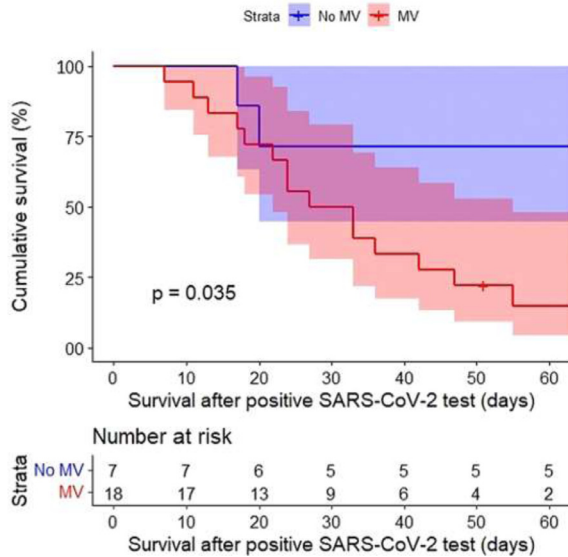




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Figure 1: Kaplan-Meier survival probabilities in the study cohort stratified by mechanical ventilation (MV).



(969)

Early Outcomes of Lung Transplantation for COVID-19 Related Lung Disease. Single Center Experience

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Purpose: Lung transplantation (LT) is a lifesaving treatment for Covid-19 related lung disease with early outcomes similar to other indications.

Methods: Seven patients underwent LT for Covid-19 related lung disease at our center: 5 for ARDS and 2 for IPF exacerbation post SARS-CoV-2 infection.

Results: Seven patients (5 men) with single organ failure underwent bilateral LT. Median age was 47 years old. All ARDS cases had poor lung mechanics on invasive mechanical ventilation with radiographic evidence of lung fibrosis: pneumatocele, GGO, consolidations, subpleural reticulations and traction bronchiectasis. vvECMO was bridge to transplant in 5 cases (bridge to recovery in 2). Median ECMO duration for ARDS was 32 days (range 7-99). Median time to LT from Covid diagnosis was 59 days (Q1-IQ3, 54-62). Two patients were post-partum women with ARDS. Explanted pathology showed UIP, DAD, diffuse hemorrhage and one case of fibrosing NSIP. Pulmonary hypertension was seen in 4 cases. One patient did not survive. Organizing pneumonia and granuloma were present in this patient. Most ARDS patients were unable to tolerate lower sedation and consent by a substitute decision-makers was obtained. Post operative ECMO decannulation was possible in all cases. Induction, maintenance immunosuppression and antimicrobials were standard for our program. Donated grafts were from deceased brain death donors and negative for 2019-nCoV. Rehabilitation potential and strong social support were absolute inclusion criteria. All survivors have excellent lung function.

Conclusion: In the USA, over 130 LT have listed Covid-19 as the diagnosis indication. Although Covid-19 ARDS makes up for the majority of these LT, other diagnosis are post Covid pulmonary fibrosis and underlying fibrosis with SARS-CoV-2 induced exacerbation. LT for ARDS poses several challenges and is reserved for the minority of carefully selected patients dependent on extracorporeal life support. As others have reported, good short-term survival is described.

Characteristics of the transplant recipients							
Age (years), sex	Comorbidities, ABO	BMI kg/m ²	Indication for LT, LAS	Covid-19 diagnosis to LT, days	vvECMO to LT, days	Follow-up, days	
1 58, M	IPF, OSA, O+	24.4	AE-IPF, 45.6	62	1	180	
2 71, M	IPF, HTN, DM, O+	24.4	AE-IPF, 84.6	50	6	230	
3 47, M	O+	33.5	ARDS, 88	62	15	115	
4 37, M	Obesity, asthma, A+	36.9	ARDS, 89.7	114	99	Dead	
5 61, M	O+	26.9	ARDS, 85.7	59	14	180	
6 31, F	post-partum, ulcerative colitis, A+	37.5	ARDS, 87.2	57	25	270	
7 35, F	post-partum, obesity, asthma, A+	37.5	ARDS, 87.7	54	7	20	

(970)

Characterization of Lung Transplant COVID19+ Patients and Mortality Outcomes

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Purpose: The aim of this study is to report the characteristic and mortality outcomes of lung transplant patients that contracted COVID19.

Methods: A retrospective chart review was conducted of lung transplant recipients who tested positive for COVID19 from 6/1/2020 to 9/1/2021.

