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A Closer Look at Risk Factors Associated with Airway Complications in Lung Transplantation

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Purpose: Airway complications can cause significant morbidity in lung transplantation; prevalence varies between 8-20%. In 2018, the ISHLT created a new grading system for airway complications. This study's aim was to grade airway complications using the new system and identify associated risk factors including the use of ex-vivo lung perfusion (EVLP).
Methods: This was a retrospective, single-center study of 188 lung transplants done between Feb 2016 and Mar 2020. Clinically significant airway ischemia (CSAI) was defined as ischemia severity equal to or worse than grade B2, > 50% stenosis, or dehiscence. EVLP was performed using the Organ Care System (OCS) Lung, in the setting of extended criteria donors (ECD) which included any combination of the following: age >55 yrs, > 6-hr ischemia, death from circulatory arrest, >20 pack-yr smoke history, or PF ratio <300. Logistic regression (LR) was used to explore risks factors associated with CSAI; Akaike information criterion was used for adjusted LR.
Results: 188 recipients or 339 lung allografts were transplanted within the study period. The average age was 52.4 years; 58% were male. Out of 339 lung allografts, 116 (34%) met criteria for CSAI. 15.3% of allografts were preserved using EVLP and of these, 88.5% were ECD. Recipients with diabetes mellitus were more likely to have CSAI than those without (OR 2.46, p value = 0.04). CSAI was associated with several factors in the unadjusted analysis including EVLP (OR 1.65, 95% CI 0.90-3.01), continuous running suture technique versus interrupted suture technique (OR 1.84, 95% CI 1.05-3.33), right versus left allograft (OR 1.41, 95% CI 0.90-2.21), right versus left side of first anastomosis (OR 0.71, 95% CI 0.45-1.11) and extracorporeal life support (ECLS) versus off-pump (OR 1.77, 95% CI 0.93-3.41). In particular, 23 of the 52 (44%) of the lung allografts performed with EVLP had CSAI compared to 93 of the 287 (32%) allografts procured traditionally. CSAI was significantly associated with EVLP (OR 1.98, 95% CI 1.05-3.76) and continuous running suture technique (OR 2.00, 95% CI 1.05-3.94) after adjusting for recipient, donor and intraoperative factors.
Conclusion: A high burden of CSAI was detected in our study. Analysis suggests that ECD lungs preserved with EVLP may be at higher risk of CSAI than donor lungs preserved on ice, but use of interrupted suture technique and avoidance of ECLS may reduce this risk.

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Baseline Gas Transfer (KCO) and Accessible Alveolar Volume (V_A) after Lung Transplant: Determinants and Relative Contributions on Graft Survival

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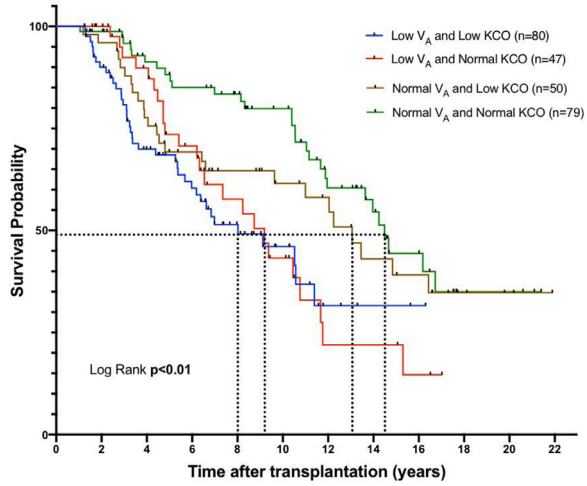
Purpose: Low baseline diffusing capacity (DLCO), at 1-year after lung transplant, is associated with an increased risk of graft loss. DLCO is the product of 2 measurements; the gas transfer factor (KCO) and the accessible alveolar volume (V_A). Our aim was to understand the relative contributions of baseline KCO and V_A on survival after lung transplant.
Methods: A retrospective cohort analysis was conducted of all bilateral lung transplant recipients between 1998 and 2018, with DLCO measured at 1 year after transplant. Low baseline V_A was defined as < Median %-pred, low baseline KCO as < Median %-pred for lung volume, and low FEV_1 as failure to achieve >80%-pred. Patients were divided into 4 groups: Normal V_A-Normal KCO, Normal V_A-Low KCO, Low V_A-Normal KCO, Low V_A-Low KCO. Multivariate logistic regression and Cox proportional hazard models were used for statistical analysis.
Results: 708 patients underwent double lung transplant during the study period. 258 patients had DLCO measured at 1-year post transplant. The mean recipient age was 44.0 (SD 15.5) with 50% males. The median time to measurement of DLCO was 378 days. The median (IQR) V_A %-pred was 82 (21), %-Pred KCO 74 (19) and %-Pred FEV_1 84 (29). Donor age was significantly associated with low KCO OR 1.06 (95%CI 1.03-1.08), p<0.01. ILD and transplant era were significantly associated with low V_A, p<0.01. Multivariate analysis demonstrated that Low V_A-Normal KCO (HR 2.09 p=0.04) and Low V_A-Low KCO (HR 2.60 p<0.01) were independently associated with reduced survival after adjustment for native lung disease and low baseline FEV_1. There was a significant difference in the Kaplan-Meier curves for the 4 V_A-KCO groups, p<0.01 **Figure 1**.
Conclusion: Donor age, ILD and transplant era were associated with baseline KCO and VA. Low baseline V_A was a greater risk for future graft loss than low KCO. There may be benefit in the incorporation of baseline V_A and KCO at 1-year post transplant to identify patients with an increased risk of graft loss.



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Single Lung Transplantation in Patients under 50: Single Center and UNOS Analysis

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Purpose: The lung transplantation (LTx) community continues to investigate single- (SLT) vs. double-lung transplantation (DLT) to predict optimal long-term survival post-LTx. We investigated the survival in younger patients receiving SLT using the current United Network for Organ Sharing (UNOS) database and our single center results.
Methods: A retrospective analysis of both UNOS and single center databases was performed, investigating patients between ages 18 and 50 who received either a SLT or DLT from August 2005 to March 2020 (n=11156; n=48). Similar patients were matched between the two databases (n=96). Survival outcomes were assessed before and after propensity score matching. P-value <0.05 was considered significant.
Results: In the pre-propensity match, the UNOS patient group who received DLT had better survival outcomes than SLT (p<0.001). This was maintained across the combination of both databases (p=0.002). No survival outcome differences were found in the single center group (p=0.317). In post-propensity matching, both database groups were similar in BMI, sex, ischemic times, transplant type, age, length of stay, lung allocation score, and ethnicity. There was no significant difference in survival outcomes based on transplant type (SLT vs. DLT) in the single center (p=0.482), UNOS group (p=0.270), or across the