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New perspectives on timing towards tracheostomy among critically ill COVID-19 patients: Role of pressure support ventilation

Juan Pablo Saullo[1], **Indalecio Carboni Bisso**[1], Carolina Lockhart[1], Ignacio Fernández Ceballos[1], Joaquin Cantos[1], Ivan Huespe[1], Marcos Las Heras[1]

[1] Intensive Care Unit, Hospital Italiano de Buenos Aires

Background

The optimal time to perform a tracheostomy (TT) in critically ill COVID-19 patients has been an object of study during the pandemic but remains in debate.

The current study examined the hypothesis that ventilated COVID-19 patients who underwent Pressure support ventilation (PSV) before TT presented more mechanical ventilation-free days (VFDs) than patients who did not achieve enough recuperation to tolerate spontaneous ventilation modes. This perspective could further clarify individualized TT procedure moment.

Methods

A single-center retrospective cohort study was performed in the ICU of a high-complexity university hospital in Buenos Aires, Argentina. Participants were recruited between March 1st, 2020, and June 30th, 2021.

Consecutive adult patients with severe COVID-19 tracheostomized during the hospitalization were included. We divided the cohorts between patients who underwent PSV before TT and patients who did not. The main outcome was ventilator-free days.

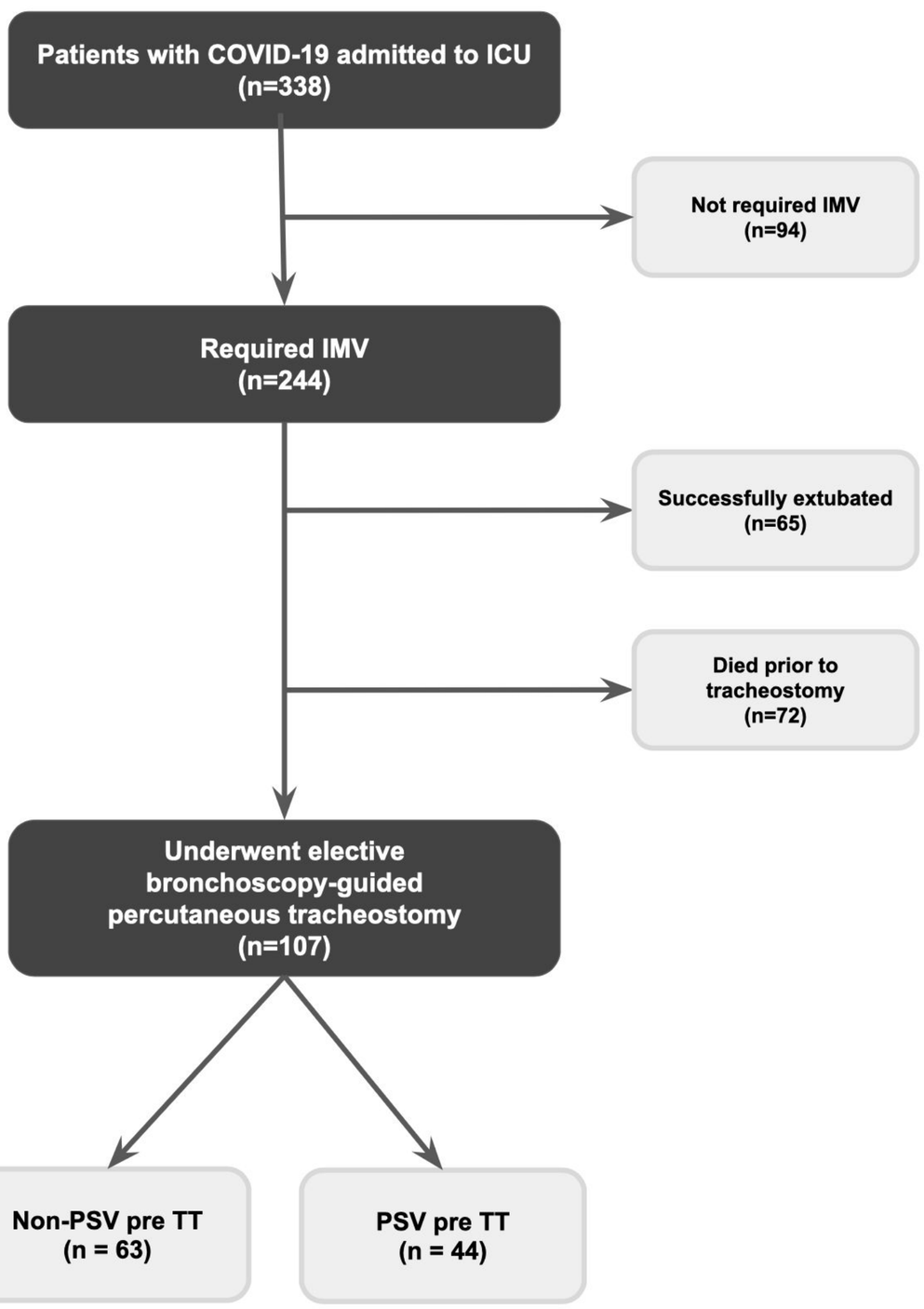
The liberation from mechanical ventilation (MV) at 60 days was studied by performing a competing risk regression model on data, according to the method of Fine and Gray; the event death was considered a competing risk, and the event extubation was considered a failure.

