COVID-19 Content

The Impact of COVID-19 Surge on Clinical Palliative Care: A Descriptive Study From a New York Hospital System

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Abstract

Context. In spring 2020, New York experienced a surge of patients hospitalized with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or COVID-19) disease, as part of a global pandemic. There are limited data on populations of COVID-19−infected patients seen by palliative care services.

Objective. To describe a palliative care population at one New York hospital system during the initial pandemic surge.

Methods. This repeated cross-sectional, observational study collected data on palliative care patients in a large health system seen during the COVID-19 outbreak and compared it with pre-COVID data.

Results. Palliative service volume surged from 678 (4% of total admissions) before COVID-19 to 1071 (10% of total admissions) during the COVID-19 outbreak. During the outbreak, 695 (64.9%) of the total palliative patients tested positive for the virus. Compared with a preoutbreak group, this COVID-19−positive group had higher rates of male (60.7% vs. 48.6%, $P < 0.01$) and Latino (21.3% vs. 13.3%; $P < 0.01$) patients and less white patients (21.3% vs. 13.3%; $P < 0.01$). Our patients with COVID-19 also had greater prevalence of obesity and diabetes and lower rates of end-stage organ disease and cancers. The COVID-19−positive group had a higher rate of intensive care unit admissions (58.9% vs. 33.9%; $P < 0.01$) and in-hospital mortality rate (57.4% vs. 13.1%; $P < 0.01$) than the preoutbreak group. There was increased odds of mortality in palliative care patients who were COVID-19 positive (odds ratio = 3.21; 95% confidence interval = 2.43−4.24) and those admitted to the intensive care unit (odds ratio = 1.45; 95% confidence interval = 1.11−1.9).

Conclusion. During the initial surge of the COVID-19 pandemic in New York, palliative care services experienced a large surge of patients who tended to be healthier at baseline and more acutely ill at the time of admission than pre−COVID-19 palliative patients.   J Pain Symptom Manage 2021;61:e1−e5. © 2020 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Key Words

Palliative care, COVID-19, supportive care, hospital-based palliative care

Introduction

Guidelines for managing pandemics recommend provision of palliative care to patients dying either directly from the disease or due to a determination of noncandidacy for life-sustaining interventions.[1]

A third group of patients that also warrant palliative care consultation during a pandemic are those diagnosed with the pandemic virus and are receiving a trial of disease-directed treatment and concurrently have a need for symptom management and/or goals of care planning. This latter category of patients constitutes

the largest group of patients in need of specialist palliative care. Therefore, guidelines tend to underappreciate the patient populations served by specialist palliative care during pandemic. This report describes changes in characteristics among hospitalized palliative care patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or COVID-19) infection during the initial stage of the COVID-19 pandemic in metropolitan New York.

Methods

This is a repeated cross-sectional, observational study describing differences in characteristics and outcomes of subjects seen by inpatient palliative care across three New York University Langone hospitals before and during the initial surge of COVID-19 patients in New York.

The New York University institutional review board approved this study as minimal-risk research and exempt from requirements of informed consent. All variables were collected by chart abstraction using the electronic health record (Epic; Epic Systems Corporation). All hospitalized patients aged 18 years and older, seen by the palliative care consultation services, before the COVID-19 pandemic from January 4, 2020, to February 28, 2020 (preoutbreak group) and during the COVID-19 outbreak from March 5, 2020, to April 30, 2020 (outbreak group) were included. The outbreak group was further subdivided into patients who had a positive nasopharyngeal polymerase chain reaction test for COVID-19 infection (COVID-19 positive) and those who tested negative or were not tested (COVID-19 negative). These two subgroups were compared with the preoutbreak group separately. Clinical outcomes were monitored until June 18, 2020.

Data analysis was conducted using version 3.5.2 of the R programming language (R Project for Statistical Computing; R Foundation). Standard descriptive methods (e.g., means and standard deviations for continuous variables, counts and percentage for categorical variables) were used to summarize data. The Chi-square test was used for comparisons of categorical variables. The Shapiro-Wilk test was used to test continuous variables for normality, and the Wilcoxon rank-sum test was used to compare nonparametric data. Multivariate logistic regression was conducted to calculate adjusted odds ratios (ORs).

Results

Before Outbreak: January 4, 2020, to February 28, 2020

During the preoutbreak period, our three medical centers recorded 15,800 unique hospitalized patients making up 17,073 separate admissions. Of these hospitalizations, our palliative care service conducted 678 consultations (4% of total admissions). Demographic information of preoutbreak palliative care consults is displayed in Table 1. The median age of these patients was 74.7 years [interquartile range: 63−86.3], with 51.4% being female. Most of the consults were on Caucasian (62.9%) patients which parallels the percentage seen among all hospitalized patients (59%). The most common comorbidities in our preoutbreak patients were hypertension (67.9%), hyperlipidemia (51.9%), and cancer (44%). Of the patients seen by our inpatient consult team, 14.5% were seen previously by our outpatient service.

