



# Post-COVID Recovery: Characteristics and Outcomes of Chronically Critically Ill Patients Admitted to a Long-term Acute Care Hospital

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# Disclosures:

Nothing to disclose



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# Background and Methods

- Survivors of COVID-19 pneumonia often suffer from chronic critical illness (CCI) and require long-term hospitalization.
- Long-term acute care (LTAC) hospitals are vital in the care of CCI patients, but their role for patients post COVID-19 infection is not well understood.
- Barlow Respiratory Hospital (BRH) is a 105-bed, not for profit, LTAC hospital serving ventilator-dependent and medically complex patients transferred from the ICUs of hospitals in southern California.
- Single-center observational descriptive report of patients recovering from acute infectious complications of COVID-19 pneumonia.
- Patients with at least one positive COVID-19 polymerase chain reaction testing (PCR) prior to admission to BRH were enrolled in the study on an ongoing basis.
- From 6/01/2020 – 12/08/2020, 240 patients were discharged from BRH; 51 (21%) were admitted for recovery from post-COVID pneumonia.
- We report patient characteristics and outcomes of our first series of COVID-19 survivors admitted to the post-acute venue of an LTAC hospital.



**Table 1. Selected Demographics and Characteristics of Patients Admitted for Post-COVID Recovery**

<b>Variable</b>	<b>n=51</b>
<b>Age, years</b>	68 [28-94]; 68 ± 15
<b>Gender, male</b>	30 (59%)
<b>Premorbid location, home</b>	36 (70.6%)
<b>Race/Ethnicity:</b>	n (%)
<i>African American</i>	2 (3.9)
<i>Asian/Pacific Islander</i>	8 (15.7)
<i>Caucasian</i>	19 (37.3)
<i>Hispanic</i>	22 (43.1)
<b>COVID-19 risk factors:</b>	n (%)
<i>Type 2 diabetes mellitus</i>	29 (56.9)
<i>Hypertension</i>	38 (74.5)
<i>Coronary artery disease</i>	15 (29.4)
<i>Hyperlipidemia</i>	19 (37.3)
<i>Obesity (BMI ≥ 30)</i>	20 (39.2)



## Table 2. Selected Event Occurrences at Transferring Hospital

Variable	n (%)
ARDS	18 (35.3)
Sepsis/septic shock	25 (49)
Invasive mechanical ventilation	42 (82.4)
Tracheostomy	38 (74.5)
Acute kidney injury/acute renal insufficiency	27 (53)
Heart failure/cardiac injury	18 (35.3)
Transferring hospital ICU/CCU days	36 [8-77]; 37.3 ± 18.2
Transferring hospital length of stay, days	39 [8-78]; 40 ± 19.8

**Table 3. Status of Post-COVID Recovery Patients on Admission to Barlow**

Variable	n=51
Invasive mechanical ventilation	25 (49%)
<i>Admitted to Ventilator Weaning Program</i>	<i>16 (64%)</i>
Tracheostomy tube	38 (74.5%)
Hemodialysis	11 (21.6%)
Enteral feeding tube	38 (74.5%)
Oral alimentation	12 (23.5%)
Central line	25 (49%)
Indwelling urinary catheter	20 (39.2%)
Pressure injury $\geq$ stage 2	39 (76.5%)
Multiple pressure injuries	24 (47.1%)
Laboratory values: Mean (SD)	
Serum albumin (g/dl)	2.72 (0.68)
Hematocrit (%)	31.3 (5.78)
BUN (mg/dl)	39.2 (25.6)
Creatinine (mg/dl)	1.5 (2.0)
Glucose	147.6 (57.1)

**Table 4. Ventilator Weaning Program Outcomes: COVID vs Non COVID Patients (6/1/2020 – 12/8/2020)**

Variable	COVID (n=16)	Non COVID (n=92)
Age, years (MED, AVG)	66.5 [28-87]; 65.6 ± 14.8	70.5 [28-104]; 70.6 ± 13.1
Gender, male (n, %)	12 (75%)	57 (62%)
Transfer hospital LOS, days	41 [11-78]; 46.5 ± 20.1	18.5 [1-94]; 21.8 ± 16.4
Pressure injury ≥ stage 2	14 (87.5%)	78 (85%)
Multiple pressure injuries	11 (69%)	48 (52%)
<b>Weaning Outcomes (scored at discharge):</b>		
Weaned	13 (81%)	50 (54%)
Ventilator Dependent	1 (6%)	34 (37%)
Died	2 (13%)	8 (9%)
Time to wean, days (MED, AVG)	17 [9-76]; 25 ± 19.4	12 [4-61]; 16.5 ± 14.2
Length of stay, days	57 [5-92]; 53.5 ± 26.1	44.5 [8-221]; 62 ± 48
Hemodialysis patients	3 (19%)	17 (18.5%)



**Table 5. Outcomes of Care: Admission and Discharge Comparisons\* (n = 45)**

Variable	Admission (n (%))	Discharge (n (%))
Tracheostomy tube	38 (84.4)	20 (44.4)
Central line	25 (55.6)	15 (33.3)
Indwelling urinary catheter	20 (44.4)	8 (17.8)
Feeding tube	38 (84.4)	32 (71.1)
Oral alimentation	12 (26.7)	28 (62.2)
Hemodialysis	11 (24.4)	10 (22.2)
Pressure injuries $\geq$ stage 2 (n)	80	36

\* *Outcomes of Care comparisons presented for live discharges*

**Table 6. Discharge Disposition (n=51)**

Location	n (%)
Home	8 (15.7)
Inpatient acute rehab facility	11 (21.6)
Subacute/skilled nursing facility	14 (27.4)
Short-term acute care hospital	11 (21.6)
Hospice	1 (2)
Expired	6 (11.7)
Length of stay, days (MED, MEAN)	28 [2-174]; 35.8 $\pm$ 30.7

# Comments and Conclusions

- Patients present with physiological imbalances, numerous penetrating and indwelling catheters and disruptions of skin integrity breaching host defenses, and manifestations of allostatic load burden.
- These patients continue to require considerable medical interventions and treatments, including weaning from mechanical ventilation, owing to the numerous sequelae of the infection and the burden of acute-on-chronic diseases.
- Outcomes – ventilator weaning, decannulation, removal of indwelling catheters and lines, wound healing, decreased oxygen needs, oral alimentation – were safely realized at the LTAC hospital level of care.
- As ICU survival rates improve, this research further emphasizes the important role of the LTAC in responding to the COVID-19 crisis. LTAC hospitals will play an increasingly critical function to fill gaps in our preparedness and response to COVID-19 infection by resuming and relieving care initiated in the acute hospital setting.
- Limitations: single center descriptive report, with a small cohort of patients, and a still emerging evidence base for COVID and post-COVID infection. Patient characteristics from this single center study may not be applicable to other centers or the post-COVID pneumonia population in general due to geographic differences in patient demographics, referral patterns, and facility-specific treatment capabilities.



# Contacts and Acknowledgments

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