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LETTER TO THE EDITOR

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To the Editor:

The most devastating consequence of the novel coronavirus disease (COVID-19) is respiratory failure. Mechanical ventilation with endotracheal (ET) intubation in this setting is associated with a poor prognosis.[1] Still, many patients require urgent procedures during hospitalization for COVID-19 necessitating anesthesia and ET intubation. However, whether extubation is readily feasible among patients hospitalized with COVID-19 with potential pulmonary involvement is unknown. The primary aim of this study was to determine the feasibility of extubation after elective intubation for GI endoscopy among patients hospitalized with COVID-19.

We present a case series of prospectively collected endoscopy data from April 1, 2020, to May 12, 2020, from 4 tertiary care hospitals within the Northwell Health System in New York. Consecutive hospitalized patients were included if (1) patient's age was >18 years, (2) patient was confirmed positive for COVID-19, and (3) urgent GI endoscopy was required. Only emergent or urgent cases were performed during this time according to GI society guidelines.[2,3] This study was approved by the Zucker School of Medicine/Northwell Health System Institutional Review Board.

Patients were considered positive for COVID-19 if their test results were positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection by polymerase chain reaction testing of nasopharyngeal samples within 2 days of the procedure. Administration of supplemental oxygenation in COVID-19 patients was standardized throughout Northwell in a protocol. If the oxygen saturation was below 94% on room air, nasal cannula oxygen was given. If the oxygen saturation was below 94% on maximum nasal cannula support, a nonrebreather mask was used. If the patient was desaturating and in respiratory distress with the nonrebreather and in the prone position, an ET tube was placed.

The anesthesia type was at the discretion of the anesthesiologist and based on standard of care for each hospital. The decision for ET intubation was based on the ability to protect the airway against aspiration once the patient was sedated. However, in general, patients with hematemesis, vomiting, or GI lumen obstruction and those undergoing ERCP (given the patient was placed prone) had ET intubation. The data were analyzed by type of anesthesia: (1) elective ET intubation just before the endoscopy, (2) ET intubation for respiratory failure during the hospitalization, or (3) sedation with monitored anesthesia care. The main outcome was the rate of extubation just after the procedure in the elective ET intubation group.

The SAS statistical software version 9.4 (SAS Institute, Cary, NC, USA) was used to conduct all statistical tests. The χ^2 test or Fisher exact test was used to compare categoric data, and the Student t test was used to compare continuous data. A P value of $< .05$ was considered statistically significant.

A total of 111 patients with COVID-19 were included in the study period during the COVID-19 pandemic. Table 1 lists the patient and procedure characteristics between the groups. Patient age, gender, body mass index, comorbidities, and indications were similar between groups.

Forty-five patients (45/111, 41%) underwent elective ET intubation. All patients but 1 were receiving oxygen by nasal cannula (98%, 44/45). One patient required a 100% nonrebreather mask. Thirty-eight percent of the patients (17/45) had chest radiograph findings indicating pulmonary involvement of COVID-19. Of the 45 patients, 98% (44/45) were extubated safely after the procedure. One patient had prolonged ET placement but was able to be extubated after 3 days. This patient was receiving nasal cannula oxygen before the procedure. All patients remained extubated after the procedure without respiratory adverse events (patients' charts abstracted until 72 hours after the procedure).

Twenty-nine (29/111, 26%) patients had an ET already in place for respiratory failure before endoscopy. Nine patients were extubated and remain ET tube free, 5 patients died in this group of COVID-related causes, 5 remain with an ET tube, and 10 underwent tracheostomy. Thirty-seven (37/111, 33%) underwent sedation with monitored anesthesia care safely without respiratory adverse events. Forty-nine percent of the patients (18/37) had chest radiograph findings indicating pulmonary involvement of COVID-19. None of these patients required ET intubation during the procedure.

Our study has limitations. These data are applicable only to tertiary care centers. In addition, there was a lack of standardization of who received elective general anesthesia versus sedation among the 4 hospitals because that choice was based on the discretion of the anesthesiologist and standard of care at each hospital. However, this was mainly based on the ability to protect the airway against aspiration, and thus per standard practice, in most institutions.

