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High Rate of Percutaneous Gastrostomy Placement in COVID-19 Patients With Low Overall Complications

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Introduction

The COVID-19 pandemic has led to a significant increase in patients requiring prolonged hospitalization with mechanical ventilation.¹ Many patients have become ventilator-dependent requiring long-term enteral feeding with a percutaneous gastrostomy tube (G-tube). Obtaining durable enteral access in a timely and safe manner is important for essential nutritional support and facilitates timely discharge when patients are medically ready, creating more available inpatient beds – a scarce resource in times of surge capacity.²

Placement of G-tubes in COVID-19 patients presents unique challenges, as the procedure is not only aerosolizing but also poses risk to staff via bodily fluid and fomite transmission.³ Additionally, many patients are systemically anticoagulated due to viral-associated hypercoagulability,^{4,5} increasing the risk of procedure-related bleeding. Overall, there is minimal data on the rates, safety, ideal methods and outcomes of gastrostomy placement in COVID-19 patients. Our primary aim was to determine the proportion of COVID-19 patients who require G-tube placement and to characterize postoperative adverse events. The secondary aim was to quantify procedurally-related staff exposures to COVID-19 in a large academic medical center.

Methods

This was a single-center retrospective cohort study. Patients with positive COVID-19 PCR tests with inpatient admission from January 1, 2020 to June 9, 2020 were reviewed. For patients who underwent G-tube placement,

information regarding demographics, comorbidities, procedural details and associated adverse events was collected for 7 days post-procedurally. All staff (physicians and nurses) involved in the procedures were surveyed regarding any reported cases of COVID-19. Data analysis was performed using SAS software (9.3, Cary NC). Continuous variables were analyzed using a t-test and categorical data was analyzed using the chi-squared test.

Results

A total of 710 charts of COVID-19 positive inpatients were reviewed. Of these, 36 (5.1%) underwent G-tube placement while inpatient during the study period. See [Table 1](#) for full demographics. In comparison, there were 24 G-tubes placed at BIDMC in the same period in 2019. G-tubes were placed for one or more of the following indications: persistent dysphagia, tracheostomy-dependence, inadequate oral nutrition, or to facilitate transfer to a lower-level care facility. Nineteen patients were on active systemic anticoagulation at time of procedure. All had anticoagulation held for at least 24 hours post-operatively.

Placement of the G-tube was most commonly performed in the ICU at the bedside with ICU sedation. Most procedures were performed by surgery (42%), gastroenterology (22%) and interventional radiology (19%). See [Table 2](#) for details regarding placement location. Among all staff who participated in G-tube placements, no staff reported testing positive for COVID-19 post-procedurally.

Adverse events were reported in 13.9% of G-tube placement procedures. One patient (3%) had abdominal

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wall bleeding that was treated with transfusion, suture placement, and cessation of anticoagulation. Three patients (8%) had aspiration within 7 days (none intraoperatively), and there was one case (3%) of wound infection requiring antibiotics. There were no occurrences of perforation, peritonitis, dislodgement, gastrointestinal bleeding or death within the 7-day postoperative period. Placement at bedside in the ICU (0 adverse events) was associated with improved outcomes compared to other all locations combined (5 total adverse events, $P < 0.02$).

Discussion

This single-center study demonstrates high rates of G-tube placements with overall low complications in COVID-19 patients admitted to a tertiary care center. Compared to the National Inpatient Sample Database data demonstrating 0.5% of all admissions resulting in G-tube placement.⁶ COVID-19 patients in our cohort were 10 times more likely to require a G-tube, with 5% undergoing placement during their hospitalization. Factors explaining this high incidence include COVID-19 leading to prolonged hospitalizations and higher incidence of intubation (12% all-hospitalization intubation rate, 88% of ICU intubation rate, and mean length of stay of 16 days).^{7,8} Additionally, our institution observed many patients were unable to achieve ventilator-independence, requiring tracheostomy and subsequent gastrostomy.

Table 1. Demographic Details of Patients With COVID Undergoing Percutaneous Endoscopic Gastrostomy

Category		Value	Percent/range
Total patients		36	100%
Sex	Male	20	56%
	Female	16	44%
Age	Median	66.8 years	47-82
BMI	Median	29.1	19-49.3
Prior abdominal surgery		6	17%
Comorbidities	Diabetes	24	67%
	Liver disease	3	8%
	Kidney disease	10	28%
	Heart failure	10	28%
	COPD	9	25%
	Dementia	3	8%
Charlson score	Median	4.5	1-11
Active antacid use	H2 antagonist	7	19%
	Proton pump inhibitor	21	58%
	None	8	22%
Aspirin (in 7 days)		13	36%
Systemic anticoagulation		19	53%

Demographic data of the 36 COVID-19 patients who underwent PEG placement during the study period, including comorbidities and anticoagulation status.

Table 2. Percutaneous Endoscopic Gastrostomy Placement Details

Category		Value	Percent/range
Hospital day	Median	33	12-69
Placing service	Gastroenterology	8	22%
	Surgery	15	42%
	Radiology	6	17%
	Pulmonology	7	19%
Placement location	Intensive care	17	47%
	Operating room	11	31%
	Endoscopy/radiology suite	8	22%
Anesthesia type	Intensive care sedation	17	46%
	Monitored anesthesia	7	19%
	General anesthesia	12	33%
Procedural personnel	Median	3	2-5
Tracheostomy status	Prior in place	11	31%
	Simultaneous placement	18	50%
	None	7	19%
Prior gastrointestinal bleeding		13	36%
Systemic anticoagulation		19	53%

Procedural details of percutaneous endoscopic gastrostomy placement in 36 total COVID-19 patients. Hospital day refers to day of percutaneous endoscopic gastrostomy placement during hospitalization for COVID-19.

The overall postprocedural adverse event rate was 13.9%, within the range reported in the literature among patients without COVID-19 (13%-40% for minor complications).⁹

Forty-seven percent of procedures occurred in the ICU. In our cohort, given that there were fewer adverse events for patients undergoing ICU bedside G-tube placement ($P < 0.02$), we believe the ICU is noninferior to non-ICU settings for this procedure. All ICU placements were done for patients with existing tracheostomy or endotracheal tubes for ventilation, which may contribute to greater safety by reducing aspiration risk. There is additional benefit in minimizing hospital exposure to COVID-19. Ultimately, ICU placement of G-tubes for COVID-19 patients warrants further investigation as a safe first line measure as it may not confer additional risk to patients or providers.

Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.tige.2021.07.001](https://doi.org/10.1016/j.tige.2021.07.001).

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Conflicts of Interest

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Ethical Statement

The corresponding author, on behalf of all authors, jointly and severally, certifies that their institution has approved the protocol for any investigation involving humans or animals and that all experimentation was conducted in conformity with ethical and humane principles of research.