Results: Forty-five patients were included for mortality incidence review with 2 patients who were admitted to outside facilities during their COVID diagnosis with limited treatment data. Mortality incidence was 15.5% with cohort mean age of 62 (±11.7). Median time from transplant to infection was 1281 days (223-5800). Five patients required O2 and n=5 were intubated with 80% mortality (n=4) among those intubated. Baseline demographics of age, gender, indication for transplant or race were not statistically different among patients that died vs those that survived. Vaccinations (2 doses) prior to infection were evident in n=35 (77.8%) of the patients. Maintenance immunosuppressants and covid therapies (table 1) did not have an associated difference in survival from infection. A significant association with mortality was found from the time of reported

Table 1.

Characteristics (N=45)	Survived (n=38)	Died (n=7)	P-value
Indications, n (%)			1.0
COPD	10 (26.3)	2 (28.6)	
IPF	16 (42.1)	3 (42.2)	
Male, n (%)	25 (55.6)	4 (5.7)	0.67
Bilateral, n (%)	30 (78.9)	4 (4.3)	0.34
Diabetes, n (%)	21 (55)	3 (42.9)	0.69
Race, n (%)			0.78
White	23 (60)	6 (85)	
Black	7 (18)	1 (14)	
Hispanic	6 (15)	0	
Other	2 (5.3)	0	
Time from transplant to infection (days), mean (SD)	1805 (1350)	2105 (2023)	0.62
Vaccinations prior to infection, n (%)	29 (64.4)	6 (85.7)	0.51
Maintenance immunosuppression			
FK+MMF, n (%)	25 (65.7)	5 (71.4)	1.0
MMF daily dose (mg), mean (SD)	1000 (103)	900 (187)	0.69
COVID Therapies			
Remdesivir+dexameth	13	4	0.14
Casirivimab/imdevimab	21	2	0.39

symptoms to triage or hospitalization in those that survived vs died, 3.3 vs 9.4 days ($p=0.003$).

Conclusion: This is one of the largest cohorts reporting lung transplant recipients who contracted COVID19, and despite lungs being the organ directly affected by COVID19, mortality rates are comparable to rates reported in other solid organ transplants. Time to triage from symptom onset to clinic management or hospital admission for COVID appears to be associated with improved mortality rates.

(971)

Donor and Peri-Transplant Hospitalization Risk Factors for Invasive Fungal Infection in Lung Transplant Recipients

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Purpose: Invasive fungal infections (IFIs) remain a frequent complication in the lung transplant (LTx) population even in the current era of antifungal prophylaxis. The organ donor and peri-transplant period risk factors for IFI remain ill-defined. Our study goal is to identify novel risk factors for IFI, focusing on the organ donor and the recipient's transplant hospitalization.

Methods: We performed a single-center, case-control study. The source cohort included all adults who underwent LTx between 1/1/12-3/31/17. The primary outcome was a Probable or Proven IFI within 6 months of transplantation, as defined by EORTC/MSG criteria. Multivariable logistic regression and Cox proportional hazard regression analyses were used to identify independent risk factors for IFI.

Results: Of 329 LTx recipients, 45 (14%) developed IFI. The median time to IFI was 50 days (IQR: 25-110) after transplantation. Independent risk factors for IFI included: donor steroid pre-conditioning (aOR 2.24, 95%CI: 1.05-4.77, $p=0.04$); cardiopulmonary bypass (aOR 3.07, 95%CI: 1.06-8.87, $p=0.04$); ICU length of stay >30 days (aOR 3.34, 95%CI: 1.48-7.5, $p<0.01$); and bronchial anastomotic dehiscence (aOR 14.06, 95%CI: 1.99-99.34, $p=0.01$). Mold isolated on donor respiratory culture increased the hazard of IFI in LTx recipients (Table 1). Peri-transplant hospitalization complications that increased the hazard of IFI included: multiple positive fungal cultures, airway ischemia, and prolonged ICU stay (Table 1). Fungal treatment for ≥ 90 days after transplant was protective against development of IFI (Table 1).

Conclusion: IFI was common in our LTx cohort. Certain donor characteristics and peri-transplant complications increased the likelihood of IFI. Interventional studies, targeting the modifiable risk factors identified in this study, are needed to reduce IFI risk in LTx recipients.

