



# Tube Complications in Patients with ARDS Requiring ECMO: Worse in COVID-19 Patients?

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## Introduction

- Tube thoracostomy placement in COVID-19 patients with acute respiratory distress syndrome (ARDS) requiring venovenous extracorporeal membrane oxygenation (VV ECMO) support is common.
- Outcomes following tube thoracostomy, however, are largely unreported.
- We sought to explore differences in complication rates between patients with and without COVID-19.

## Methods

- Single institution, retrospective case-control study of patients with COVID-19 related ARDS requiring VV ECMO.
  - Cohort was matched 1:1 for age and gender to controls requiring VV ECMO for ARDS-related diagnoses from January 2018 – January 2020
- Primary outcome was any complication following initial tube thoracostomy placement defined as tube malposition, tube obstruction, persistent hemo/pneumothorax or recurrent hemo/pneumothorax after removal requiring intervention.

## Results

- No differences in comorbidities between groups (**Table 1**)
- Patients with COVID-19 were as likely to receive tube thoracostomy as controls, 36% vs 32%, p=0.41 (**Table 2**)
- Tube-related complications were more common in patients with COVID-19, 77.8% vs 25.0%, **p=0.03 (Table 3)**
- COVID-19 patients were also more likely to require more than one tube thoracostomy during admission, 88.9% vs 37.5%, **p=0.03 (Table 3)**

**Table 1. Demographic information of COVID-19 and control patients**

	COVID-19 Patients (n=25)	Control Patients (n=25)	p-value
Age, mean (SD)	45.32	44.88	0.966
BMI, mean (SD)	34.66	38.31	0.121
Male gender, n (%)	21 (84)	21 (84)	1.000
Smoker, n (%)	6 (24)	9 (36)	0.165
Diabetes, n (%)	11 (44)	11 (44)	1.000
Hypertension, n (%)	9 (36)	10 (40)	0.771
COPD, n (%)	0 (0)	1 (4)	0.312
Asthma, n (%)	2 (8)	0 (0)	0.149
Pre-existing renal insufficiency, n (%)	0 (0)	1 (4)	0.312
Time on ECMO, days (mean, SD)	23.4 (21.5)	17.4 (20.0)	0.312
ECMO survival (%)	64%	88%	<b>0.047</b>
ICU survival (%)	64%	88%	<b>0.047</b>

**Table 2. Tube thoracostomy incidence in ARDS patients requiring ECMO**

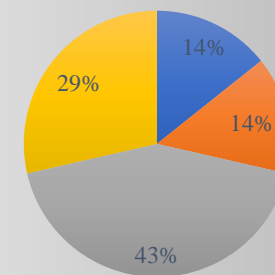
	COVID Patients (n=25)	Control Patients (n=25)	OR	95% CI	p Value
Pneumothorax	36%	28%	1.65	(0.49, 5.54)	0.41
Chest tube placement	36%	32%	1.19	(0.37, 3.86)	0.765

*The views expressed are those of the presenter and do not reflect the official views or policies of the Department of Defense or its Components*

**Table 3. Tube thoracostomy complications in ARDS patients requiring ECMO**

	COVID Patients (n=9)	Control Patients (n=8)	OR	95% CI	p Value
Complications	77.8%	25.0%	10.50	(1.11, 98.9)	<b>0.030</b>
>1 complication	77.8%	0%	4.50	(1.33, 15.28)	<b>0.001</b>
>1 tube thoracostomy procedure	88.9%	37.5%	13.33	(1.07, 166.37)	<b>0.027</b>

**Type of Complication Following Initial Tube Thoracostomy Placement in COVID-19 Patients**



- Tube malposition
- Tube obstruction
- Persistent hemo/pneumothorax
- Recurrent hemo/pneumothorax

## Conclusions

- Complications following tube thoracostomy placement in COVID-19 patients requiring VV ECMO are common
- The need for multiple tube thoracostomies and re-intervention in these patients is high