Results

During the study period, 338 patients were admitted to the ICU due to COVID-19. 244 required MV and 107 underwent percutaneous TT.

Patients who performed PSV before TT presented 20 VFDs and a median of 36 days of MV (IQR 30-46.8) vs. 18 VFDs and 37 (IQR 30-46) days of MV in the non-PSV before TT group.

In the Fine and Gray analysis, the sub-hazard ratio of non-PSV before TT was 1.05 (95% CI 0.66-1.69), and adjusted for confounders was 1.01 (95% CI 0.43-2.36).



	All patients (n=107)	Non-PSV pre TT (n=63)	PSV pre TT (n=44)	p.overall
Age - mean (SD)	65 (12.9)	66 (12)	62 (13)	0.122
Male sex - n (%)	69 (65%)	39 (62%)	30 (68%)	0.717
Body mass index	29.4 (5.6)	29.7 (5.8)	29.1 (5.2)	0.594
APACHE II - median (IQR)	12 (8 - 16)	12 (9 - 16)	10 (8 - 15)	0.331
SOFA - median (IQR)	3.5 (2 - 6)	4 (3 - 5)	3 (2 - 6)	0.447
Charlson - median (IQR)	4 (3 - 5)	4 (3 - 5)	3 (2 - 4)	0.111

Table 1. Clinical characteristics of patients.

	All patients (n=107)	Non-PSV pre TT (n=63)	PSV pre TT (n=44)	p.overall
Hospital mortality, n (%)	21 (21%)	11 (18.6%)	10 (24.4%)	0.65
Days from initial symptoms to MV	9 (6-13)	9 (6-12)	10 (8-14)	0.14
Days from MV to PSV	16 (9-22)	10 (7-16)	22 (20-32)	<0.001
Days using a ventilator	36 (30-46)	36 (30-46)	37 (30-46)	0.61
Days from last BNM use to PSV	7.5 (2-13)	4.5 (2-10)	10.5 (6-14)	0.01
VFDs at 60 days	18.5 (0-29)	18 (0-29)	20 (0-28)	0.93
UCI length of stay, days	34 (30-48)	33 (28-44)	35 (32-50)	0.14
Hospital length of stay, days	52 (39-66)	50 (38-66)	55 (44-69)	0.22

Table 2. Results.

Continuous variables were expressed as medians and interquartile ranges (IQR) or mean and standard deviation (SD), as appropriate.
Categorical variables were summarized as counts and percentages.

Conclusion

In critically ill COVID-19 ventilated patients, PSV previous to TT, regardless of the day of the procedure, has no statistical significance in terms of mechanical ventilation-free days.

HIBAVENTILA

Corresponding author:
juan.saullo@hospitalitaliano.org.ar

/hibaventila
@hibaventila
@hibaventila