

Impact of complex segmentectomy by VATS on peri-operative outcomes

Introduction

Pulmonary segmentectomies are generally classified:

- **Simple** (trisegmentectomy or lingulectomy and superior or basilar segmentectomy)
- **Complex** (individual or bi-segmentomy of the upper, middle and lower lobe).

Complex segmentectomies are technically feasible by VATS but remain challenging, and reports are limited on post-operative outcomes [1-2].

This study analyzed the differences in term of peri- and post-operative outcome between simple and complex VATS segmentectomy.

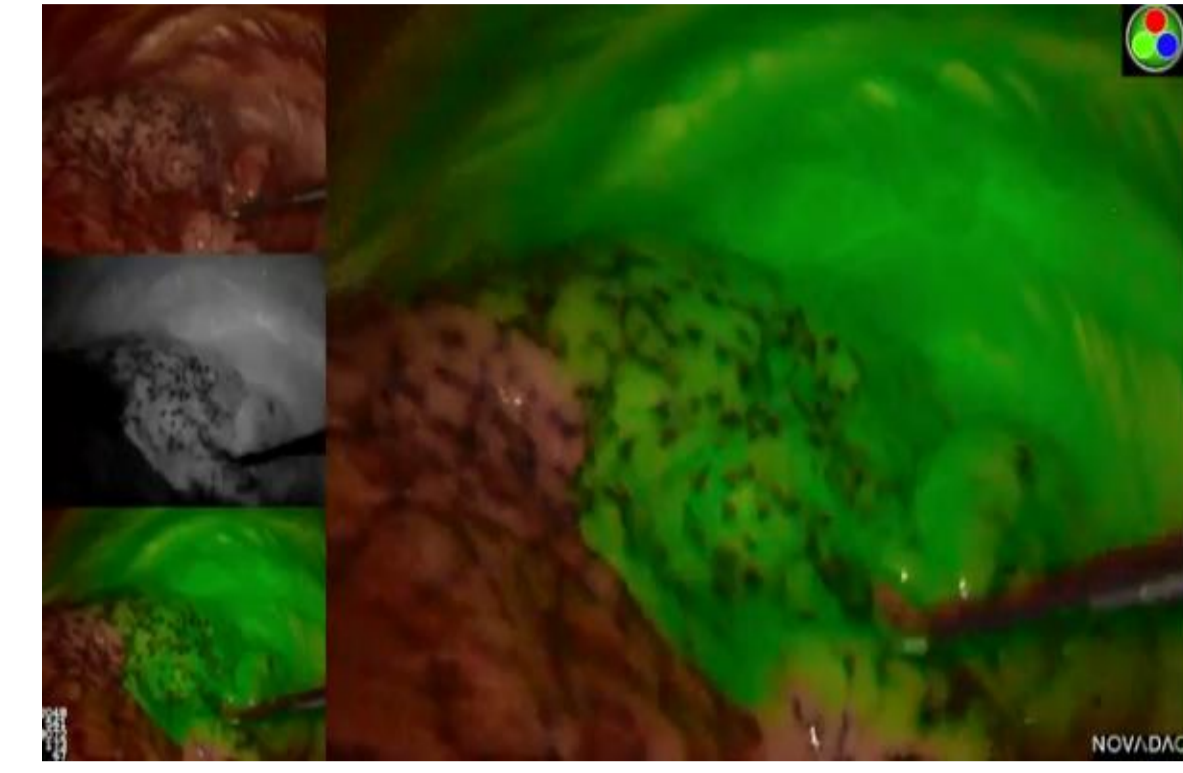


Figure 1: Indocyanin green use for identification of intersegmental plane

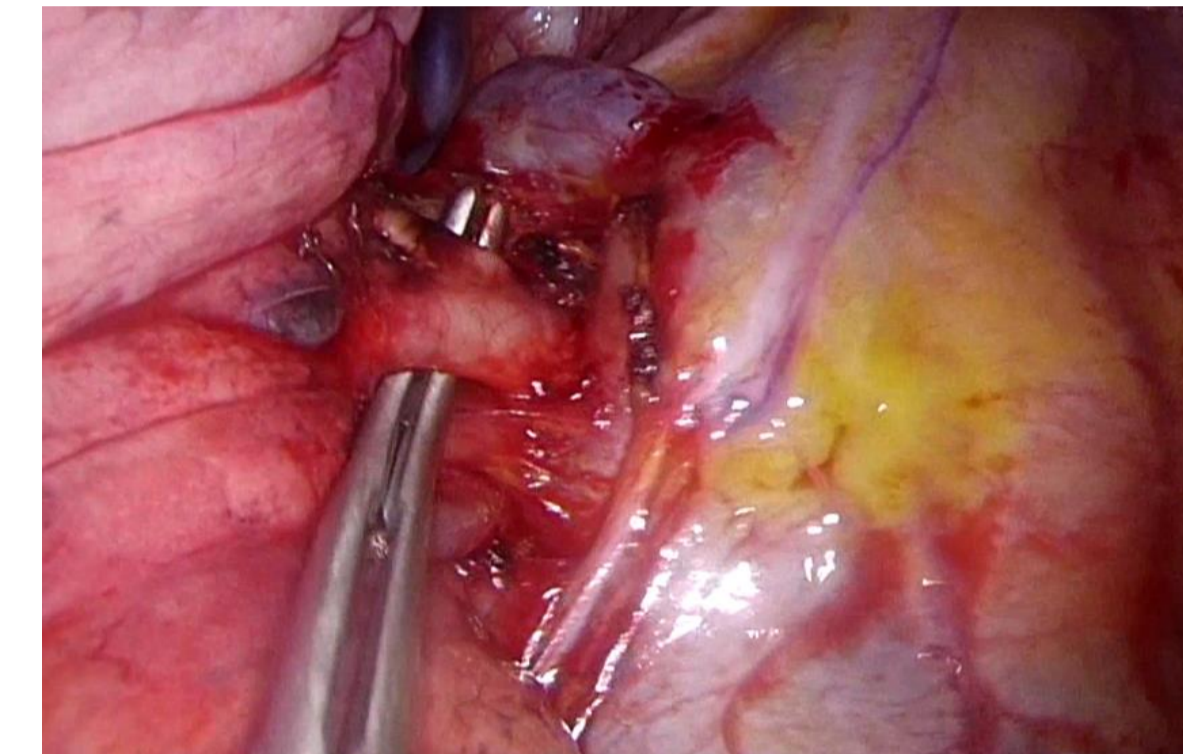


Figure 2: Intra-operative view during Uniportal VATS of S1-2 artery of the RUL.

Material and Methods

We retrospectively reviewed records of all patients who underwent anatomical pulmonary segmentectomy by VATS from January 2014 to May 2018 in two University Hospitals.

	Complex (n=111)	Simple (n=121)	P-value
Sex			
- Male	54 (49%)	60 (50%)	0.89
Age			
Median (range)	66 (32-84)	68 (29-87)	0.08
Comorbidities			
- Cardiopathy	16 (14%)	10 (8%)	0.13
- Diabetes	10 (9%)	19 (16%)	0.12
- Tabacco use	86 (77%)	91 (75%)	0.69
- Previous cancer	39 (35%)	53 (44%)	0.18
- COPD	20 (18%)	33 (27%)	0.09
- VEMS	91%	84%	0.0075
- DLCO	79%	73%	0.02
ASA score			
- I-II	69 (62%)	62 (51%)	0.15
- III-IV	42 (38%)	59 (49%)	

Table 1: Patients characteristics

	OR	CI 95%	P-value
Complex	0.99	0.56-1.75	0.99
Gender	1.01	0.57-1.76	0.98
Age>70 y	0.98	0.55-1.76	0.95
ASA>2	1.77	1.05-2.97	0.03
COPD	1.59	0.86-2.91	0.14
Tabacco use	3.08	1.37-6.95	0.003
VEMS<60	1.2	0.46-3.12	0.71
DLCO<60	1.61	0.84-3.06	0.15
Right side	0.51	0.27-0.96	0.034
Multiple segments	1.23	0.70-2.17	0.45
Upper segments	1.17	0.66-2.07	0.59
Operation time>2h	1.54	0.84-2.83	0.16
Coronaropathy	1.87	0.81-4.31	0.15

Table 4: Univariate analysis for risk factors of post-operative complication after VATS segmentectomies

	Complex (n=111)	Simple (n=121)	P-value
Indication			
- Lung cancer	79 (71%)	98 (81%)	0.08
- Metastasis	12 (11%)	14 (12%)	
