

Bowel Management in the ICU: What We Know

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Abstract

Introduction. Gastrointestinal dysmotility frequently occurs in critically ill patients, who often experience symptoms such as constipation and diarrhea. Within the high-tech environment of modern intensive care units (ICUs), bowel care is often overlooked and sometimes regarded as a secondary concern. Limited guidelines and low-quality evidence hinder the management of constipation and diarrhea. The aim of this study is to review and analyze the literature on bowel management in ICUs.

Method. This is a cultural paper. All articles were sourced from indexed databases and nursing journals.

Results. Constipation is defined by NANDA-I as "a decrease in the normal frequency of defecation." In the ICU, the incidence of constipation ranges from 45% to 83%. The most commonly used laxatives are osmotic, bulk-forming, and stimulant laxatives. The World Health Organization (WHO) defines diarrhea as the passage of three or more loose or liquid stools per day. Diarrhea is common in ICUs, and its complications can prolong the length of stay in the intensive care unit. The incidence of diarrhea ranges from 29.5% to 95%. In the ICU, acute fecal incontinence and diarrhea can be managed with a bowel management system (BMS). The implementation of bowel management protocols can improve bowel care in the ICU.

Discussion and Conclusion. Studies agree that the incidence of constipation and diarrhea is high in the ICU. The use of BMS is controversial. The use of a bowel protocol allowed standardization and improving bowel care in ICU. Further studies are necessary to find robust evidence for orientating healthcare staff in bowel management in ICU.

Keywords: Constipation, Diarrhea, Bowel Protocol, Intensive Care Unit

Introduction

Kayambankadzanja and colleagues defined critical illness as “a state of ill health with vital organ dysfunction, a high risk of imminent death if care is not provided, and the potential for reversibility”¹. Patients with critical illness require critical care, which can be defined as the identification, monitoring, and treatment through the initial and sustained support of vital organ functions.¹ While the staff prioritizes high-tech life support treatments, fundamental care activities are closely associated with patient outcomes and the prevention of clinical risks.² Gastrointestinal (GI) dysmotility frequently occurs in critically ill patients who often experience symptoms including vomiting, regurgitation, abdominal bloating, constipation, and diarrhea.³ Ischemia, analgesics, vasoconstrictors, fluid management, and comorbidities such as diabetes can impair GI motility.³ In Intensive Care Unit (ICU), critically ill patients experience constipation and diarrhea.³ Within the high-tech environment of contemporary intensive care units (ICUs), bowel care is often overlooked and at times regarded as a secondary concern.⁴ Minor guidelines and low-quality evidences limit constipation and diarrhea management.³

The aim of this work is to overview and analyze the literature about ICU's bowel management focusing on constipation, diarrhea and bowel protocol utilization.

Constipation

Constipation is defined by NANDA-I (North American Nursing Diagnosis Association International) as, “A decrease in normal frequency of defecation accompanied by difficult or incomplete passage of stool and/or passage of excessively hard, dry stool.”⁴ The associated adverse symptoms include abdominal distension, nausea, vomiting, and restlessness. Gastrointestinal movement impairment rarely contributes to intestinal pseudo-obstruction, which leads to a risk of bowel perforation.⁵ In most critically ill patients, the impairment of bowel movements might be challenging to manage because of sedation⁵. In fact, opioids used as analgesics and sedatives can cause opioid-induced constipation (OIC) because the opioid μ -receptors are highly expressed in the myenteric and enteric submucosal plexus, regulating gut motility and secretion.⁵ Therefore, when opioid drugs are administered, side effects can occur, such as slow gastric emptying, increasing

sphincter tone, and slow gut peristalsis.⁵ It is known that 85% of critically ill patients receiving opioid drugs develop OIC, which appears to be related to their dosage. OIC can be limited by the administration of opioid receptor antagonist drugs such as Naloxone, and PAMORA drugs (Peripherally Acting μ -opioid antagonists) such as Naldemedine.⁶ However, in the ICU, factors other than opioid drugs are related to constipation, such as illness consequences (dehydration, hypovolemic state, hypoperfusion state, and endotoxin hyperproduction), medications (amines, diuretics, antidepressants, and anticonvulsants), and environmental issues (immobilization, stress, lack of privacy, and supine position).⁴

