



Early Tracheostomy and the Incidence of Posterior Vocal Cord Ulcers

Aldin Malkoc^a, Danny T. Nguyen^a, Stephanie Wong^a, Vi Doe^a, David T. Wong^a.

^aArrowhead Regional Medical Center, 400 N Pepper Ave, Colton, CA 92324, USA

The authors declare there is no conflict of interest. The research presented had no specific funding from any agency in the public, commercial or not-for-profit sectors.

Background

Endotracheal intubation is a routinely performed procedure in the ICU that can result in laryngeal injury. Many injuries from intubations occur at the posterior vocal cords (PVC) and can present as superficial ulcers that can progress to involve deeper mucosal layers.

Posterior vocal cord ulcers (PVCU) can lead to the development of:

- Granulomas
- Vocal cord dysfunction
- Increase risk of aspiration

There is currently no consensus in the literature on the incidence of PVCU. One method to determine the occurrence of PVCU is during a tracheostomy. **This study investigated the length of time ICU patients can be on a ventilator before the development of PVCU by determining the presence of PVCU at the time of tracheostomy placement.**

Methods and Results

This was an IRB approved retrospective analysis of 1,355 patients from 2002–2018 who received a tracheostomy. Post tracheostomy operative notes were reviewed and considered only if proper visualization of the vocal cords was documented.

Demographic data was ascertained.

Primary outcome measures included the presence of:

- PVCU
- Length of time on a ventilator until a tracheostomy
- Length of hospitalization
- Mortality

Ulcers were stratified by severity (mild, moderate, and severe) and were analyzed using ANOVA with an alpha of 0.05. Data was reported as *n* (%) and median (IQR).

Socio-demographic and Clinical Variables by severity of Posterior Vocal Cord Ulcer. Categorical variables are presented as total number with percentages. Continuous variables are reported as median with IQR. Significant differences are in bold.

Characteristic	No Posterior Vocal Cord Ulcer (n=39)	Mild Posterior Vocal Cord Ulcer (n=52)	Moderate Posterior Vocal Cord Ulcer (n=47)	Severe Posterior Vocal Cord Ulcer (n=54)	<i>P</i> ^a
Age	44 (27, 59)	51 (34, 65)	51 (42, 58)	65 (51, 73)	<0.001
Male (%)	28 (72%)	31 (60%)	23 (49%)	33 (61%)	0.186
Body Mass Index	27 (22, 31)	26 (23, 31)	25 (20, 30)	27 (23, 32)	0.085
Body Surface Area	1.9 (1.7, 2.2)	1.9 (1.7, 2.1)	1.8 (1.7, 1.9)	2.0 (1.8, 2.1)	0.008
Length of Hospitalization	34 (19, 48)	28 (19, 43)	38 (21, 73)	28 (20, 46)	0.113
Length on Ventilator until Tracheostomy Placement	6 (4, 7)	9 (5, 13)	10 (8,15)	11 (8, 17)	<0.001
Mortality (%)	8 (13%)	4 (8%)	6 (13%)	6 (11%)	0.833

^aAge, Length of Stay, Length on Ventilator until Tracheostomy, Body Mass Index, and Body Surface Area analyzed with ANOVA. All other comparisons with Chi-square test.

Discussion

192 patients were included in the study and divided into two groups: patients who developed PVCU (*n* = 153) and patients who did not develop PVCU (*n* = 39).

Comparisons were calculated between patients with and without PVCU.

- Most notably, there was a statistically significant difference (*P* < 0.001) between the length of time on a ventilator before tracheostomy and the severity of the PVCU seen

There was no statistically significant difference between gender, BMI, and mortality.

Conclusion

Patients with PVCU were on average older and intubated for longer. **Longer intubation before tracheostomy correlated with more severe ulceration of the PVC suggesting earlier conversion to tracheostomy may decrease the incidence of severe PVCU and possibly decrease associated morbidity**