Hospitalization information for our palliative care patients is displayed in Table 2. About a third of our patients (33.9%), before the outbreak, were admitted to the intensive care unit (ICU) with a median length of stay of 9 days and median time to palliative care consultation of 3 days. Most of our patients (77.6%) were full code at the time of admission. The most common discharge destinations for palliative care patients were to home (36.3%), skilled nursing facility (17.6%), and inpatient hospice (15.8%).

COVID-19 Outbreak: March 5, 2020, to April 30, 2020

During the COVID-19 surge, our hospitals admitted 10,197 unique patients accounting for 10,830 hospitalizations, which was a significant decrease from preoutbreak numbers ($P < 0.01$). Among all admissions, 3663 (36%) tested positive for COVID-19. The median age of all hospitalized patients dropped from 69 years before COVID-19 to 58 years ($P < 0.01$) during the outbreak. The percentage of Hispanic (17.1% vs. 20.5%; $P < 0.01$) and black patients (12.4% vs. 13.9%; $P < 0.01$) went up, while the rate of Caucasian patients (59% vs. 47.5%; $P < 0.01$) decreased during the outbreak. Despite the drop in total admissions, our inpatient palliative care team completed 1081 consultations (10% of total admissions), a 59% increase from the preoutbreak period.

Covariates associated with increased odds of palliative care consultation included COVID-19−positive status (OR = 2.7; 95% confidence interval [CI] = 2.28−3.2), history of cancer (OR = 1.71; 95% CI = 1.43−2.04), ICU admission (OR = 6.12; 95% CI = 5.14−7.29), and "Do-Not-Resuscitate" order at the time of admission (OR = 3.23; 95% CI = 2.56−4.06).

COVID-19−Positive Palliative Care Patients. The COVID-19−positive palliative care subgroup contained 695 patients who tested positive for the virus, making up 63.4% of our total consults during the outbreak. This group was compared with the preoutbreak

Table 1
Demographic Data

| | | During Outbreak | | | |
| | Before Outbreak | COVID-19 Negative/Not Tested | | COVID-19 Positive | |
Characteristic	($n = 588$)	($n = 329$)	*P*-value	($n = 695$)	*P*-value
Age (years): median [IQR]	74.7 [63−86.3]	72.74 [59.1−84]	**0.04**	73.18 (63−83.3)	0.08
Gender: n (%)					
Female	302 (51.4)	170 (51.7)		273 (39.3)	
Male	286 (48.6)	159 (48.3)	0.92	422 (60.7)	**<0.01**
Ethnicity: n (%)					
Hispanic or Latino	78 (13.3)	40 (12.2)		148 (21.3)	
Non-Hispanic or Non-Latino	498 (84.7)	281 (85.4)		484 (69.6)	
Unknown/Not Reported	12 (2.0)	8 (2.4)	0.83	63 (9.1)	**<0.01**
Race: n (%)					
Caucasian	370 (62.9)	205 (62.3)	0.85	339 (48.8)	**<0.01**
Black	83 (14.1)	34 (10.3)	0.12	91 (13.1)	0.65
Asian	44 (7.5)	33 (10.0)	0.22	51 (7.3)	1
Other or Unknown	91 (15.5)	56 (17)	0.64	214 (31)	**<0.01**
Comorbidities: n (%)					
Hyperlipidemia	305 (51.9)	151 (45.9)	0.1	357 (51.4)	0.9
Hypertension	399 (67.9)	204 (62)	0.09	487 (70.1)	0.43
Obesity	135/579 (23.3)	111/322 (34.5)	**<0.01**	358/678 (52.8)	**<0.01**
COPD	98 (16.7)	44 (13.4)	0.21	81 (11.7)	**0.01**
Heart Failure	170 (28.9)	75 (22.8)	**0.05**	98 (14.1)	**<0.01**
Coronary Artery Disease	129 (21.9)	62 (18.8)	0.31	153 (22.1)	1
Peripheral Vascular Disease	45 (7.7)	28 (8.5)	0.74	59 (8.5)	0.66
Diabetes	182 (31.0)	83 (25.2)	0.08	284 (40.7)	**<0.01**
Asthma	53 (9.0)	36 (10.9)	0.41	65 (9.4)	0.91
CKD	117 (19.9)	71 (21.6)	0.66	138 (19.9)	1
Cancer	259 (44.0)	133 (40.4)	0.32	134 (19.3)	**<0.01**
Cirrhosis	25 (4.3)	19 (5.8)	0.38	10 (1.4)	**<0.01**
Autoimmune Disorder	38 (6.5)	15 (4.6)	0.3	31 (4.5)	0.14
Previously Seen by Outpatient Palliative Care: n (%)	85 (14.5)	47 (14.3)	1	33 (4.7)	**<0.01**

CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease; COVID-19 = severe acute respiratory syndrome coronavirus 2; IQR = interquartile range.
Bolded values are statistically significant.

