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Introduction: Major Airway complications (MAC) requiring bronchoscopic intervention after Lung Transplantation (LuTx) remain a major cause of morbidity and mortality and varies greatly among different centers. A precise knowledge of the actual prevalence of MAC in each program and its contributing factors might result in new improved strategies. We present a retrospective analysis of demographic data of lung and lung/heart recipients between 06/2023 and 07/2025. Grading of the severity of MAC was based on the 2018 ISHLT Consensus Document (1).

Results

During the study period, 29 patients were transplanted and 55 anastomoses performed. 16/29 patients (55%) developed a severe bacterial pulmonary infection in the 1st month after LuTx, while 9 patients (11 anastomoses) suffered MAC (incidence 20% per anastomosis). Among all MAC, severe ischemia with mucosal necrosis was present. The second most common airway complication was stenosis (10/11 anastomosis). Dehiscence occurred in 8 anastomoses and was manifested predominantly on the right anastomosis (7/8 cases). 6/11 MAC emerged as complex airway pathology. Among all examined variables, only thoracic fungal infection within the first 6 months was significantly associated with the occurrence of MAC (OR: 10,1, $p = 0.010$). For patients with anastomotic dehiscence, no death was registered in 1 year after transplantation.

Table 1. Demographic data and univariate analysis of variables associated with MAC

Variables	MAC (N=9)	NO MAC (N=20)	OVERALL (N=29)	Univariate analysis P-Value
Gender N, (%)				
Male	7 (77.8%)	12 (60.0%)	19 (65.5%)	0.43
Age at transplant				
Median	55.35	50.51	50.71	0.41
BMI				
Median	23.32	22.01	22.86	0.44
Primary Diagnosis N, (%)				
Obstructive Lung disease	3 (33.3%)	4 (20.0%)	7 (24.1%)	
ILD	3 (33.3%)	8 (40.0%)	11 (37.9%)	
CF	0 (0.0%)	3 (15.0%)	3 (10.3%)	
Bronchiectasis	2 (22.2%)	1 (5.0%)	3 (10.3%)	
Vascular disease	0 (0.0%)	3 (15.0%)	1 (10.3%)	
CLAD	1 (11.1%)	1 (5.0%)	2 (6.9%)	
Induction N, (%)				
Yes	6 (66.7%)	10 (50.0%)	16 (55.2%)	0.45
pRBC (units)				
Median	4.00	6.00	6.00	0.570
Ventilation time (hours)				
Median	63.95	48.29	51.37	0.73
LOS in ICU (days)				
Median	11.00	11.50	11.00	0.85
PGD Grade 3 first 72h N, (%)				
Yes	1 (11.1%)	4 (20%)	5 (17.2%)	1.00
LOS in hospital (days)				
Median	58.00	46.00	48.00	0.23
ECMO use postoperative N, (%)				
Yes	1 (11.1%)	5 (25.0%)	6 (20.7%)	0.63
Fungal infection thorax first 6 months N, (%)				
Yes	6 (66.7%)	3 (15.0%)	9 (31.0%)	0.01*

* $p < 0.05$ considered statistically significant with MAC

Discussion: Our data align with existing evidence that severe airway complications after LuTx is a common condition. Bacterial and fungal infections are widely known risk factors for the development of airway complications. In our cohort, 16/29 patients (55%) suffered a severe pulmonary infection in the 1-month after LuTx. This fact underlines the high burden of hospital-acquired multi-resistant pathogens in southern Europe. MAC in 20% of the performed anastomoses was mostly correlated with fungal infection. Although in cases of dehiscence, a high prevalence of in-hospital mortality up to 66% has been described in the literature (2), in our cohort, no death occurred in 1 year after transplantation. No surgical revision was mandatory.

Table 2. Classification of anastomotic complications

Location	a. 0% to 25% of circumference	b. 25% to 50% of circumference	c. 50% to 75% of circumference	d. >75% of circumference
Dehiscence (D) n = 8				
a. Cartilaginous	1 (12.5%)	–	–	–
b. Membranous	–	–	3 (37.5%)	–
c. Both	3 (37.5%)	1 (12.5%)	1 (12.5%)	–
Stenosis (S) n = 10				
	a. 0% to 25% reduction in cross-sectional area	b. 25% to 50% reduction in cross-sectional area	c. 50% but 100% reduction in cross-sectional area	d. 100% obstruction
a. Anastomotic	–	–	–	–
b. Anastomotic plus lobar/segmental	–	–	2 (20%)	–
c. Lobar/segmental only	–	–	4 (40%)	4 (40%)
Ischemia and necrosis (I) n = 1				
	a. <50% circumferential ischemia	b. 50% to 100% circumferential ischemia	c. <50% circumferential necrosis	d. 50% to 100% circumferential necrosis
a. Peri-anastomotic	–	–	–	–
b. Extending >1 cm from anastomosis to major airways	–	–	–	–
c. Extending >1 cm from anastomosis into lobar or segmental airways	–	–	–	11 (100%)
Malacia (M) n = 6				
a. Peri-anastomotic	6 (100%)	–	–	–
b. Diffuse	–	–	–	–

Literature

- Crespo MM et al. JHLT. 2018 May;37(5):548-563. .2. Huang J et al. JHLT. 2023 Sep;42(9):1251-1260.