Combined Lung-Liver Transplant: Recipient Risk Factors

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Introduction

- Combined lung-liver transplant (CLLT) is a life-saving procedure for treating patients with simultaneous lung and liver disease.[1]
- Despite a historically low case volume, the incidence of CLLT is currently rising (Fig 1). However, nation-wide data on CLLT outcomes is still limited as most previous studies have focused on single center data.[2]
- Considering the rising trend in CLLT as well as the significant cost and resources associated with the procedure, it is crucial to analyze past CLLT data to improve future patient selection and care.[3]
- The objective of this study is to analyze key clinical characteristics that correlate with CLLT survival rate as compared to existing literature on the topic as well as single organ lung/liver transplants.

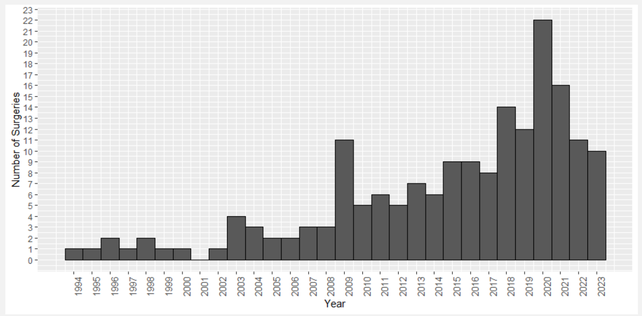

Fig 1. CLLT patients per year

Methods

- The United Network for Organ Sharing (UNOS) registry was used to identify all patients (n=178) who underwent CLLT from January 1994 to June 2023.
- Cox proportional hazards was used to assess predictors of overall mortality risk. Kaplan-Meier analysis was used to estimate survival probability.

Results

- Median (Q1-Q3) recipient age at transplant was 41 years (25-57), donor age 26 years (19-37), waitlist time 112 days (32.5-326), and ischemic time 5 hours (3.97-6.0).
- Median (Q1-Q3) recipient MELD score at transplant was 10 (7-15) and LAS score 37.8 (35.2-44.4).
- Post-operative infections requiring hospitalization occurred in 40.4% of cases.
- Survival rates (95% CI) after 30 days, 1 year, and 5 years were 95.4% (92.4-98.6), 80.4% (74.6-86.6), and 61.2% (53.4- 70.2). (Fig 3)
- Among the variables examined, only recipient diagnosis predicted survival. Compared to cystic fibrosis (CF), other indications for CLLT were associated with higher postoperative mortality.
- Patients diagnosed with idiopathic pulmonary fibrosis (IPF) had 4.74 (n=42, p=0.01) fold increased risk of overall mortality following transplantation compared to those diagnosed with CF. (Fig 2)

Variable	Median or Percentage	Hazard Ratio	p-value
Year (After 2008)	84.8%	3.03	0.10
Sex (Male)	66.3%	0.98	0.95
Age	41	0.97	0.08
Diabetes (Yes)	32.6%	1.80	0.07
Cigarette Use	30.3%	1.08	0.85
MELD	10	1.04	0.08
Diagnosis (CF as Reference)			
IPF	23.6%	4.74	0.01
Other	28.7%	4.41	0.01
Donor Age	26	0.99	0.34
Donor Ejection Fraction	60	1.01	0.48

Fig 2. Cox Proportional Hazards Model

Discussion

- Compared to CF, all other indications for CLLT, especially IPF, were important predictors of increased postoperative mortality risk. Survival rates at 1 and 5 years were similar to previous studies of CLLT as well as single lung and single liver transplants.
- Future directions include (1) presenting additional descriptive statistics to further elucidate CLLT patient demographics and outcomes and (2) improving our multivariate regression by refining variable selection (e.g., including LAS score and waitlist duration).

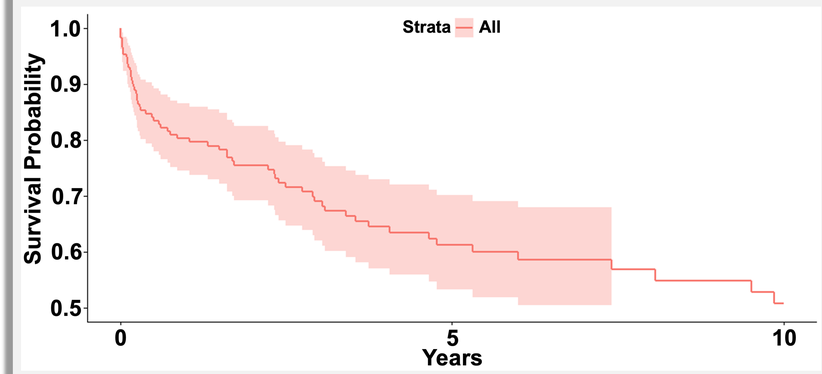

Fig 3. Kaplan-Meier Survival Plot for CLLT Patients

Citations

1. Han JL, Beal EW, Mumtaz K, Washburn K, Black SM. Combined liver-lung transplantation: Indications, outcomes, current experience and ethical Issues. Transplant Rev. 2019;33(2):99-106. doi:10.1016/j.trre.2018.11.002
2. Yi SG, Lunsford KE, Bruce C, Ghobrial RM. Conquering combined thoracic organ and liver transplantation: indications and outcomes for heart-liver and lung–liver transplantation. Curr Opin Organ Transplant. 2018;23(2). doi:10.1097/MOT.0000000000000509
3. Hyzny EJ, Chan EG, Morrell M, Harano T, Sanchez PG. A review of liver dysfunction in the lung transplant patient. Clin Transplant. 2021;35(8):e14344. doi:10.1111/ctr.14344

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