Table 2
Hospital Characteristics

| | | During Outbreak | | | |
| | Before Outbreak | COVID-19 Negative/Not Tested | | COVID-19 Positive | |
Characteristics	($n = 678$)	($n = 356$)	*P*-value	($n = 725$)	*P*-value
Intensive Care Unit: n (%)	230 (33.9)	140 (39.3)	0.1	427 (58.9)	**<0.01**
Length of Stay (Days): Median [IQR]	9 [5-15]	10.2 [3-12]	**<0.01**	11 [6-22]	**<0.01**
Time to Palliative Care Consult (Days): Median [IQR]	3 [1-6]	2 [1-5]	**0.02**	5 [2-12]	**<0.01**
Code Status: n (%)					
Admission − Full Code	562 (77.6)	272 (76.4)		624 (86.1)	
Admission − Do Not Resuscitate	147 (21.7)	83 (23.3)	0.63	100 (13.8)	**<0.01**
Disposition: n (%)					
Home/Self-Care	246 (36.3)	123 (34.6)	0.58	69 (9.5)	**<0.01**
Skilled Nursing Facility	119 (17.6)	48 (13.5)	0.09	59 (8.1)	**<0.01**
Acute Rehab Facility	19 (2.8)	8 (2.3)	0.59	22 (3)	0.8
Long-Term Acute Care (LTAC)	2 (0.3)	3 (0.8)	0.23	6 (0.83)	0.19
Inpatient Hospice	107 (15.8)	53 (14.9)	0.71	96 (13.2)	0.18
Home Hospice	83 (12.2)	34 (9.6)	0.19	3 (0.4)	**<0.01**
Deceased	89 (13.1)	79 (22.2)	**<0.01**	416 (57.4)	**<0.01**
Still Admitted	3 (0.4)	2 (0.56)	0.79	52 (7.2)	**<0.01**

COVID-19 = severe acute respiratory syndrome coronavirus 2; IQR = interquartile range.
Bolded values are statistically significant.

consultation group and found to have a significant increase in the percentage of males (60.7% vs. 48.6%; $P < 0.01$) and Latino patients (21.3% vs. 13.3%; $P < 0.01$), with a decrease in the number of Caucasian patients from 62.9% to 48.8% ($P < 0.01$). We observed no difference in the rates of black or Asian patients between the groups. The COVID-19−positive group had increased rates of obesity and diabetes with decreased rates of advanced organ failure and cancer. The COVID-19−positive group was also less likely to have been seen by palliative care as an outpatient before admission (4.7% vs. 14.5%; $P < 0.01$).

The COVID-19−positive group was found to have a higher rate of ICU admissions (58.9% vs. 33.9%; $P < 0.01$), longer length of stay (11 days vs. 9 days; $P < 0.01$), and a higher inpatient mortality rate (57.4% vs. 13.1%; $P < 0.01$) than the preoutbreak group. The rate of mechanical ventilation was 58.9%, and the rate of dialysis was 23.6% (Table 3). Most patients in the COVID-19−positive group were full code on admission (86.1%), a significant increase from 77.6% ($P < 0.01$) observed before the outbreak. We saw a decrease in discharges to home hospice, skilled nursing facilities, and home care in this group, with no difference in the amount of inpatient hospice utilization. There were increased odds of mortality in palliative care patients who were positive for COVID-19 (OR = 3.21; 95% CI = 2.43−4.24) and for those that were admitted to the ICU (OR = 1.45; 95% CI = 1.11−1.9).

COVID-19−Negative Palliative Care Patients. We further compared the COVID-19−negative patients seen by palliative care during the outbreak with the preoutbreak palliative care consult group. These two groups were similar in demographic and hospitalization characteristics. The COVID-19−negative group was slightly younger (72.7 vs. 74.7 years old; $P = 0.04$) and had an increased rate of obesity (34.5% vs. 23.3%; $P < 0.01$) when compared with the preoutbreak group. We observed no difference

in gender, race, ethnicity, or previous outpatient palliative care visits between the two groups.

