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Sublobar Resection is Equivalent to Lobectomy for Clinical Stage IA Lung Cancer

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SLR vs. LR for Clinical Stage IA

- Lobectomy established as the standard of care since 1994
- Renewed interest in sublobar resection
 - More advanced staging modalities
 - Detection of smaller tumors
 - Aging population



Objective

To compare the survival of patients with clinical stage 1A treated with LR or SLR in the International Lung Cancer Action Program (I-ELCAP).



I-ELCAP is an international study that prospectively enrolls eligible individuals in participating screening programs using a common protocol that provides for data pooling.



I-ELCAP Screening Participants

- Asymptomatic
- Individual deemed by LMD suitable for thoracic surgery
- Base-line and annual repeat CT



Methods

- Retrospective review of a prospectively enrolled cohort
- Demographic, clinical, surgical and pathological data
- Co-morbidities were self reported
- Imaging information
 - Staging
 - Presence/extent of emphysema
 - Presence/extent CAC



End-points

- Lung cancer specific survival
- Overall recurrence rate



Results

- Clinical stage IA : 348 patients

LR: 294 SLR: 54 (38 wedge resection)

- Median age

LR: 63 yrs SLR: 65 yrs

- Most were Caucasian men

- Median pack year

LR : 48 SLR: 49



Comorbidities

	Lobectomy (294)	SLR (54)	P Value
Cardiac	17 (6%)	6 (11%)	0.15
Vascular	62 (21%)	12 (22%)	0.85
COPD	45 (15%)	14 (26%)	0.06
DM	25 (9%)	4 (7%)	1.00
Other Cancers	40 (14%)	7 (13%)	0.9
Other	58 (20%)	10 (19%)	0.84



Imaging Information

	LR	SLR	P Value
Clinical Tumor Size			
• ≤ 20 mm	256 (87%)	51 (94%)	0.12
• 21-30 mm	38 (13%)	3 (6%)	
Peripheral Location	205 (69%)	39 (74%)	0.71
Emphysema			
• Any	140 (48%)	25 (46%)	0.86
• Severe	13 (4%)	2 (4%)	1.00
CAC			
• Any	154 (52%)	27 (50%)	0.75
• Score 4-12	54 (18%)	14 (26%)	0.20



Pathological Variables

	LR	SLR	P Value
Path Tumor Size			
• ≤ 20 mm	239 (81%)	50 (93%)	0.04
• 21 – 30 mm	55 (19%)	4 (7%)	
Carcinoma Cell Type			
• Adenocarcinoma	191 (65%)	37 (69%)	0.74
• Squamous Cell	72 (24%)	11 (20%)	
• Large Cell	25 (9%)	4 (7%)	
• Other	6 (2%)	2 (4%)	
P. Invasion	80 (27%)	10 (19%)	0.18
LVI	53 (18%)	6 (11%)	0.21



Pathological Variables

	LR	SLR	P-Value
T₁: ≤ 30mm without pleura invasion	197 (67%)	41 (76%)	0.63
T_{2a}: ≤ 30mm & pleural invasion	75 (26%)	10 (18%)	
T_{2a}: > 30 mm without pleural invasion	5 (2%)	1 (2%)	
T₃: ≤ 30 mm & add'l Ca in same lobe	16 (5%)	0 (0%)	
T₃: ≤ 30 mm & add'l Ca in ipsilateral lobe	1 (0%)	2 (4%)	



Pathological Variables

	LR	SLR	P-Value
N Status			
N₀	267 (91%)	52 (96%)	0.22
N₁	18 (6%)	0 (0%)	
N₂	8 (3%)	2 (4%)	
N₃	1	0	
Med. Nod resection			
• Any	231 (78%)	30 (56%)	0.0003
• # stations	2	1	

Path stage I : 86% / 93%



Deaths

	LR	SLR
Hospital Deaths	3 (1.0%)	0
Lung Cancer Deaths	26 (9%)	4 (7%)
All causes	64 (22%)	9 (17%)

Hospital mortality 3/348 (0.9%)

