

# Chapter 40

## Approach to Ileus in the ICU



### 40.1 Introduction

Ileus refers to a functional disruption of the normal propulsive activity of the gastrointestinal (GI) tract, resulting in delayed passage of contents. This condition can affect any part of the GI system but most commonly impacts the small and large intestines. The condition manifests as abdominal discomfort, distension, nausea, vomiting, and the inability to pass flatus or stool, leading to complications such as bacterial overgrowth, sepsis, and multi-organ failure. Ileus often develops postoperatively or due to electrolyte imbalances, infections, or medications, especially opioids. Prompt recognition and effective management are critical to preventing severe complications like bowel perforation or ischemia [1, 2] [Ref: Algorithm 40.1].

### 40.2 Pathophysiology and Mechanisms

The pathophysiology of ileus, especially in critically ill patients, is multifactorial, involving both neuronal and inflammatory mechanisms:

- **Neuronal Mechanisms:** Ileus is influenced by the autonomic nervous system, where an imbalance between sympathetic and parasympathetic activity results in reduced GI motility. Postoperative ileus is particularly linked to increased sympathetic activity, leading to decreased peristalsis. Additionally, enhanced release of inhibitory neuromodulators like nitric oxide from inhibitory motor neurons contributes to motility reduction.

- **Inflammatory Mechanisms:** Surgery or systemic inflammation can activate local inflammatory responses within the intestinal muscularis, releasing cytokines, nitric oxide, and prostaglandins. These substances, produced by activated macrophages and other immune cells, suppress coordinated intestinal contractions. This mechanism is particularly relevant in critically ill patients, where inflammation, often compounded by sepsis or trauma, leads to prolonged ileus.

Understanding these mechanisms helps explain the therapeutic efficacy of agents like neostigmine, which enhances parasympathetic tone, and peripherally acting opioid antagonists, which counteract opioid-induced motility suppression [3].

### 40.3 Risk Factors and Etiology

Ileus in critically ill patients often arises from complex, interrelated factors:

- **Primary vs. Secondary Ileus:** Primary ileus usually results from direct GI trauma or abdominal surgery. In contrast, secondary ileus is a consequence of systemic conditions like sepsis, multi-organ failure, or metabolic disturbances (inadequate fluid resuscitation, excess fluid administration, hyperglycemia, hypothyroidism, uremia, acidosis) that impact GI motility without direct GI injury.
- **Critical Illness Factors:** The pathogenesis of ileus in the ICU setting involves multiple contributors, including:
  - **Mechanical Ventilation:** Prolonged ventilation is associated with increased intra-abdominal pressure and decreased diaphragm movement, both of which impair GI motility.
  - **Medications:** Sedatives and opioids, commonly used in the ICU, decrease bowel motility by reducing neural signaling to the GI tract. Anticholinergics, calcium channel blockers.
  - **Immobility.**
  - **Electrolyte Imbalances:** Hypokalemia, hypomagnesemia, and hypercalcemia are frequent in critically ill patients and can significantly impair smooth muscle function, contributing to ileus [4].

Understanding these risk factors allows for targeted interventions to reduce the incidence and severity of ileus in the ICU.

### 40.4 Monitoring and Diagnosis

Accurate diagnosis of ileus involves both clinical assessment and judicious use of diagnostic tools:

- **Limitations of Gastric Residual Volume (GRV):** Although GRV measurement is commonly used to assess gastric emptying, its clinical utility in managing ileus is debated. Recent evidence suggests that relying solely on GRV may not accurately predict the risk of aspiration or the severity of ileus, as endogenous secretions can confound the readings. Instead, a focus on clinical symptoms like vomiting, distension, and feeding intolerance is recommended for more effective monitoring.
- **Advanced Diagnostic Tools:** Newer methods, such as the  $^{13}\text{C}$ -octanoate breath test, offer a less invasive approach to assessing gastric emptying and could serve as an alternative to traditional methods like scintigraphy. However, the availability and practicality of such tests in the ICU remain limited.