Variable	Adjusted HR	95% CI	P-value
Donor mold culture	3.88	1.32-11.40	0.014
Multiple positive fungus cultures	1.16	1.07-1.25	<0.001
Airway ischemia	3.56	1.80-7.03	<0.001
ICU stay >30 days	2.87	1.49-5.54	0.002
Antifungal treatment for ≥ 90 d	0.13	0.05-0.37	<0.001

(972)

Risks and Outcomes Associated with Pleural Space Infections After Lung Transplantation

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Purpose: Pleural space infections (PSI) are a serious complication after lung transplantation (LT) however there is limited data on the associated

risk factors and outcomes of PSI. We examined: 1) risk factors associated with PSI after LT; 2) effect of PSI on LT outcomes.

Methods: This is a retrospective single center cohort study of 74 consecutive LT recipients (1/2018- 6/2020). Patients were divided into infected and non-infected groups, where PSI were defined as post-LT pleural effusions with pathogen(s) isolated from pleural fluid. Data were collected and compared between two groups with two-sample t-test or Fisher-exact. Multivariable logit model was performed with estimations of odds ratio (OR) and its confidence interval [CI].

Results: Among 74 LT recipients, 38 (51%) developed pleural effusions requiring drainage; of them 16 (42%) had PSI. Baseline demographics were similar in patients with and without PSI (Table). Notably, 88% of PSI group received steroids pre-LT compared to 55% in the non-infected group ($p<0.05$); 88% of the PSI group had an underlying diagnosis of interstitial lung disease versus 45% of the non-infected group ($p<0.01$). Overall post-operative complications occurred more frequently in the PSI group vs. non-infected group 77% vs. 25% ($p<0.01$) and airway complications in 86% vs. 44% ($p<0.01$). Hospital length of stay was longer in the PSI group with the median of 78 versus 31 days in the non-infected group ($p<0.01$). Results of logistical modeling showed high risk of PSI with presence of post-LT airway complications (OR =10.8 95% CI 1.7- 72.5) and presence of post operative complications (OR=10.6, 95% CI 1.8-63.5). There was no difference in the incidence of readmissions, acute cellular rejection or 1 year mortality between the two cohorts.

Conclusion: PSI remain a prevalent yet under-studied complication. Airway or post-operative complications after LT were associated with PSI. One-year outcomes were similar in LT recipients with and without PSI.

Variable	All Patients	No Infection (N=22)	Infection (N=16)	p-value
Male Gender, N (%)	27 (71)	16 (73)	11 (69)	0.79
Age, years Mean \pm SD	62.05 \pm 5.99	62.50 \pm 6.7	61.44 \pm 4.98	0.60
Race, N (%)				
Black	5 (13)	4 (18)	1 (6)	0.36
Hispanic	1 (3)	1 (5)	0 (0)	
White	32 (84)	17 (77)	15 (94)	
Underlying Lung Disease, N (%)				
Interstitial Lung Disease	24 (63)	10 (45)	14 (88)	<0.01
Chronic Obstructive Pulmonary Disease	5 (13)	3 (14)	2 (13)	
Other	9 (24)	9 (41)	0 (0)	
History of Diabetes- A1C, Mean \pm SD	6.32 \pm 1.26	6.59 \pm 1.52	5.95 \pm 0.63	0.09
Steroid Use Pre-Transplant, N (%)	26 (68)	12 (55)	14 (88)	<0.05
Infections, Pre-Transplant, N (%)	12 (32)	6(27)	6 (38)	0.50
Lung Allocation Score, Mean \pm SD	65.55 \pm 20.10	61.91 \pm 18.61	70.56 \pm 21.57	0.19
Bilateral, N (%)	33 (87)	18 (82)	15 (94)	0.43
Ischemic Time, Mean \pm SD	323.62 \pm 64.85	311.19 \pm 61.21	339.94 \pm 67.79	0.19
Post-Operative Complications, N (%)	17 (45)	5 (23)	12 (75)	<0.01
Airway Complications, N (%)	12 (32)	3 (14)	9 (56)	<0.01
Post-Transplant Length of Stay, Mean \pm SD	56.17 \pm 51.37	38.35 \pm 35.43	78.44 \pm 60.13	0.03

(973)

Pneumonia in the Early Post-Lung Transplant Period: A Prospective Study

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Purpose: Hospital- (HAP) and Ventilator-associated pneumonia (VAP) are important complications early (<30 days) after lung transplantation (LT). However, current incidence, risk factors at LT and outcomes are not well reported.

Methods: We included all recipients who underwent LT 07/2019-02/2020 at our institution. We prospectively collected epidemiological and microbiological data in the first 30 days post-LT. We assessed incidence and