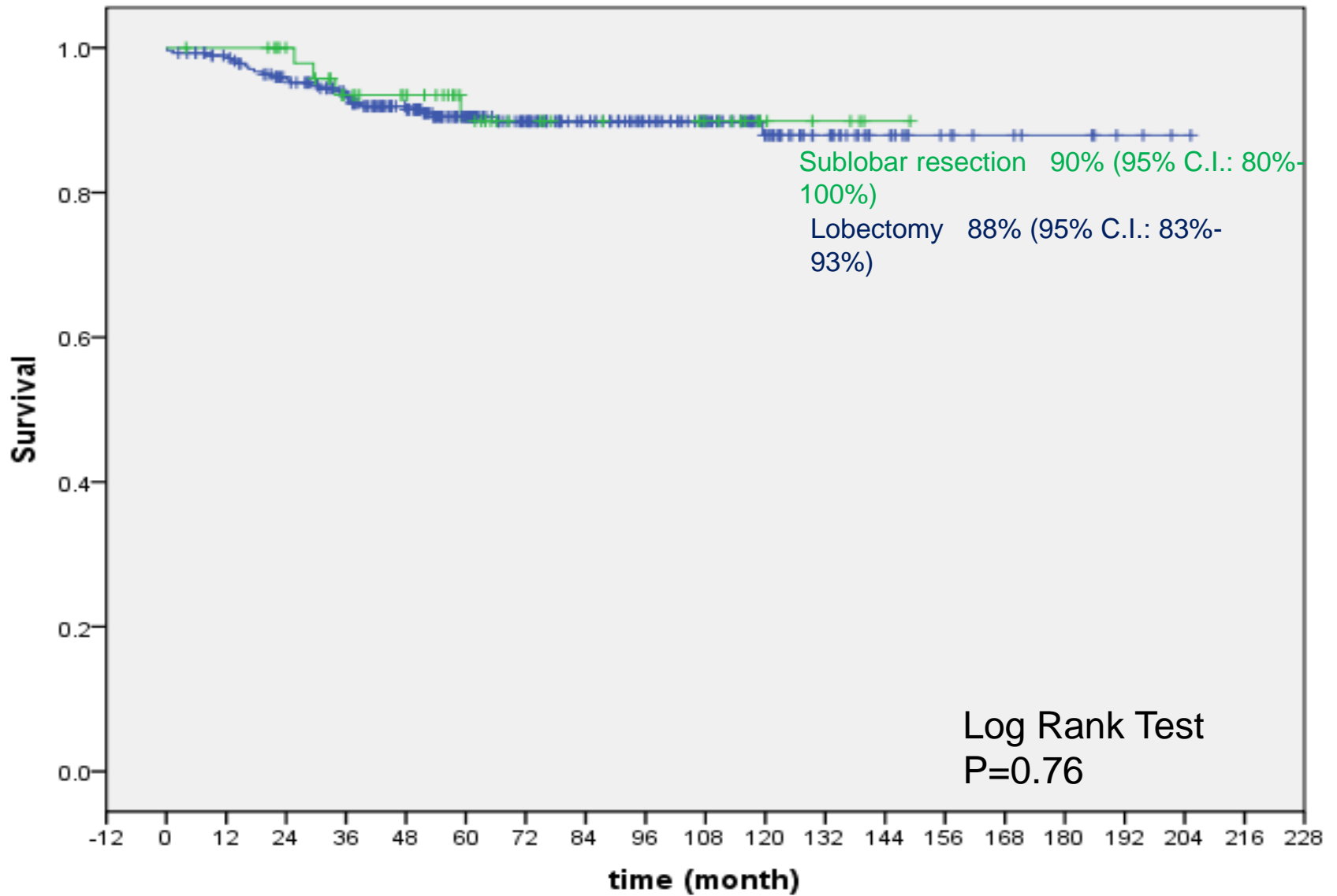


Recurrence

- Lobar resection : 32 (11%)
- Sublobar resection : 8 (15%)
- All recurrence after wedge resection 21% vs 0%

