The Impact of *Staphylococcus aureus* Peri-transplant Cultures on Six-Month Outcomes in Lung Transplantation

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Background

- *Staphylococcus aureus* (*S. aureus*) infections post-lung transplant lead to increased mortality
- The impact of *S. aureus* peri-transplant respiratory cultures on post-transplant outcomes is unknown, as is the optimal duration of peri-transplant antibiotics
- We compared lung transplant recipients with and without *S. aureus* growth on peri-transplant cultures and the impact on 6-month outcomes, including rejection, survival, and occurrence of *S. aureus* infections

Methods

- Retrospective review
- January 2017– April 2021
- Reviewed all lung transplants at Brigham & Women's Hospital, Boston, MA
- Donor/recipient characteristics, microbiologic data, antibiotics, and 6-month outcomes were analyzed

Survival Plot

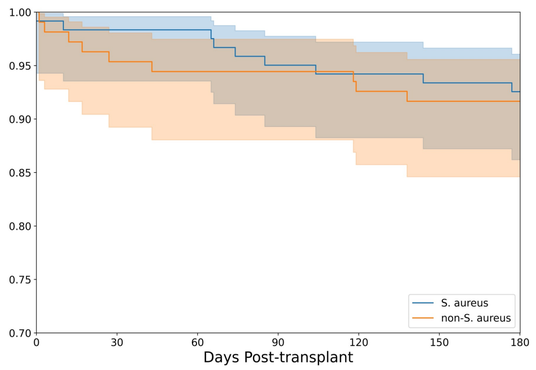

Figure 1: Six-month survival plot of recipients with *S. aureus* vs. non-*S. aureus* peri-transplant cultures

Results

Characteristic	*S. aureus* Peri-transplant Culture (n = 122)	Non- *S. aureus* Peri-transplant Culture (n = 107)	P-value*
Recipient baseline characteristics			
Median age, years [IQR]	62 [54, 67]	62 [55, 68]	0.737
Male, n (%)	76 (62)	57 (56)	0.167
White non-Hispanic, n (%)	110 (90)	94 (88)	0.575
Median lung allocation score [IQR]	38 [34, 47]	38 [34, 49]	0.722
Underlying disease, n (%)			
Restrictive lung disease	73 (60)	67 (63)	0.667
Obstructive lung disease	28 (23)	31 (29)	0.299
Cystic fibrosis	14 (11)	5 (5)	0.091#
Pulmonary vascular disease	7 (6)	4 (4)	0.549#
Donor characteristics			
Median age, years [IQR]	33 [26, 46]	38 [30, 47]	0.053
Increased risk, n (%)	69 (57)	46 (43)	0.041
Cause of death, drug intoxication, n (%)	60 (49)	33 (31)	0.005
Index hospitalization			
Mean donor ischemic time, minutes (SD)	315 (96)	307 (96)	0.845
Mean cardiopulmonary bypass time, minutes (SD)	197 (57)	198 (68)	0.655
Pulmonary graft dysfunction, grade 3 at 72 hours, n (%)	7 (6)	10 (9)	0.332
Median length of stay, days [IQR]	17 [12,25]	17 [12,27]	0.884
Median ICU stay, days [IQR]	6 [4,11]	7 [4, 10]	0.341
6-month recipient outcomes			
Patients with readmissions, n (%)	95 (78)	87 (81)	0.328
Chronic kidney disease stage 4 or 5, n (%)	26 (21)	14 (13)	0.107
Respiratory failure, n (%)	10 (8)	14 (13)	0.215
CMV reactivation, n (%)	14 (11)	9 (8)	0.392
Post-transplant lymphoproliferative disorder, n (%)	4 (3)	3 (3)	1.000#
Clinically significant rejection, n (%)			
Acute cellular rejection	27 (22)	27 (25)	0.305
Antibody mediated rejection	6 (5)	5 (5)	1.000#
Survival, n (%)			
30 days	120 (98)	102 (95)	0.256#
6 months	113 (93)	98 (92)	0.772
Post-transplant *S. aureus* infection, n (%)	12 (10)	14 (13)	0.440
Pneumonia	11 (9)	12 (11)	0.581
Bacteremia	3 (2)	5 (5)	0.478#
Empyema	1 (1)	4 (4)	0.188#
Skin and soft tissue infection	1 (1)	3 (3)	0.342 #
Mediastinitis	0 (0)	3 (3)	0.101 #

*P-values are based on the Chi-square test of independence or Fisher's exact test when noted due to size# (categorical variables) or the Wilcoxon rank-sum test (continuous variables)

Results

- Rates of peri-transplantation *S. aureus* were high, with over half of all patients with growth (53%)
- 84 (69%) of peri-transplant *S. aureus* growth was methicillin-susceptible *S. aureus* (MSSA), 30 (25%) methicillin-resistant *S.aureus* (MRSA), and 7 (6%) had MSSA and MRSA
- Recipient baseline characteristics and median length of hospitalization were similar
- In the *S. aureus* cohort, more donors died from drug intoxication (50% vs 31%, p = 0.005), were increased risk donors (69% vs 46%, p=0.041), and were younger (median age 33 vs 38, p=0.053)
- The median duration of antibiotics post-transplant was 28-days in the *S. aureus* group
- 67% of non-*S. aureus* recipients received *S. aureus* targeting antibiotics (p = <0.001) for other indications for a median of 13-days
- Patients who had a *S. aureus* infection post-transplant had lower 6-month survival that was not statistically significant (85% vs 93%, p = 0.131)

Discussion

- The growth of *S. aureus* on peri-transplant respiratory cultures did not increase the risk of having a *S. aureus* infection post-transplant.
- Growth of *S.aureus* was not associated with increased mortality or rejection at 6-months.
- The impact of a shorter duration of peri-transplant antibiotics on recurrence of infection and outcomes needs to be further studied.

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