


Palliative care in critically ill COVID-19 patients: the early New York City experience

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ABSTRACT

Objectives The COVID-19 pandemic in the USA has been accompanied by high rates of mortality and an unprecedented need for palliative care delivery. Little is known about the use of palliative care services in intensive care unit (ICU) settings during the COVID-19 pandemic.

Methods This is a retrospective cohort study of critically ill COVID-19 patients requiring ICU admission, between 7 March and 14 April 2020 to two academic teaching hospitals in New York City. Palliative care consultation included a one-time telemedicine consultation or continued telemedicine consultation and follow-up with multidisciplinary team involvement. Patient information was collected from the electronic health record and analyses were conducted with Stata V.15.1 (StataCorp) statistical software.

Results A total of 151 critically ill patients with COVID-19 pneumonia requiring ICU admission were identified, of whom 59 (39.07%) received an inpatient palliative care consultation. More than half of patients died (n=85/151, 56.29%), with 57.65% (n=49/85) of these patients receiving palliative care services during their hospitalisation. Patients who received palliative care consultation were more likely to be older, sicker and receive mechanical ventilation than their counterparts. Patients who died and did not receive palliative care were younger and required non-invasive ventilation support.

Conclusion There is a lack of utilisation of palliative care in COVID-19 patients admitted to the ICU. Further research into predictors of poor outcomes in critically ill COVID-19 patients may help identify patients that would benefit from early palliative care involvement going forward.

INTRODUCTION

The COVID-19 pandemic in the USA has been accompanied by high rates of mortality and an unprecedented need for palliative care delivery. As of 30 September 2020, the number of COVID-19 cases in

the USA has surpassed 7 million, resulting in over 200 000 deaths.¹ Even in non-pandemic times, approximately one in five deaths in the USA occurs during or shortly after admission to the intensive care unit (ICU). Palliative care delivery in the ICU has been shown to reduce the length of stay and improve communication between providers and family members.² Those diagnosed with COVID-19 have an estimated mortality of around 2%.³ It is estimated that approximately 15%–20% of cases require hospitalisation, and 3%–5% require critical care.⁴ Mortality rates vary widely in those who require mechanical ventilation, ranging from anywhere from 25% to 97%.^{3–5}

Research to date, examining the role of palliative care during this pandemic has focused on strategies developed to implement novel palliative care models in the hospital setting.⁶ This research has also highlighted the overall utilisation of palliative care services in patients admitted to the hospital with COVID-19,⁷ along with proactive strategies applied in ICU settings to quickly identify patients with palliative care needs.⁸ The objective of this study was to examine the utilisation rates of palliative care consultation in critically ill patients with COVID-19 pneumonia admitted to two ICUs in New York City.

METHODS

Between 7 March and 14 April 2020, 151 consecutive adult patients with confirmed COVID-19 pneumonia, requiring ICU admission at two academic hospitals, were identified. Patient information, including demographic data, clinical characteristics, laboratory parameters and outcomes, were collected from the electronic health record.

During this study period, the delivery of palliative care services in our two

hospitals was adapted to minimise the transmission of COVID-19 among patients, families and clinicians. Telemedicine, using video or telephone conference calls, with patients and their families, formed the basis of two palliative care consultation models employed in our institution. The first type was based on the conventional inpatient palliative care service model incorporating a multidisciplinary team (MDT) approach, including the palliative care provider, critical care team, patient, family, social worker and chaplain. The palliative care team conducted family meetings, addressed patients' symptom burden and provided emotional support to patients and their families using video and telephone calls. The second type of consultation was a single point in time telemedicine visit between the palliative care provider, patient and family. The critical care provider would update the palliative care provider regarding the patient's medical condition. The palliative care provider would then reach out to the patient and/or family to conduct a one-time advance care planning and goals of care discussion. On initial consultation, the palliative care provider and critical care provider would determine if a single telemedicine visit or continued telemedicine follow-up with MDT would be appropriate, based on the needs of the patient and family.

All statistical analyses were conducted with Stata V.15.1 (StataCorp). Proportions were compared using the Fisher's exact test, and continuous variables were compared using the Student's t-test. All p values were two sided, with 0.05 as the threshold for statistical significance. Univariate logistic regression was performed to explore the association of clinical characteristics with the need for palliative consultation. Confounding variables were selected based previous studies on predictors of mortality in COVID-19 with a causal inference model, and consideration of any variables with a $p < 0.2$ from univariate logistic regression.^{4 5 9} Propensity score using the next neighbour method without replacement with 2:1 matching was created to adjust for confounders.¹⁰

RESULTS

A total of 151 critically ill patients with COVID-19 pneumonia requiring ICU admission were identified during the study period, of whom 59 (39.07%) received an inpatient palliative care consultation. More than half of patients died ($n=85/151$, 56.29%), with 57.65% ($n=49/85$) of these patients receiving palliative care during their hospitalisation.

Among the fifty-nine ICU patients who received palliative care consultation, 16 received a one-time telemedicine consultation, 39 received continued telemedicine and follow-up with MDT involvement, and 4 patients initially received one-time telemedicine consultation, followed by continued telemedicine and follow-up.

