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Impaired gastrointestinal transit and its associated morbidity in the intensive care unit☆

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Abstract

Purpose: To determine the proportion of critically ill adults developing impaired gastrointestinal transit (IGT) using a clinically pragmatic definition, its associated morbidity and risk factors.

Materials and Methods: Critically ill adult patients receiving enteral nutrition for ≥72 hours and mechanically ventilated for ≥48 hours were prospectively identified. IGT was defined as absence of a bowel movement for ≥3 days, treatment for constipation, and one of the following: (1) radiologic confirmed ileus, (2) feed intolerance, (3) abdominal distention, or (4) gastric decompression.

Results: One thousand patients were screened, and 248 were included for analysis. Fifty patients (20.1%; 95% confidence interval, 15.1-25.6%) developed IGT persisting for 6.5 ± 2.5 days. Patients with IGT had longer lengths of intensive care unit stay and were less likely to reach nutrition targets compared to patients without IGT or traditional definitions of constipation. Daily opioid use and pharmacological constipation prophylaxis were identified risk factors for IGT.

Conclusion: Traditional definitions of constipation or ileus in intensive care unit patients are simplistic and lack clinical relevance. Pragmatically defined IGT is a common complication of critical illness and is associated with significant morbidity. Future interventional studies for IGT in critically ill adults should use a more clinically relevant definition and evaluate energy deficits and lengths of stay as clinically relevant outcomes.

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1. Introduction

Gastrointestinal (GI) motility disorders are common complications of critical illness; however, there is a paucity of data describing their epidemiology and associated morbidity [1,2]. Possible reasons include a lack of standardized definitions, variable clinical presentations depending on the area(s) of the GI tract affected, and multifactorial etiologies [3,4]. GI motility is regulated by a complex interaction of neurohormonal stimulation and feedback involving a large number of peptides and hormones [3,5]. In the intensive care unit (ICU), GI motility can be altered by sedation, analgesics, anticholinergics, immobility, surgery, enteral feeding, head and spinal injuries, inflammation and sepsis. Hypomotility disorders of the GI tract can be characterized by constipation, abdominal distension, pain, nausea, and vomiting and may result in morbidity such as feeding intolerance, inadequate absorption of nutrition and medications, and prolonged length of hospitalization [1,6]. Disorders of impaired gut transit (IGT) are often referred to as ileus or constipation but these terms do not encompass all parts of the GI tract that can become affected leading to impaired transit.

Most of the published literature on IGT, most often described as ileus or constipation, is in post surgical populations. It is most commonly defined as "an absence of bowel movement for defined period of time" [7]. Most frequently, this period of time has been defined as 3 days, but durations as long as 6 days have been used [8]. Using these definitions, the incidence of ileus or constipation is reported as high as 80% in the postoperative period [8–10]. This definition, although attractively simple, only addresses one manifestation of GI dysmotility. Defecation may be a reliable manifestation of sigmoid and rectal propulsive function, but variability may exist with feeding patterns and pre-existing bowel habits. Furthermore, dysmotility of the esophagus, stomach, and small bowel have different clinical presentations (ie, reflux, vomiting, feed intolerance) [11]. Consequently, no consensus reference standard for detection or treatment exists [12].

The primary objective of this multicentered, prospective, observational study was to determine the proportion of critically ill, mechanically ventilated, and enterally fed patients who develop IGT over a 3-month period, using a clinically pragmatic definition. Secondary objectives were to describe the clinical course for and compare outcomes between patients with IGT and traditionally defined constipation and controls and to identify risk factors thereof in this population.

2. Materials and methods

2.1. Study design

This prospective observational study was conducted between March 1, 2010, and August 31, 2010, in the ICUs of 3 academic hospitals for three consecutive months in each unit. Research and Ethics Board approval was obtained for all sites.

2.2. Clinical definition of IGT

In this study, IGT was defined as the absence of a bowel movement for 3 or more days from the onset of enteral feeding *plus* the initiation of treatment for constipation *and* one of the following: (1) radiologic confirmation of ileus by a qualified radiologist blinded to the study objectives, (2) feed intolerance (feeds held for gastric residuals or vomiting), (3) new or worsening abdominal distention without alternative explanation (ie, ascites), (4) nasogastric tube insertion for decompression. At the participating institutions, the practice of withholding enteral nutrition for feed intolerance is not protocolized; however, local policy suggests that this practice is unnecessary for measured gastric residuals less than 200 mL. This proposed definition of IGT was developed a priori based on literature review and consultation amongst local experts and is a composite of clinically suspected and/or radiologically supported diagnosis [4,11,13–21].

2.3. Patient selection

All patients consecutively admitted to the ICU were prospectively screened for eligibility. Patients were eligible if they were ≥ 18 years of age, receiving enteral nutrition for ≥ 72 hours, and were mechanically ventilated for ≥ 48 hours. Exclusion criteria included expected removal of active treatment within 72 hours of ICU admission or if the patient had a terminal ileostomy or total colectomy upon enrolment.

2.4. Data collection

Patient demographics including severity of illness using Acute Physiology and Chronic health Evaluation, second revision (APACHE II) scores, components of the proposed definition, course of illness, clinical outcomes, and hypomotility risk factors were recorded from the patient's medical record using a standardized case report form. Nutritional targets and caloric intake were calculated and obtained from registered dietitians or clinical pharmacists in each unit. Senna, docusate sodium, metoclopramide, domperidone, and erythromycin were considered preventative therapies for constipation and were therefore not considered as active treatment relative to our proposed definition of IGT. All other pharmacologic interventions for constipation (eg, lactulose, bisacodyl glycerin suppositories, polyethylene glycol, neostigmine, naloxone, methylnaltrexone) were considered active treatment. If multiple episodes of IGT were experienced by one patient, each episode of ileus was counted as a separate incident.

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