In conclusion, endoscopy can be a lifesaving procedure for indications that are urgent or emergent in patients with COVID-19. Often these procedures require ET intubation, of which the pulmonary risk was previously unknown in this cohort. This series shows that elective ET placement in patients with COVID-19 appears to be well tolerated and removable shortly after the procedure for the majority

TABLE 1. Characteristics of 111 COVID-19 patients undergoing urgent GI endoscopy

Characteristic	All patients	Patients intubated for respiratory distress before endoscopy (n = 29)	Patients electively intubated (n = 45)	Patients with sedation (n = 37)	*P* value
Average age, years (%)	63.5 (16.74)	64.5 (13.60)	61.6 (19.79)	65.2 (15.01)	.36
Gender female, % (n)	32.4 (36)	24.1 (7)	33.3 (15)	37.8 (14)	.67
Race, % (n)					.005
White	37.3 (41)	41.4 (12)	45.5 (20)	24.3 (9)	
Black	22.7 (25)	17.2 (5)	25.0 (11)	24.3 (9)	
Asian	10.9 (12)	13.8 (4)	0.00 (0)	21.6 (8)	
Multiracial/other	29.1 (32)	27.6 (8)	29.6 (13)	29.7 (11)	
BMI (SD)	29.9 (9.4)	29.4 (6.7)	32.2 (11.3)	27.7 (8.3)	.06
Charlson Comorbidity Index, average (SD)	4.28 (3.0)	3.69 (2.5)	4.04 (3.0)	5.03 (3.3)	.16
Comorbidities, % (n)					
DM	39.6 (44)	48.3 (14)	44.4 (20)	27.0 (10)	.10
HTN	57.7 (64)	62.1 (18)	60.0 (27)	51.4 (19)	.43
CAD	16.2 (18)	13.8 (4)	11.1 (5)	24.3 (9)	.11
CHF	9.0 (10)	6.9 (2)	8.9 (4)	10.8 (4)	1.00
COPD	8.1 (9)	10.3 (3)	8.9 (4)	5.4 (2)	.69
Smoking	5.4 (6)	0 (0)	8.9 (4)	5.4 (2)	.69
Asthma	1.8 (2)	0 (0)	4.4 (2)	0 (0)	.50
OSA	0.9 (1)	0 (0)	0 (0)	2.7 (1)	.45
Cirrhosis	3.6 (4)	3.5 (1)	0 (0)	8.1 (3)	.09
Prior GI bleeding	7.2 (8)	0 (0)	4.4 (2)	16.2 (6)	.13
Kidney disease	15.3 (17)	6.9 (2)	17.8 (8)	18.9 (7)	.89
Cancer	18.9 (21)	13.8 (4)	17.8 (8)	24.3 (9)	.47
Abnormal CXR, % (n)	55.9 (62)	93.1 (27)	37.8 (17)	48.7 (18)	.32
Patient in ICU, % (n)	38.7 (43)	93.1 (27)	26.7 (12)	10.8 (4)	.07
ASA class, % (n)					.61
1	3.6 (4)	0.00 (0)	6.7 (3)	2.7 (1)	
2	5.4 (6)	0.00 (0)	8.9 (4)	5.4 (2)	
3	46.9 (52)	10.3 (3)	53.3 (24)	67.6 (25)	
4	44.1 (49)	89.7 (26)	31.1 (14)	24.3 (9)	
Oxygenation status before procedure, % (n)					
Nasal cannula	73.0 (81)	0 (0)	97.8 (44)	100 (37)	1.00
Nonrebreather	0.9 (1)	0 (0)	2.2 (1)	0.00 (0)	1.00
ET tube for respiratory failure	26.1 (29)	100 (29)	0 (0)	0 (0)	N/A

Continuous variables are represented as means (SD), and categoric variables are represented as % (n).
ASA, American Society of Anesthesiologists Classification class; *BMI*, body mass index; *CAD*, coronary artery disease; *CHF*, congestive heart failure; *COPD*, chronic obstructive lung disease; *CXR*, chest x-ray; *DM*, diabetes mellitus; *ET*, endotracheal; *HTN*, hypertension; *ICU*, intensive care unit; *OSA*, obstructive sleep apnea.

of patients who require nasal cannula oxygen supplementation before the GI endoscopy procedure.

DISCLOSURE

Dr Benias *is a consultant for Olympus America, Apollo Overstitch, Boston Scientific, and FujiFilm. Dr Andrews is a consultant for Olympus and the recipient of minor food and beverage from US Endoscopy, Abbvie, and Cook Medical. Dr Sejpal is a consultant for Olympus America and Boston Scientific. Dr Bernstein is a consultant for Gilead Sciences, AbbVie, Intercept Pharmaceuticals, and Bayer Health Care Pharmaceuticals. Dr Trindade is a consultant for Olympus America and Pentax Medical, the recipient of minimal food and beverage from Boston Scientific,*

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