The mean age for patients included in this study was 62.63 ± 15.54 years. Most patients included were male ($n=103/151$, 68.21%) and Hispanic ($n=52/151$, 34.44%) or African American ($n=43/151$, 28.48%). The most common comorbidity present in this patient cohort was hypertension (60.93%), followed by hyperlipidaemia (39.07%). Eighty-seven (57.62%) patients had a Charlson Comorbidity Index (CCI) of 3 or above. All patient characteristics are displayed in table 1.

Patients who received palliative care consultation were older (71.24 ± 12.44 vs 57.20 ± 14.87 years, $p < 0.001$), had higher CCI (77.97% vs 44.57%, $p < 0.001$) and required mechanical ventilation (84.75% vs 47.83%, $p < 0.001$), when compared with those who did not receive palliative care consultation. Among patients who died, those who did not receive palliative care services prior to their death were younger (64.72 ± 11.93 vs 72.81 ± 11.80 years, $p = 0.003$) and required non-invasive ventilation support (36.11% vs 12.24%, $p = 0.01$), when compared with those who died and received palliative care consultation. Conversely, those who received palliative care services prior to their death had a higher rate of invasive mechanical ventilation (87.76% vs 63.89%, $p = 0.01$), compared with their counterparts.

Total hospital length of stay was shorter in patients who died compared with patients who survived their hospitalisation (14.42 days vs 22.63 days, $p = 0.002$). Subsequent two-to-one propensity score matching was applied (see Supplemental Table 1), resulting in similar distribution of age, gender, race, insurance status, body mass index, CCI, use of invasive mechanical ventilation, shock and death in patients who received palliative care consultation and patients who did not. After propensity matching, palliative care consultation was associated with similar length of ICU and hospital stay to patients who did not receive palliative care services.

DISCUSSION

This study on critically ill patients with COVID-19 pneumonia, requiring ICU admission, highlights the differences in patients who did and did not receive palliative care services during their stay. Patients who did receive palliative care in this cohort were generally older, sicker and required mechanical ventilation. Unfortunately, almost two-thirds of patients admitted to the ICU did not have a palliative care consult. Similarly, among patients that ultimately died, palliative care was involved in slightly over half of the cases. In our cohort, patients who died without palliative care services, were younger and required non-invasive ventilation supports, compared with their older counterparts who required mechanical ventilation. These major differences in patient characteristics could have potentially led to uncertainty among providers regarding which patients would warrant palliative care involvement, in the setting of a novel virus with an

Table 1 Clinical characteristics of critically ill patients hospitalised with COVID-19 with and without palliative consultation and impact of palliative care on clinical outcomes (propensity score matching)**A. Clinical characteristics of critically ill patients hospitalised with COVID-19**

Characteristics	All patients (n=151)	Palliative care (n=59)	Without palliative care (n=92)	P value
Mean age (years)*	62.63±15.54	71.24±12.44	57.20±14.87	<0.001
Sex—no (%)				
Male	103 (68.21)	38 (64.41)	65 (70.65)	0.48
Female	48 (31.79)	21 (35.59)	27 (29.35)	
Race†—no (%)				
White	38 (25.16)	17 (28.81)	21 (22.83)	0.42
Black	43 (28.48)	17 (28.81)	26 (28.26)	0.94
Asian	6 (3.97)	2 (3.4)	4 (4.35)	0.76
Hispanic	52 (34.44)	17 (28.81)	35 (38.04)	0.24
Other	12 (7.95)	6 (10.17)	6 (6.52)	0.42
Insurance—no (%)				
Medicaid	21 (13.91)	5 (8.47)	16 (17.39)	0.1
Medicare	58 (38.41)	36 (61.02)	22 (23.91)	<0.001
Private	46 (30.46)	13 (22.03)	33 (35.87)	0.06
Uninsured	26 (17.22)	5 (8.47)	21 (22.83)	0.02
Body mass index (range)	33.19±9.29	33.79±9.21	32.81±9.37	0.52
Symptoms—no (%)				
Dyspnoea	120 (79.47)	45 (76.27)	75 (81.52)	0.45
Dry cough	111 (73.51)	41 (69.49)	70 (76.09)	0.38
Fever	101 (66.89)	38 (64.41)	63 (68.48)	0.61
Duration of symptoms prior to ED visit (days)*	6.39±4.13	5.77±3.85	6.78±4.27	0.15
Comorbidities (%)				
Hypertension	92 (60.93)	42 (71.19)	50 (54.35)	0.03
Hyperlipidaemia	59 (39.07)	24 (40.68)	35 (38.04)	0.75
Diabetes	53 (35.10)	26 (44.07)	27 (29.35)	0.07
Charlson Comorbidity Index—no (%)				
0	21 (13.91)	3 (5.08)	18 (19.57)	0.005
1	22 (14.57)	2 (3.39)	20 (21.74)	<0.001
2	21 (13.91)	8 (13.56)	13 (14.13)	0.92
3+	87 (57.62)	46 (77.97)	41 (44.57)	0.001
Treatments—no (%)				
On admission				
Antibiotics	135 (93.10)	52 (91.23)	83 (94.32)	0.52
Fluids	89 (62.68)	36 (66.67)	53 (60.23)	0.48
Adjuvant therapy				
Hydroxychloroquine + azithromycin	136 (90.07)	54 (91.53)	82 (89.13)	0.78
Tocilizumab	64 (42.38)	21 (35.59)	43 (46.74)	0.24
Corticosteroids	70 (46.36)	23 (38.98)	47 (51.09)	0.18
ICU Course				
NIPPV	57 (37.75)	9 (15.25)	48 (52.17)	<0.001
IMV	94 (62.25)	50 (84.75)	44 (47.83)	<0.001
Vasopressors (shock)	78 (53.79)	44 (80.00)	34 (37.78)	<0.001
Renal replacement therapy	38 (25.17)	19 (32.20)	19 (20.65)	0.13
Clinical outcome—no (%)				
Discharged	66 (43.71)	10 (16.95)	56 (60.87)	<0.001
Died	85 (56.29)	49 (83.05)	36 (39.13)	<0.001