## 40.5 Pharmacological Management

Managing ileus pharmacologically requires a tailored approach based on the underlying causes and severity:

- **Laxatives/Stool softeners:**
  - Lactulose: 13 g three times daily should be given until stool passage and then as needed (on SOS basis).
  - PEG (polyethylene glycol): 13.125 g three times daily in 100 ml water.
  - Psyllium.
  - Coloxyl.
- **Prokinetics:** Metoclopramide (10 mg four times a day for a maximum of 7 days) and erythromycin are common choices for stimulating gastric motility. However, their long-term use is limited by potential side effects like tardive dyskinesia and tachyphylaxis, respectively. Erythromycin, at doses of 250 mg IV every 8 hours, can be effective for short-term use. 5-HT<sub>4</sub> agonists—Cisapride, Levosulpiride (25 mg three times a day)—can also be used.
- **Neostigmine:** As an acetylcholinesterase inhibitor, neostigmine is particularly effective for treating colonic pseudo-obstruction by increasing parasympathetic activity, thus enhancing motility. Continuous infusion is often preferred over bolus doses to minimize the risk of bradycardia (dose: intravenous infusion 0.4–0.8 mg/h for 24 hours (watch for bradycardia)).
- **Peripherally Acting Mu-Opioid Receptor Antagonists:** Agents like methylnaltrexone and alvimopan specifically target opioid-induced constipation without affecting central analgesia. Their use is critical in reversing opioid-induced ileus, especially in postoperative patients [5].

## 40.6 Prevention and Early Intervention

Prevention plays a pivotal role in reducing the incidence of ileus in critically ill patients:

- **Early Mobility:** Mobilizing patients early and reducing the duration of immobility can significantly stimulate bowel motility. Early ambulation has been shown to reduce the duration of ileus postoperatively.
- **Minimizing Opioid Use:** Judicious use of opioids, alongside non-opioid analgesics, helps prevent opioid-induced suppression of GI motility. The use of multimodal analgesia is often preferred.
- **Optimal Nutritional Strategies:** Early initiation of enteral nutrition, using small volumes and advancing slowly, supports gut function and reduces the risk of ileus. When enteral feeding is not possible, intravenous fluids should be carefully managed to maintain hydration.

## 40.7 Detailed Treatment Pathways

A stepwise approach to managing ileus ensures timely intervention and minimizes complications:

### 1. Initial Assessment and Stabilization:

- Ensure airway protection and stabilize circulation. Consider fluid resuscitation or vasopressors for hypotensive patients while avoiding fluid overload.
- Hold enteral feeding temporarily if signs of intolerance are present and initiate nasogastric decompression for symptomatic relief.

### 2. Medical Management:

- Correct electrolyte imbalances and discontinue medications that impair motility.
- Start prokinetic agents if there is no evidence of mechanical obstruction and escalate to neostigmine or other specific therapies in refractory cases.

### 3. Escalating Care and Surgical Consultation:

- If symptoms persist despite medical management, consider abdominal CT to rule out complications like ischemia or perforation.
- Surgical consultation is necessary for cases with suspected bowel ischemia, perforation, or mechanical obstruction.

**Surgical Decompression:**

- (a) Sigmoidoscopy.
- (b) Colonoscopy.
- (c) Surgical decompression.
- (d) Cecostomy, colectomy, ileostomy, and Hartmann procedure.