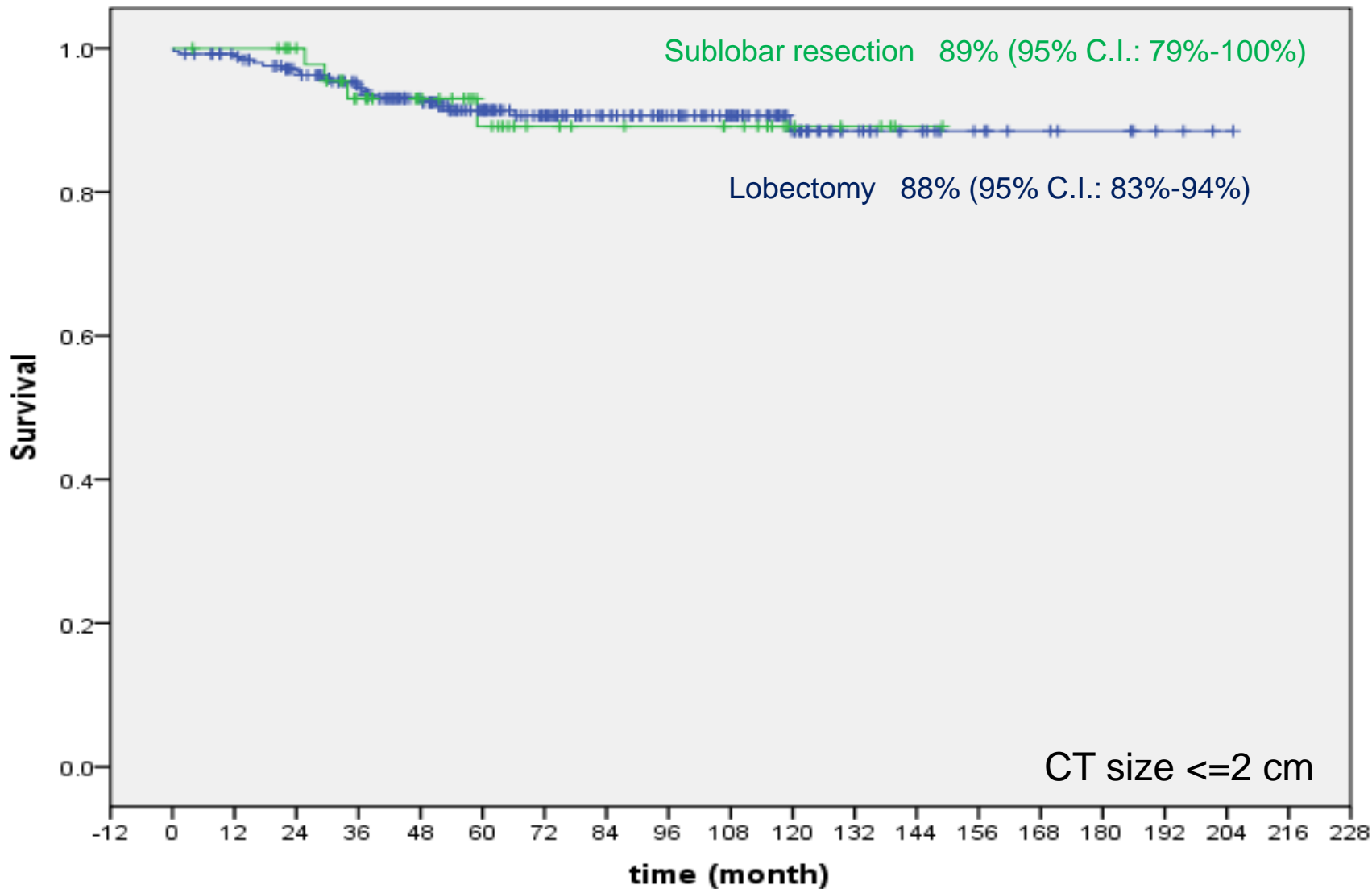
P Value: 0.40





Lobectomy	282	270	250	227	197	159	131	105	86	69	45	29	18	11	8	6	3	1	0
Sublobar resection		53	52	47	39	34	25	19	16	15	12	6	4	1	0	0	0	0	0





Lobectomy	251	242	225	203	176	141	118	95	80	64	40	25	18	11	8	6	3	1	0
Sublobar resection	50	49	44	36	31	23	17	15	14	12	6	4	1	0	0	0	0	0	0



Cox Regression Analysis

Covariates	HR Estimate		P-Value
	Point	Interval (95%)	
Sub-lobar resection	0.8	(.3-2.2)	0.60
Age (in decade)	2.9	(1.7-4.8)	<0.0001
Severe Emphysema	4.2	(1.5-11.5)	0.005
CAC Score 4-12	1.1	(0.5-2.5)	0.81
Pleura Invasion	1.9	(0.9-3.8)	0.07
Angiolymphatic Invasion	2.4	(1.1-5.0)	0.03



Summary

- In this screen detected cohort of stage 1A NSCLC , lobar and sub-lobar resections were associated with equivalent lung cancer specific survival and equivalent rates of overall recurrence .
- Wedge resection as a modality of sub-lobar excision seems to be associated with a higher rate of recurrence than anatomical segmentectomy .
- The frequency of assessment of the mediastinal nodes remains suboptimal even in the hands of qualified thoracic surgeons .
- The overall low rate of hospital mortality in this multicenter study represents what is achievable in screening centers of excellence

