

Does Induction Treatment Influence Postoperative Results after Completion Pneumonectomy for Non-Small Cell Lung Cancer?

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BACKGROUND (I)

- Completion pneumonectomy (CP) is the removal of the remaining lung after a first lung resection procedure done to treat benign and malignant disease
- CP results in higher mortality and morbidity rates compared to standard pneumonectomy, with operative mortality rate of up to 21%

BACKGROUND (II)

- Indication for CP are expanding as a result of the rising incidence of lung cancer, increased survival rates after pulmonary resection for NSCLC, and improvement in management of these patients
- Preoperative workup test, anesthesia techniques, and postoperative management have improved in recent years, opening up the possibility that morbidity and mortality rates associated with CP may have decreased

OBJECTIVE

To evaluate if induction treatments (IT) (chemotherapy or radiotherapy) may affect postoperative outcome and long-term results

METHODS

- We reviewed the medical records of all patients who underwent CP for NSCLC between January 1998 and December 2015
- Factors affecting operative mortality and postoperative morbidity were analyzed using univariate and multivariate analysis
- Kaplan-Meier method was used to calculate the expected survival rates after CP

PATIENTS CHARACTERISTICS

- N° of patients 61
- Median age 63 (range, 19-83 yrs)
- Sex ratio 46 M / 15 F
- Preoperative treatment
 - No treatment 37 (60.7%)
 - Chemotherapy 18 (29.5%)
 - Chemo-Radiotherapy 6 (9.8%)

PATIENTS CHARACTERISTICS

- Reason of CP
 - Second primary 39 (63.9%)
 - Recurrence 22 (36.1%)
- Time after first operation 28 m (1 – 83 m)
- First Operation
 - RUL 19 (31.1%, 3 sleeves)
 - ML 6 (9.8%)
 - RLL 11 (18.0%)
 - Bilobectomy 4 (6.6%)
 - LUL 12 (19.7%)
 - LLL 4 (6.6%)
 - Segmentectomy/Wedge 5 (8.2%)

SURGICAL RESULTS

- Side 40 R / 21 L
- Complete resection 61/61 (100%)
- Extended resection 15 (24.6%)
 - Chest wall 5
 - Pulmonary artery 4
 - Left atrium 3
 - Diaphragm 2
 - Aorta 1
- Tracheal sleeve CP 4 (6.6%)

MORTALITY and MORBIDITY

• Mortality

intraoperative	0
30-day	2 (3.3%)

• Morbidity

	21 (34.4%)
Major complications	4 (6.6%)
BPF	1
Diaphragmatic hernia	1
Cardiac dislocation	1
TIA	1
Minor complications	17 (27.8%)
Pulmonary	9 (14.7%)
Cardiac	6 (9.8%)
Neurological	2 (3.3%)

POSTOPERATIVE RESULTS

• Histology

Squamous cell ca.	19 (26.5%)
Adenoca.	31 (38.2%)
Others	11 (32.3%)

• pStage

I	17 (27.8%)
II	32 (52.5%)
III	12 (19.7%)

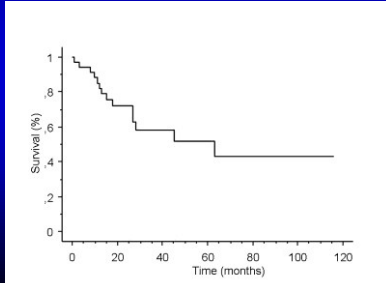
- ICU stay (median, range) 1 day (0-37 days)
- Hospital stay (median, range) 8 days (5-40 days)

Variable	IT (n = 24)	No IT (n = 37)	p value
Age (y, #SD)	62.70(6.22)	61.62(5.86)	0.76
Sex (M/F)	18M/6F	20M/7F	0.85
Site (R/L)	15/9	25/12	0.52
FEV1 (mean % predicted, #SD)	81.72(12.16)	80.46(13.85)	0.65
FVC (mean % predicted, #SD)	79.73(16.98)	80.62(14.67)	0.73
DLCO (mean % #SD)	76.90(15.23)	78.45(16.08)	0.69
Histology (%)			
Squamous	8 (33.3)	11 (29.7)	
Adenocarcinoma	12 (50.0)	19 (51.3)	
Others	4 (16.7)	7 (18.9)	0.67
Pathological stage (%)			
I	7 (29.2)	10 (27.3)	
II	11 (45.8)	21 (56.7)	
III	6 (25.0)	6 (16.2)	0.88
Extended resections			
Chest wall	2 (8.3)	3 (8.1)	
Pulmonary artery	2 (8.3)	2 (5.4)	
Lev. Atrium	2 (8.3)	1 (2.7)	
Diaphragm	0	2 (5.4)	
Aorta	1 (4.2)	0	0.28