Epidemiology and assessment

In the ICU, the incidence of constipation ranges from 45% to 83%.^{7,8} However, the definition used for constipation varies. Constipation is in fact defined as: more than 3 consecutive days without a bowel movement, failure of bowel function for 3 consecutive days and the absence of a bowel movement during the first 4 days of hospitalization.^{6,8,9,10} The “Norgine Risk Assessment Tool for Constipation” assesses the risk of constipation. It includes six components (medical condition, current medication, toileting facilities, mobility, nutritional intake, and daily fluid intake), and each part is divided into items. “Medical condition” is composed of cancer, clinical depression, diabetes, hemorrhoids, anal fissure, rectocele, local anal or rectal pathology, history of constipation, impaired cognition/dementia, multiple sclerosis, Parkinson's disease, post operative, rheumatoid arthritis, spinal cord conditions and stroke. “Current medications” include aluminum antacids, anticholinergics, antiparkinsonian drugs, antipsychotic drugs, calcium channel blockers, calcium supplements, diuretics, iron supplements, non-steroidal anti-inflammatory drugs (NSAIDs), opioids, tricyclic antidepressants, and polypharmacy. “Toileting Facilities” is formed from bed pan, commode by bed in hospital/care home/home, supervised use of lavatory/commode and raised toilet seat without foot stool. “Mobility” is composed of restricted to bed, restricted to wheelchair/chair, walks with aids/assistance, and walks short distance but less than 1/3 ml daily. “Nutritional intake” is consisted of nutritional risk as identified by local nutritional screening tool, fiber intake 6 g or less per day, difficulty in swallowing/chewing and needs assistance to

eat. At the end “Daily fluid intake” is made up minimum fluids not achieved. The “Daily fluid intake” can be calculated as 30 mls fluid per 1 kg of body weight. The health staff checks the items and sums them. If the score is > 4, the patient is at risk of constipation.¹¹ This scale is developed using the evidence from a systematic review, however there are minimum data on its validity or reliability.¹² It is newly developed and it is anticipated that it will evolve and change over time.¹²

Treatment

Kleninger, Masri and colleagues have studied the prophylactic use of laxative medications for managing constipation in ICU. Kleninger and colleagues found that 24% of the patients using laxative medications had an adequate defecation compared to the control group (8,3%).¹³ Masri and fellows found that 18% of patients had defecated after using laxative medication instead of 4% of control group.¹⁴ The most used laxatives are osmotic, bulk-forming, and stimulant.^{8,15} Studies agree that all laxative drugs can have negative effects on patients (discomfort, abdominal distension, electrolytic disorder, etc.).^{13,15} In fact, Masri and colleagues revealed that the use of laxative medications improved defecation in the first 72 h, but it also caused an increase in mechanical ventilation days.¹⁴ For OIC treatment, studies have shown that enteral administration of methotrexate (MTX) and naloxone is safe because it only acts in the bowel system and does not reduce the central level sedative effect of opioids.^{16,17,18} However, it is still not clear whether MXT is better than common laxatives.^{16,17}

Diarrhea

The World Health Organization (WHO) defines diarrhea as the passage of three or more loose or liquid stools per day, or more often than normal for the individual. However, there are different definitions of diarrhea in the literature.¹⁹ The definitions are often based on frequency, consistency, weight, duration, and their combinations.¹⁹ Diarrhea can be distinguished in bowel dysmotility (rapid transit time), malabsorptive diarrhea (reduction or loss of absorptive capacity causing maldigestion of nutrients), inflammatory or secretory diarrhea (impaired absorption of water and electrolytes due to inflammation or toxic agents), osmotic diarrhea (increase of osmotically active solutes which draw more water in the bowel).¹⁹ Diarrhea can also be a consequence

of impaired intestinal absorption or reduction of the intestinal surface.^{19,20} The most frequent causes of diarrhea are infective, inflammatory, iatrogenic, endocrine, vascular, immunological, neoplastic, and pharmacological. Moreover, broad-spectrum antibiotics disrupt the intestinal flora, which promotes *Clostridium difficile* proliferation. *Clostridium d.* associated with diarrhea may lead to inflammation of colonic mucosa which, in its fully developed form, manifests as pseudomembranous colitis which could be life-threatening.²⁰ ICU patients are very frail, and diarrhea is common; its complications (malabsorption, malnutrition, electrolyte and fluid imbalance, skin injuries, dehydration, infections, and isolation) can prolong the duration of intensive care unit stay.⁵

Epidemiology and Assessment

The incidence of diarrhea goes from 29,5% to 95% in the ICU.^{21,22} The most recognized stool assessment instruments are the Bristol Stool Chart and Bliss Stool Classification System.²² The Bristol Stool Chart is composed of seven categories with graphical and textual descriptions of stools, and diarrhea is classified as a score of 6 or 7.²² This chart has been used by The European Society for Clinical Microbiology and Infectious Disease to define *Clostridium difficile* diarrhea and is a better predictor of whole intestinal transit.²² The Bliss Stool Classification System was developed to assess stool consistency in patients with intestinal incontinence. The chart is composed of 4 categories with depictions and descriptions.¹⁴ When used by healthcare workers, it has shown good reliability levels.²² The Bristol Stool Chart and the Bliss Stool Classification System have not yet been validated in the ICU setting for clinical or research purposes.²² It is important to remember that these assessment scales rely on observation and subjective interpretation. This can result in variability between different operators. The Wexner Incontinence Score is composed of 5 items: solid stool, liquid stool, gas present, wearing pad, and lifestyle alteration. Each category was scored from 0 to 4, and the scores were summed to obtain the total result (0 = perfect continent to 20 = total incontinence).²³ Orenzi and colleagues declared the Italian version of the Wexner Score proved good consistency, reliability and reproducibility.²⁴ They declared that it could be useful in clinical practice and research areas.²⁴