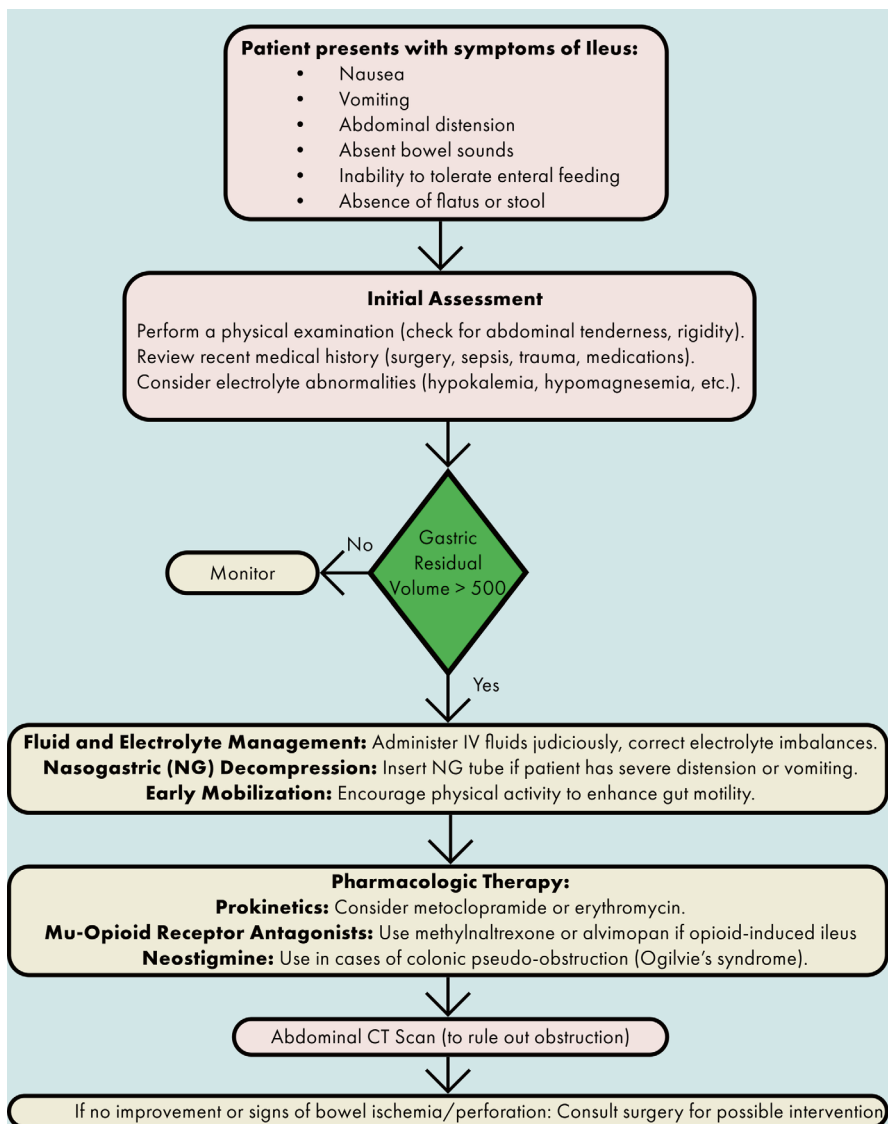
**40.8 Impact on Patient Outcomes**

Effective management of ileus significantly improves outcomes in critically ill patients:

- **Reduced ICU Stay and Morbidity:** Timely intervention can shorten the duration of mechanical ventilation and ICU length of stay by enabling early resumption of enteral nutrition.
- **Prevention of Complications:** Proper management reduces the risk of aspiration pneumonia and other complications like bacterial translocation, which can lead to sepsis.
- **Improved Survival Rates:** Addressing ileus and its underlying causes helps prevent multi-organ failure, ultimately improving patient survival.

**40.9 Conclusion**

The management of ileus in critically ill patients requires a comprehensive and systematic approach that addresses the underlying pathophysiology, closely monitors clinical symptoms, and applies targeted pharmacological and supportive therapies. Early intervention and a multidisciplinary approach can significantly improve patient outcomes, reducing morbidity and mortality associated with this condition.

**Algorithm 40.1: Approach to ileus in the ICU**

## Bibliography

1. Bauer AJ, Schwarz NT, Moore BA, Türler A, Kalff JC. Ileus in critical illness: mechanisms and management. *Curr Opin Crit Care*. 2002;8(2):152–7.
2. Govil D, Pal D. Gastrointestinal motility disorders in critically ill. *Indian J Crit Care Med*. 2020;24(Suppl 4):S179–s82.
3. Aries P, Huet O. Ileus in the critically ill: causes, treatment and prevention. *Minerva Anesthesiol*. 2020;86(9):974–83.
4. Ladopoulos T, Giannaki M, Alexopoulou C, Proklou A, Padiaditis E, Kondili E. Gastrointestinal dysmotility in critically ill patients. *Ann Gastroenterol*. 2018;31(3):273–81.
5. Vazquez-Sandoval A, Ghamande S, Surani S. Critically ill patients and gut motility: are we addressing it? *World J Gastrointest Pharmacol Ther*. 2017;8(3):174–9.