Variable	IT (n = 24)	No IT (n = 37)	P value
Intraoperative mortality (%)	0	0	
30-day mortality (%)	1 (4.2)	1 (2.7)	0.32
Morbidity (%)	9 (37.5)	12 (32.4)	0.56
Major	2 (8.3)	2 (5.4)	
Diaphragmatic hernia	1 (4.5)	0	
Cardiac hernia	0	1 (2.7)	
Broncho-pleural fistula	1 (4.2)	0	
TIA	0	1 (2.7)	0.13
Minor	7 (29.2)	10 (27.0)	
Pulmonary	4 (16.6)	5 (13.5)	
Cardiac	2 (8.3)	4 (10.8)	
Neurological	1 (4.5)	1 (2.7)	0.10
ICU stay (d, median)	1	1	0.78
Hospital stay (d, median)	8	7	0.83

LONG-TERM OUTCOME

- Median survival 25.5 (1-116 m)
- Overall 5-yr survival 51.7%



LONG-TERM OUTCOME

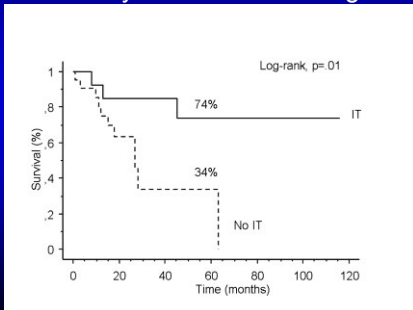
Factors affecting survival

(univariate analysis)

Factor	p value
T	0.01
N	NS
pStage	NS
IT	0.008
Side	NS
Extended surgery	NS
Histology	<0.001

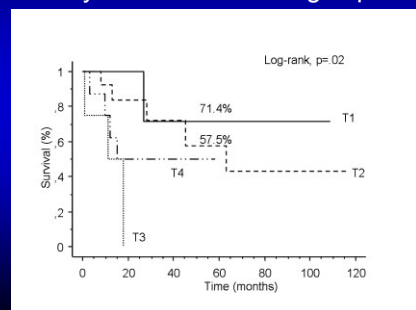
LONG-TERM OUTCOME

Overall 5-yr survival according to IT



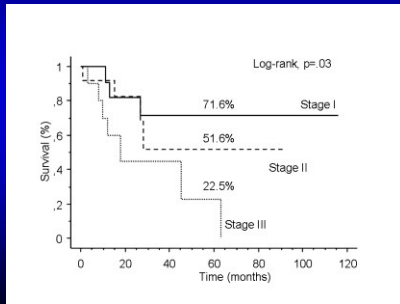
LONG-TERM OUTCOME

Overall 5-yr survival according to pT status



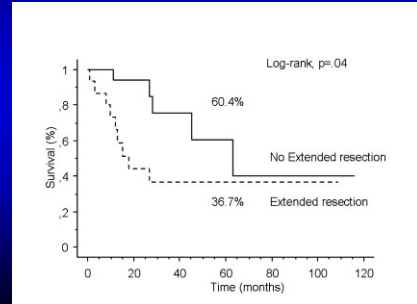
LONG-TERM OUTCOME

Overall 5-yr survival according to pStage



LONG-TERM OUTCOME

Overall 5-yr survival according to Extended resection



LONG-TERM OUTCOME

- Factors associated with best prognosis (multivariate analysis)

<i>Factor</i>	<i>95% CI</i>	<i>p value</i>
Induction therapy (no)	1.26-19.70	.02
Histology (Adenoca.)	0.30-9.97	.03

CONCLUSIONS

- In our experience, CP for NSCLC had a low mortality, acceptable morbidity, and good long term survival which justify this surgical procedure
- Postop. outcomes were not influenced by IT
- Long-term survival was adversely influenced by the absence of IT, extended resection, and advanced stages