



# Challenges of Gastric Versus Post-pyloric Feeding in COVID-19 Disease

Mohamed Eisa<sup>1,2,3</sup> · Endashaw Omer<sup>1,2</sup> 

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## Abstract

**Purpose of the Review** The COVID-19 pandemic has had an unprecedented challenge to the critical care providers caring for those patients, including the delivery of nutrition. This review will address the challenges of gastric versus post gastric feeding in patients in COVID-19 disease.

**Recent Recommendations** Many societies, including American, British, and Australian recommend initiating of enteral feeding in COVID-19 patients as soon as 24 h of ICU admission or within 12 h after intubation. Consideration for post-pyloric feeding if there is evidence of intolerance to gastric feeding.

**Summary** The same principle for non-COVID-19 critically ill patients applies to COVID-19 patients when it comes to the route of nutritional delivery. Gastric feeding should be initiated as soon as 24 h of admission to the ICU, and post gastric feeding should be reserved to patients who demonstrate gastric feeding intolerance.

**Keywords** COVID-19 disease · Coronavirus · Nutritional therapy · Enteral nutrition · Gastric feeding · Post-pyloric feeding

## Introduction

The coronavirus disease (COVID-19) pandemic has overwhelmed the healthcare systems across the globe, particularly the intensive care units (ICU). High-quality care, including nutritional therapy, remains the mainstay to maximize the survival of this critically ill population. Approximately 15–20% of patients with COVID-19 are critically ill and require mechanical ventilation [1]. Severe COVID-19 disease is frequently associated with gastrointestinal manifestations. The SARS-COV-2 can infect the gastrointestinal tract through the angiotensin converting enzyme 2 (ACE-2) receptor which is expressed widely in the gastrointestinal tract as evident by detection of the virus on rectal swabs, which suggest a possible fecal–oral transmission of the virus [2]. Gu et al. identified 11 surface proteins of SARS-COV-2 independent of ACE-2 that can directly contribute to the infection of multiple organs including the gastrointestinal tract [3]. The development of gastrointestinal symptoms such as loss of appetite, nausea, vomiting, abdominal pain, and diarrhea, will further impact the nutritional status of these patients. Severe cases of COVID-19 can lead to prolonged ICU stay, hospitalizations, and subsequently prolonged rehabilitation course necessitating long-term nutritional support in the form of Percutaneous Endoscopic Gastrostomy (PEG) or Percutaneous Endoscopic Jejunostomy (PEJ). The Society of Critical Care Medicine (SCCM) and the American Society for Parenteral and Enteral Nutrition (ASPEN) released a joint statement in April of 2020 which recommended initiating early enteral nutrition (EN) within 24–36 h of ICU admission or within 12 h of intubation and placement of mechanical ventilation if enteral feeding is feasible [4•]. Regarding the route of enteral feeding, gastric feeding is the preferred mode, unless it is unsuccessful due to

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✉ Mohamed Eisa  
mohamed.eisa@ahn.org

<sup>1</sup> Allegheny Center for Digestive Health, Allegheny Health Network, Pittsburgh, PA, USA

<sup>2</sup> Division of Gastroenterology, Hepatology, and Nutrition, University of Louisville School of Medicine, Louisville, KY, USA

<sup>3</sup> Allegheny Center for Digestive Health, Allegheny Health Network, 1307 Federal St Suite B301, Pittsburgh, PA 15212, USA

intolerance, then post-pyloric feeding should be thought. This review will address the challenges of gastric versus post gastric feeding in patients in COVID-19 disease.

### Challenges to Enteral Feeding in COVID-19 Disease

Severe COVID-19 disease is characterized by hyperinflammatory and hypermetabolic response which can rapidly change patients' hemodynamics and oxygenation. This will rapidly shift the priorities of management in the ICU, with nutritional delivery being at the bottom of the priorities. Increasing pressor requirements for those patients can lead to gut malfunctions and ileus, which would also contribute to delayed feeding. Most institutions have a protocol in place for insertion of orogastric or nasogastric tubes at the time of intubation which can be utilized for enteral feeding, however, for patients on non-invasive ventilation (NIV), there is a fear of breaking the seal and compromising oxygenation to those patients, in addition to the hypothesized risk of aspiration. Proning is one of the strategies to treat adult respiratory disease syndrome (ARDS) in COVID-19 patients despite whether they are ventilated or non-ventilated [5]. Feeding patients who are ventilated and prone is a challenging task for the ICU staff, who are already overwhelmed by the acuity of this population. Those are other challenges for enteral feeding in severe cases of COVID-19 patients.

