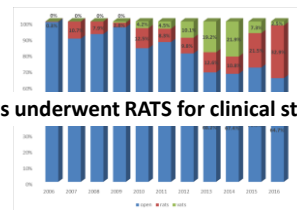
Study Objective

The objective of this study was to evaluate the impact of RATS for early stage non-small cell lung cancer (NSCLC) in term of short and long term outcomes

Methods

From 2006 to 2016, at our Division of Thoracic Surgery, 3093 patients underwent anatomical lung resection for NSCLC

339 patients underwent RATS for clinical stage I-II NSCLC



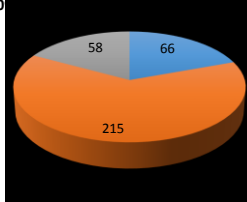
Methods

From 2006 to 2016, 339 patients underwent RATS for clinical stage I-II NSCLC

Da Vinci S
(2006-2008)

Da Vinci Si
(2009-2013)

Da Vinci Xi
(2015-2016)



■ Da Vinci S
■ Da Vinci Si
■ Da Vinci Xi

Methods

From 2006 to 2016, 339 underwent patients RATS for clinical stage-I NSCLC



Utility incision
(3 cm)

Camera port

- Lateral position
- Robot placed at the head posteriorly
- Four-arm technique
- 3 thoracoscopic incision + a small utility incision
- Camera port: VII space mid axillary line



Results

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

	All N=339	Pneumonectomy N=3	Lobectomy N=307	Segmentectomy N=29
IA	254 (77.9)	1 (33.3)	236 (76.9)	27 (93.1)
IIA	17 (5.0)	1 (33.3)	16 (5.2)	-
Histology				
Squamous cell carcinoma	40 (11.8)	-	38 (12.4)	2 (6.9)
Other types	13 (3.8)	-	5 (1.6)	-
Median (range)	18 (3-98)	45 (23-98)	19 (3-85)	13 (6-34)
Q (95)	2 (0.6)	-	1 (0.3)	1 (3.4)
IB	82 (24.2)	-	75 (24.4)	7 (24.1)
IB	10 (3.0)	-	9 (2.9)	1 (3.4)

22 conversions (6.5%):

4 (1.2%) oncological reasons
3 (0.9%) bleeding
15 (4.4%) technical issue

	Pneumonectomy N=3	Lobectomy N=286	Segmentectomy N=28
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Median length of stay was 5 days (range 2-191)

Results

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)

28 patients from cN0 to pN1
22 patients from cN0 to pN2
6 patients from cN1 to pN2

Results

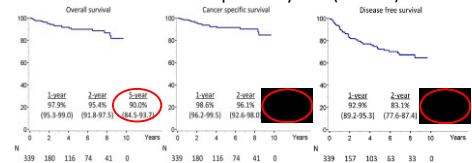
Early complication (within 30 days) n=87 pts (25.0%)		Late complication (after 30 days) n=7 (2.1%)	
Minor (24.5%)	Major (2.4%)		
Prolonged air leak	ARDS/pneumonia	Pneumothorax	3 (0.8%)
Atrial fibrillation	Re-thoracotomy (air leak)	Pulmonary embolism	2 (0.6%)
Bronchial toilette	Pulmonary embolism	Wound infection	1 (0.3%)
Anemia with transfusion	Cardiac arrhythmia	Bronchopleural fistula *	1 (0.3%)
Dysphonia			

* Converted patient

The 30-day and 90-day operative mortality was 0% and 0.3%, respectively

Results

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



58 (18%) recurrences:

- 16 local (ipsilateral) → 8 patients new pulmonary nodule, 5 lymph node relapses, and 3 pleural metastases
- 27 regional (contralateral)
- 15 distant metastasis

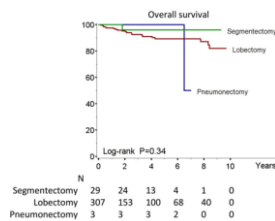
Results

5-year OS

Segmentectomy → 96.2%

Lobectomy → 89.1%

Pneumonectomy → 100%



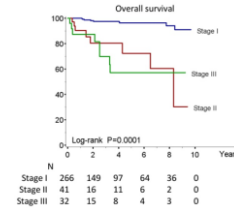
Results

5-year stage specific survival

STAGE I → 96.4%

STAGE II → 76.4%

STAGE III → 57.8%



Conclusions



- Very low morbidity and mortality rates
- Mediastinal lymph node dissection adequately assesses lymph node stations detecting occult lymph node metastasis and leading to excellent oncologic results
- Excellent five-year OS and cancer-specific survival rates of 90% and 91.5%

RATS was performed by different surgeons with different ages and experience, showing the feasibility of the technique and the same short and long-term outcomes

Thank you!!

