

ABSTRACT

OBJETIVE

METHODS

Objective: To evaluate the outcomes of tracheotomy performed on lung transplant patients. To compare these outcomes to tracheotomy performed on non-transplant patients for the same indications.

Methods: A retrospective chart review of all patients who underwent lung transplantation at Temple University Hospital from 2010 – 2016 was performed. Those patients who required a tracheotomy post-transplantation were identified. An age and gender matched group of patients who underwent tracheotomy during the same time period but were not previously transplanted were used as a control. The indications, technique, risk factors, and outcomes were recorded. Multivariate and chi square analysis were used to compare the two groups.

Results: 285 lung transplants patients were identified of which 55 patients (19.3%) met inclusion criteria. There were 33 (60%) males and 22 (40%) females. Average age at time of transplant was 62. Tracheotomy in lung transplant patients was highly correlated with death (56% vs 11%, $\chi^2(1, N=110) = 24.5, p < 0.001$) (OR, 10.5; 95% CI, 3.9 – 28.7). Lung transplant patients were more likely to be decannulated than their non-transplant counterparts (67% vs 36%, $\chi^2(1, N=110) = 10.5, p < 0.001$) (OR, 3.6; 95% CI, 1.6 – 7.9). The correlation with long term laryngotracheal complications was not significant (4% vs 13%, $\chi^2(1, N=110) = 3.0, P = 0.8$) (OR, 0.3; 95% CI, 0.05 – 1.3).

Conclusions: Patients who undergo tracheostomy after lung transplant have outcomes that are significantly different from non-transplanted patients who undergo the same procedure.

- There are several benefits of tracheotomy in patients who require long term mechanical ventilation.
- Complications of tracheotomy include bleeding, infection, dislodgement, pneumothorax, pneumomediastinum, subcutaneous emphysema, laryngotracheal stenosis, tracheocutaneous fistula, and death.
- Patients who have undergone lung transplantation represent a unique population who often require ventilator support yet have increased perioperative risks secondary to their immunocompromised state and associated comorbid conditions.
- Our aim is to evaluate the outcomes of tracheostomy in lung transplant (LT) recipients and compare them to a matched population of non-transplanted (NT) patients who have undergone tracheotomy for ventilator dependence.

- A retrospective review of lung transplant patients from 2010 – 2016 was conducted.
- This cohort was compared to a matched group of non-transplanted tracheotomy patients in the same time period.
- All procedures were done at Temple University Hospital.
- Lung transplant patients were excluded if they had a concurrent solid organ transplant that was not a lung, or if they underwent tracheotomy prior to lung transplantation.
- Non-transplanted tracheotomy patients were excluded if the indication for the procedure was anything other than ventilator dependent respiratory failure (VDRF).
- Statistical analysis was completed in IBM SPSS and Microsoft Excel.

RESULTS

Demographics				Tracheostomy Perioperative Data			
	NT	LT	P value		NT	LT	P value
Total	55	55		ETT size prior to trach(fr*)	7.7±0.4	8.0±0.3	p< 0.001
Male	28 (51%)	33(60%)	p= 0.3	Tracheostomy tube size (fr*)	7.5±0.8	8±0	p< 0.001
Female	27(49%)	22(40%)		Anticoagulation at time of trach	7 (13%)	26 (47%)	p< 0.001
Age	59.8 ± 14.8	62.0 ± 9.3	p= 0.4	ECMO required	2 (4%)	27 (49%)	p< 0.001
Smoking Status	Former = 13(24%) Current = 10 (18%) Never = 20 (36%)	Former = 44 (80%) Current = 0 Never = 11 (20%)		PT	13.7	13.6	p= 0.9
BMI	29.6 ± 7.9	28.8 ± 4.1	p= 0.5	PTT	35.0	42.1	p= 0.04
Height (cm)	166.7 ± 10.5	169.3 ± 9.2	p= 0.2	INR	1.1	1.1	p= 0.9

Tracheostomy Procedural Data				Tracheostomy Complication Diagnoses			
		NT	LT		NT	LT	
Technique*	Open	36 (65%)	5 (9%)	p< 0.001	Early	Bleeding (1) Tracheitis (1) Difficulty ventilating (1)* Accidental decannulation(1)	Bleeding (1)* Tracheitis (1) Difficulty ventilating (1)* Pneumomediastinum (1) Subcutaneous emphysema (1)
	Perc**	14 (25%)	50 (91%)				
Location	ICU	14 (25%)	47 (85%)	p< 0.001	Late	Mild Subglottic stenosis (1) Accidental decannulation (2)** Tracheitis (1)*** Stomal granulation tissue (1) Mucus plugging (2)*	Subglottic stenosis (1) Tracheocutaneous Fistula (1)*
	OR	41 (75%)	8 (15%)				

*There were 5 (9%) NT patients who underwent a combination of open approach to the trachea with percutaneous creation of tracheostomy. **Percutaneous. All tracheostomies were performed for ventilator dependent respiratory failure.

*Required procedural intervention or management in the operating room. **Tolerated by patients and considered day of decannulation. ***Required readmission.

Outcomes					
	NT	LT	χ^2	Odds Ratio	95% CI
Decannulation	20 (36%)	37 (67%)	(1, N=110) = 10.5, p=0.001	3.6	1.6 – 7.9
Early Trach Complication	3 (5%)	5 (9%)	(1, N=110) = 0.5, p=0.5	1.7	0.4 – 7.6
Late Trach Complication	7 (13%)	2 (4%)	(1, N=110) = 3.0, p=0.8	0.3	0.05 – 1.3
Discharge Home	2 (4%)	14 (25%)	(1, N=110) = 14.8, p< 0.001	13.2	2.8 – 62.6
Death	6 (11%)	31 (56%)	(1, N=110) = 25.4, p<0.001	10.5	3.9 – 28.7
Lost to Follow up	27 (49%)	0	(1, N=110) = 35.8, p<0.001	*RR: 0.5	0.4 – 0.7

* Relative risk reported as odds ratio could not be calculated.

Outcomes			
	NT	LT	P value
Avg Length of ICU stay*	25.3±10.7	43.3±33.9	p< 0.001
Avg Time to Death**	35.5±25.4	401.5±485.5	p=0.04
Avg Time to Discharge**	22.3±20.3	61.9±35.6	p< 0.001

*During admission that tracheostomy was performed. **From time tracheostomy was performed. Averages are reported in days.

CONCLUSION

- While lung transplant patients and non transplanted patients both undergo tracheostomy for VDRF, each group's respective perioperative factors differ significantly.
- Lung transplant patients undergo significantly more bedside percutaneous tracheostomies and on average are more frequently on ECMO and anticoagulation when undergoing the procedure.
- Lung transplant patients are more likely to be decannulated and more likely to be discharged home.
- Non transplanted tracheostomy patients were more likely to be lost to follow up.
- Likelihood of an early or late complication secondary to tracheotomy was not significantly different between the two groups.