- Benign	20 (18%)	9 (7%)	
Upper lobe	86 (77%)	49 (40%)	<0.0001
Lower lobe	25 (23%)	72 (60%)	
Multiple segment	44 (40%)	65 (54%)	0.03
Right	53 (48%)	31 (26%)	0.0004
Left	58 (52%)	90 (74%)	
S1	19 (17%)		
S2	13 (12%)		
S3	15 (14%)		
S1+2	31 (28%)		
S1+3	6 (5%)		
S1-3		34 (28%)	
S4+5		18 (15%)	
S6		58 (48%)	
Basal pyramide		16 (13%)	
S8, S9 or S10	29 (26%)		
Operative time (Mean) (minutes)	145	143	0.79
Operation performed within the first 2 years	25 (23%)	46 (38%)	0.01

Table 2: Surgical characteristics

	Complex (n=111)	Simple (n=121)	P-value
Mortality	2 (2%)	0	0.14
Complications			
Overall	33 (30%)	36 (30%)	0.99
Pulmonary	27 (24%)	33 (27%)	0.65
Re-operation	5 (4.5%)	7 (6%)	0.66
Re-admission	1 (1%)	2 (2%)	0.61
Length of drainage			
Median (range)	1 (0-33)	2 (1-19)	0.95
Length of stay			
Median	5 (1-36)	7 (2-31)	0.026
>5d	49	78	

Table 3: Post-operative outcomes

Results

Post-operative overall complications were not different between the two groups (30% vs 30% respectively, p=0.99) and was not associated with the type of segmentectomy. Complex segmentectomy had a shorter length of hospitalization compared to simple segmentectomy (median 5 days [1-36] vs 7 days [2-31], p=0.026). Interestingly, complex segmentectomies were realized most frequently two years after implementation of our program (25 vs 86 cases) (p=0.01).

Conclusion

In comparison with simple segmentectomy, complex segmentectomy by VATS seems to present similar post-operative complication rate. Gradual experience and progressive adoption seem to be the key element for successful implementation and could explain shorter length of stay.

References

1. Clinical outcome and risk factors for complications after pulmonary segmentectomy by video-assisted thoracic surgery: results of an initial experience. Bédât B, Abdelnour-Berchtold E, Krueger T, Perentes JY, Ris HB, Triponez F, Licker MJ, Karenovics W, Gonzalez M. J Thorac Dis. 2018 Aug;10(8):5023-5029
2. How to decrease technical obstacles to difficult video-assisted thoracoscopic surgery segmentectomy? Karenovics W, Gonzalez M. J Thorac Dis. 2019 Jan;11(1):53-56.