Executing early nutrition should always be aimed for, and COVID-19 with circulatory compromise should not be considered as a contraindication to EN unless there is an accompanying enteral feed intolerance for which prokinetics should be considered first before concluding failure of gastric feeding.

### Challenges of Gastric Feeding in COVID-19 Disease

Most of the major nutritional societies (American Society for Parenteral and Enteral Nutrition "ASPEN," European Society for Clinical Nutrition and Metabolism "ESPEN," British dietetic association "BGA," Australian Society for Parenteral and Enteral Nutrition "AuSPEN") guidelines recommend initiation of EN to COVID-19 patients via nasogastric tube route, with consideration of post-pyloric feeding if there is intolerance to feeding after trial of prokinetics agents [6].

Although the highest risk to the staff is related to respiratory or aerosolized procedures, there is a risk with the placement of nasogastric tube due to the induction of cough during placement [7]. The lack of personal protective

equipment (PPE) early during the pandemic has posed a challenge to the staff caring for those patients especially when feeding pumps have to be adjusted frequently to address intolerance and assess for residual volumes [8].

Severe COVID-19 disease that requires intensive care admission and nutritional support, frequently present with gastrointestinal symptoms and gastrointestinal failure [2], which can be mistaken for feeding intolerance with subsequent interruption of EN.

The rapidly changing hemodynamics and oxygenation status of patients with COVID-19, and development of ARDS have made some institutions adopt proning techniques [9], which creates a fear of aspiration as a consequence of gastric feeding.

The above-mentioned challenges in addition to the lack of the agreed-upon tools to assess the nutritional status of the critically ill patients overall need to be considered when formulating guidance and recommendation for nutritional support in COVID-19 patients.

### Challenges of Post-pyloric Feeding in COVID-19 Disease

Patients who are intolerant to gastric feeding after trial of prokinetics or unable to reach feeding goals should be considered for post-pyloric feeding. The American Society for Parenteral and Enteral Nutrition (ASPEN) recommends that post-pyloric feeding to be considered only after the above-mentioned measures have been taken [4•]. The European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines recommend placement of post-pyloric feeding tube if gastric residuals above 500 mL [10].

Placement of post-pyloric feeding tube is more challenging than the placement of a nasogastric tube, requires certain expertise, use of fluoroscopy in certain case, confirmation of placement with X-ray, and an additional exposure and increased risk to the staff caring for COVID-19 patients. Another option for enteral access is the use of the GPS-guided enteral access, however, it is not readily available to all institutions, and require training to the ICU staff that will place it.

There is no clear consensus on the timing of placement of PEG or PEJ tubes in patients with COVID-19 given the risk of exposure and aerosolization. It has been suggested that placement should take place only after 30 days of hospitalization when there is evidence of clinical improvement [11].

Liu et al. did a meta-analysis of 41 studies conducted in ten countries and involving 3248 participants comparing gastric versus post-pyloric feeding in critical ill patients. The meta-analysis showed that post-pyloric feeding had a lower incidence rate of pulmonary aspiration, gastric

reflux, and pneumonia ( $P < 0.001$ , all), less incidence of gastrointestinal complications including vomiting, nausea, diarrhea, abdominal distension, high gastric residual volume, and constipation ( $P < 0.05$ , all), more optimal gastrointestinal nutrition including the percentage of total nutrition provided to the patient, the time to tolerate enteral nutrition, the time required to start feeding and the time required to reach nutritional targets ( $P < 0.05$ , all), shorter length of mechanical ventilation, stay in ICU and stay in hospital ( $P < 0.001$ , all), compared with gastric tube feeding. No significant differences were shown in the time of gastrointestinal function recovery, mortality, or hospitalization expenses between the two feeding routes. This meta-analysis provides evidence that post-pyloric feeding appears to be the safer and more effective choice, as compared to gastric tube feeding among critical patients [12]. Given the challenges related to the placement of post-pyloric feeding tubes, along with the findings of this meta-analysis of no significant differences in mortality between the two groups (gastric versus post pyloric), gastric feeding should be commenced first with the consideration of post pyloric for those with intolerance.

## Conclusion

As in other critically ill patients, gastric feeding is generally well tolerated in COVID-19 patients and should be started as soon as possible. Post-pyloric feeding should be reserved for patients who do not tolerate gastric feeding. Overall, protocol-based feeding has been shown to help reach nutritional goals sooner and should be implemented in all ICUs.

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