Continued

Table 1 Continued

B. Impact of palliative care on length of stay in critically ill patients hospitalised with COVID-19 (propensity score matching)

Characteristics	OR	SD	95% CI	P value
Length of hospital stay				
Days 5–9	1.15	0.76	0.31 to 4.24	0.83
Days 10–14	0.89	0.48	0.31 to 2.60	0.84
Days 15–19	1.34	0.71	0.48 to 3.78	0.57
Days ≥20	2.1	1.22	0.67 to 6.60	0.2
Length of ICU Stay				
Days 5–9	1.04	0.63	0.32 to 3.39	0.95
Days 10–14	0.26	0.18	0.07 to 1.00	0.05
Days 15–19	2.55	2.84	0.29 to 22.60	0.4
Days ≥20	1.68	1.06	0.48 to 5.81	0.41

*Mean±SD (SD).

†Race and ethnic group were reported by the patient.

ICU, intensive care unit; IMV, invasive mechanical ventilation; NIPPV, non-invasive positive-pressure ventilation.

unpredictable clinical course. Nevertheless, this high-risk group and their families would likely have benefited from the extra support palliative care provides. The lack of deployment of palliative care services in the ICU further supports previous studies highlighting an underutilisation of palliative care services in this patient population.⁷

This study also demonstrates the use of telemedicine in delivering palliative care services in an ICU setting during COVID-19. This period represented a unique time for palliative care delivery, in which shared decision making, advance care planning and symptom management was largely conducted using telemedicine, owing to the transmissibility of this disease and need to use personal protective equipment conservatively. This pandemic resulted in an overwhelming need for palliative care services. In response, our institution adapted its approach, using two forms of telemedicine to deliver palliative care services. This allowed for palliative care time and resources to be distributed depending on the complexity of the case, needs of patients and their family members, as determined by the critical care team in conjunction with the palliative care provider.

Studies examining palliative care interventions and advance care planning frequently demonstrate a trend towards reduced ICU length of stay.¹¹ In our study, after accounting for differences among patients' characteristics with propensity matching, there was no observable difference in their length of ICU, or hospital stay. Palliative care in the ICU setting is known to aid with end-of-life management, communication with relatives, and addressing goals of care, ensuring dignity in death and decision-making power.¹² It may also serve to provide emotional support to family members involved, particularly crucial during this infectious pandemic, with family members largely unable to visit their critically ill loved ones. Larger studies may help identify significant differences in length of stay among

critically ill patients with COVID-19 when palliative care interventions and advance care planning is incorporated into their care.

This study highlights how palliative care delivery was adapted to respond to this unique time for palliative care need. Despite this, there was an overall deficiency in the utilisation of palliative care services among ICU patients admitted with COVID-19. Application of this experience may help to identify patients at risk of poorer outcomes that would benefit from early palliative care involvement going forward.

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SUPPLEMENTAL TABLE**Supplemental Table 1. Propensity Score Matching of Patients with and without Palliative Care Consultation**

Characteristics	Palliative Care (n = 53)	Without Palliative Care (n = 25)	p value
Mean age (years)	71.36	70.32	0.96
Sex (%)			
Male	(reference)	(reference)	0.91
Female	32.08	41.51	
Race (%)			
White	(reference)	(reference)	0.41
African American	28.30	35.85	0.99
Asians	3.77	3.77	0.41
Hispanics	28.30	35.85	
Insurance (%)			
Medicaid	(reference)	(reference)	0.12
Medicare	60.38	45.28	0.10
Private	24.53	39.62	0.70
Uninsured	7.55	5.66	
Body mass index (range)	32.10	30.69	0.77
Charlson Comorbidity Index (number) (%)			
0	(reference)	(reference)	
1	3.77	15.09	0.05
2	13.21	3.77	0.08
3+	77.36	79.25	0.082
Invasive mechanical ventilation (%)	88.68	90.57	0.75
Vasopressor (Shock) (%)	81.13	88.68	0.28
Died (%)	83.02	92.4	0.14