

Impact of a pharmacist on transitions and ambulatory outcomes in lung transplant recipients

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Background: Lung transplant recipients (LTRs) require complex lifelong pharmacotherapy and monitoring to prevent allograft rejection, infection, and other complications. Minimal data exists describing the impact of a pharmacist in transitions of care (TOC) and ambulatory medication management in LTRs.

Objective: Following a 2-tiered implementation of comprehensive pharmacy services, we sought to investigate the impact of a dedicated inpatient and ambulatory lung transplant pharmacy team on both TOC and 1 year clinical outcomes in LTRs.

Methods: A retrospective 3 group cohort study of LTRs was conducted. Cohort 1 included LTRs transplanted from 1/1/2015-12/31/2017 who were seen ad hoc by an ambulatory pharmacist. Cohort 2 included LTRs transplanted from 1/1/2018-12/31/2018 who were seen at each routine ambulatory visit by a pharmacist and physician. Cohort 3 included LTRs transplanted from 1/1/2019-12/31/2019 who were followed inpatient by a dedicated pharmacist then outpatient as per Cohort 2. Dual organ, pediatric and LTRs who did not survive to hospital discharge were excluded. All LTRs received basiliximab induction and tacrolimus goal 8-12ng/mL, mycophenolate, and prednisone 20mg daily immunosuppression. Outcomes assessed were twofold: TOC outcomes included appropriate guideline-based post-operative anti-infective and preventative medications upon hospital discharge, medication errors at first clinic visit and 30- and 90-day readmissions; ambulatory outcomes included 1 year rates of blood pressure and hemoglobin A1c (A1c) at goal, bone health monitoring and therapies, tacrolimus level variability (assessed by level coefficient of variation [CV]), and appropriate preventative medication regimens. No other protocol changes occurred during the study period. Chi-squared and ANOVA analyses were used.

Results: 63 LTRs were included, with no significant differences between cohorts other than rate of diabetes at transplant (Table 1). Several TOC outcomes were improved in Cohort 3 compared to Cohort 1 and 2, including increased medication education, reduction in medication errors and increased use of preventative therapies (Table 2). At 1 year, more LTRs in Cohort 2 and 3 were on lipid and bone health therapies, with similar rates of A1c at goal despite a higher rate of underlying diabetes in Cohort 3 (Figure 1). Over 1 year, outpatient pharmacy-led visits significantly increased in Cohort 2 and 3 with no differences in number of physician visits. No differences in rejection or patient/graft survival was seen.

Conclusion: Based on this single center limited cohort study, integration of dedicated inpatient and ambulatory transplant pharmacists reduced medication errors at index hospital discharge and improved use of supportive care therapies at 1 year post-transplant.

Table 1. Baseline Demographics

	Cohort 1 (n=39)	Cohort 2 (n=16)	Cohort 3 (n=8)	P value
Male Sex, n (%)	22 (56.4)	11 (68.8)	7 (87.5)	0.41
Age at transplant, median (range)	50 (16-78)	61 (26-73)	58.5 (20-82)	0.64
Race, n (%)				0.53
Caucasian	29 (74.4)	15 (93.8)	7 (87.5)	
Black	9 (23.1)	1 (6.3)	1 (12.5)	
Other	1 (2.6)	0 (0)	0 (0)	
Primary Lung Diagnosis, n (%)				0.10
Restrictive	23 (59)	6 (37.5)	4 (50.0)	
Cystic fibrosis	10 (25.6)	4 (25.0)	3 (37.5)	
Pulmonary vascular disease	6 (15.4)	2 (12.5)	0 (0)	
Obstructive lung disease	0 (0)	2 (12.5)	0 (0)	
Other	0 (0)	2 (12.5)	1 (12.5)	
LAS at transplant, median (range)	45 (33-92)	39 (30-94)	41 (37-85)	0.43
Pre-Transplant Diabetes, n (%)	6 (15.4)	2 (12.5)	6 (75)	<0.001
Pharmacist visits, median (range)	6 (0-18)	12.5 (1-35)	13 (12-21)	<0.001
Physician visits, median (range)	20 (8-34)	18 (3-52)	17 (6-25)	0.26

Table 2. Transition of Care Outcomes

	Cohort 1 (n=39)	Cohort 2 (n=16)	Cohort 3 (n=8)	P value
Post-Transplant LOS, median (range)	17 (8-80)	21 (8-102)	33.5 (8-76)	0.03
30 day readmission, n (%)	17 (43.6)	7 (43.8)	3 (37.5)	0.95
90 day readmission, n (%)	22 (56.4)	10 (62.5)	5 (62.5)	0.89
Discharge Medication Education, n (%)	30 (76.9)	9 (56.3)	8 (100)	0.02
Discharge Medications, median (range)	24 (14-46)	21 (14-42)	27 (18-46)	0.07
Medication errors at first clinic visit	--	2 ± 1.6	1 ± 0.8	0.04
Discharge Medications				
PJP, Antiviral, and Antifungal Prophylaxis, n (%)	39 (100)	16 (100)	8 (100)	1.00
Proton pump inhibitor, n (%)	39 (100)	16 (100)	8 (100)	1.00
Azithromycin, n (%)	31 (79.5)	12 (75.0)	8 (100)	0.32
Statin, n (%)	13 (33.3)	7 (43.8)	7 (87.5)	0.02
Calcium, n (%)	5 (12.8)	5 (31.3)	7 (87.5)	<0.001
Vitamin D, n (%)	20 (51.3)	10 (62.5)	7 (87.5)	0.16

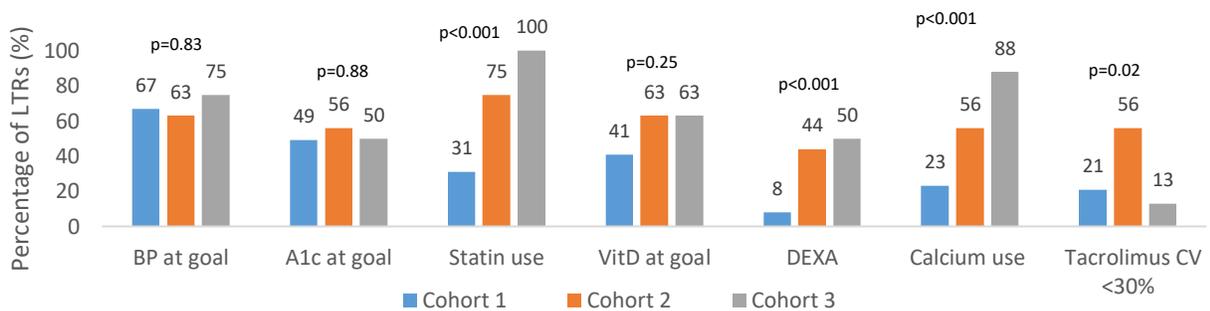


Figure 1. Outpatient Outcomes at 1 Year