Treatment

In the ICU, acute fecal incontinence and

diarrhea can be managed with a bowel management system (BMS), a class 1 medical disposal system made of a tube anchored by a balloon, and a closed-circuit collection system, which allows the collection of liquid stools from bedridden patients.²³ This device can be used for 29 continuous days and can improve skin integrity, infection control, and patient dignity.²³ Moreover, they can reduce healthcare staff engagement and use of other devices. However, BMS cannot be used for chronic diarrhea, ambulant patients, pediatric patients, patients undergoing rectal surgery, or those with rectal mucosa compromise (injury, stenosis, and hemorrhoids). The BMS must be removed as soon as diarrhea ends. In fact, balloons may cause bowel obstruction and perforation.²³ Ritzema and colleagues al. studied the relationship between days with mechanical ventilation and the use of BMS. They proved that patients with BMS were ventilated for an average of five days longer than those without BMS. This difference may be due to the difficulty in mobilizing patients with a BMS in situ. Critically ill patients with BMS are placed in a sitting position for a brief time, which reduces ventilatory rehabilitation.²⁵ Peart and Richardson instead studied the relationship between delayed application of BMS and pressure ulcer development in patients with fecal incontinence. They declare that the delayed application of the BMS is probably related to inadequate knowledge of the instrument and the absence of a guide tool. The authors developed the 'CRITICAL CARE BOWEL MANAGEMENT ASSESSMENT TOOL' to help healthcare professionals in selecting proper bowel management strategies. The tool is divided into three items (tissue integrity in the perineal area, continence, and mobility) with a score from 0 to 4. The three scores must be added up; if the result is <6 (low risk), BMS is not recommended; if >6 (high risk), it is recommended to prevent pressure ulcers.²⁶ Its use can reduce the risk of developing pressure ulcers, but it can also delay respiratory rehabilitation.^{25,26}

Bowel Management Protocols (BMP)

The use of prophylactic laxative regimens in enterally fed critically ill patients has been proposed to prevent bowel movement impairment and its adverse effects.⁵ The regimens are found to be effective for improving bowel movements; however, they can increase the occurrence of diarrhea, which often occurs in critically ill patients.⁵ Most studies have shown that the use of bowel protocols improves bowel management

in ICU.^{27,28,13} Dorman and colleagues show an increase of bowel assessment (95%), detection of bowel sound and bowel palpation (57%), and 90% of patients defecate within the fourth day after using the protocol. The study conducted by Mcpeake, Gilmour, and Macintos underlined a decrease in the incidence of constipation (20%) and diarrhea (15%) with the use of the protocol.²⁸ Kieninger et al. revealed an increase in patients (24%) that had a good canalization within five days following the bowel protocol, made of both drugs and not medical techniques. An increase in bowel activity assessment is registered after applying protocol.^{28,29} However, a few studies have found no significant differences after using bowel protocols to reduce constipation.^{28,30} The use of bowel protocols can improve bowel management in the ICU.^{27,28,13} The studies that did not reveal an improvement declared that there was poor adherence from the healthcare staff following the protocol.^{29,30,7} Dionne et al. analyzed 44 ICUs and found 37 different bowel management protocols. They differ in the type of patients, drugs used, ICU, and the starting and ending criteria. The authors concluded that there is no best bowel protocol or management.³¹

The use of this protocol improved bowel registration in medical records.^{28,29}

Conclusion

Studies agree that the incidence of constipation and diarrhea is high in the ICU.^{7,8,9,10,22,23} However, there were differences between constipation and diarrhea. Having a unique definition of diarrhea and constipation would allow a better comparison of studies and results, and the incidence of diarrhea and its multifactorial causes (infection, antibiotics, bowel inflammation, etc.) should be investigated more carefully. The use of the BMS is controversial, and this underlines the importance of critical thinking and choosing tools based on patients' conditions to avoid negative outcomes.

Future studies should investigate the safe use of BMS in sitting and other positions. The use of a bowel protocol allowed standardization and improving bowel care in ICU, however more studies are necessary.²⁹ This study shows that bowel management in the ICU is not currently supported by robust evidence, even though bowel impairment can worsen the patient's outcome. Further studies are necessary to find robust evidence for orientating healthcare staff in bowel management in the ICU. Future studies should assess probiotic use, use of the term

“gastrointestinal failure” to show all bowel and gastric alterations, unique definitions of diarrhea and constipation, and the role of enteral and parental nutrition in bowel management.

We hope that in the future bowel management will be executed by doctors and nurses through an integrative collaboration with also other healthcare professionals (dietitians, physiotherapists, etc.).

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