The COVID-19−negative palliative care subgroup had similar hospitalization characteristics to the preoutbreak palliative care consults. There was no difference in ICU admissions, admission-code status, or discharge plan. The COVID-19−negative subgroup did have a longer length of stay (10.2 vs. 9 days; $P < 0.01$) and increased mortality rate (22.2% vs. 13.1%; $P < 0.01$), in addition to a decrease in the time to palliative care consult (2 days vs. 3 days; $P = 0.02$), when compared with the preoutbreak group. The rate of mechanical ventilation was 26.4%, and the rate of dialysis was 8.1% in the COVID-19−negative group.

Discussion

Our study provides a unique perspective on inpatient palliative care consultations from a large health system during the initial COVID-19 outbreak in New York. By comparing patients seen during the outbreak with patients seen before the outbreak, we describe some major differences between the two palliative care populations.

The palliative care consultation service saw a significant increase of 59% in the number of consultations during the outbreak, with 67% of these consults being positive for COVID-19. Penetration rates, defined as the percent of all hospital discharges receiving palliative consultation, rose by 2.5 times. The COVID-19−positive patients were much more likely to be male and Latino. These findings are consistent with changes seen in our total hospital population and with New York state-level data.[2] Our services did not see an increase in the proportion of black patients despite increases in the percentage of admitted black patients during the outbreak. It is unclear whether lower rates of palliative consultation for black patients were due to clinician-dependent variables, patients' preferences, or other factors.[3,4]

When looking at prehospitalization comorbidities, the rates of advanced disease states such as heart failure, chronic obstructive pulmonary disease, and cancer were higher in our preoutbreak group while the rates of metabolic disorders such as obesity and diabetes were higher in the COVID-19−positive patients. Only 4% of the COVID-19−positive patients had seen outpatient palliative care compared with 14.5% before the outbreak, which suggests that the COVID-19−positive population was relatively healthier before hospitalization than baseline palliative patients.

The COVID-19−positive patients were more acutely ill than the baseline palliative patient population. COVID-19−positive patients had the highest rate of

Table 3
Advanced Intervention Utilization in Palliative Care Patients During Outbreak

Advanced Therapy	COVID-19 Negative/ Not Tested ($n = 356$)	COVID-19 Positive ($n = 725$)
Invasive Mechanical Ventilation: n (%)	94 (26.4)	426 (58.8)
Dialysis: n (%)		
Continuous Renal Replacement	9 (2.4)	75 (10.3)
Hemodialysis	19 (5.3)	88 (12.1)
Peritoneal	1 (0.3)	8 (1.1)
Total	29 (8.1)	171 (23.6)

COVID-19 = severe acute respiratory syndrome coronavirus 2.

mortality and ICU stays, as well as longest length of stay. Both COVID-19 and ICU admission statuses were found to be associated with higher odds of inpatient mortality. More than half of the patients from the COVID-19 group required mechanical ventilation, and just less than a quarter of patients needed dialysis. Despite greater mortality, we saw no increase rise in the use of either inpatient or home hospice which is consistent with the relatively healthier baseline and significantly higher rates of "Full-Code" status on admission. The large drop in referral to home hospice among this group was likely in part due to disease severity and rapid deterioration after election for comfort-focused care. It is possible that plans for home hospice were made more difficult owing to the prevalence of COVID-19 illnesses among family members.

Although there were some differences between the preoutbreak group and the COVID-19−negative groups, these two cohorts were very similar. The significant increase in the rate of obesity in this group, coupled with previous studies illustrating obesity as a risk factor for hospitalization from COVID-19, may suggest that some of these patients had false-negative tests or otherwise undiagnosed COVID-19 infections.[5,6] The COVID-19−negative group did have an increase in length of hospitalization as well as mortality rate which could very well be from disruption from usual care from the surging number of patients in the hospital during that time. Moreover, primary teams likely had a lower threshold to consult our service for this group as the median time to consult decreased.

This description of a COVID-19−positive palliative care population has several limitations. Comparing the outbreak group with a population during the corresponding period in 2019 may have yielded a more accurate depiction of our baseline population; however, this was not possible, given a recent change in the electronic medical record platform in one of our hospitals. The large sample sizes precluded extracting noncategorical data such as the reason for consult and degree of symptom burden. We were also unable to extract baseline rates of mechanical ventilation and dialysis rates in our preoutbreak group because of changes in collecting those data from the medical record. Furthermore, the retrospective nature of the study allows us to make observations about the populations but does not explain why these changes occurred.

In summary, palliative services may expect a large surge in consultation volume during viral epidemic and should prepare for a high proportion of critically ill patients and for high mortality. Most of these consultations were not triggered by limitations in life-sustaining resources.

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