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CLINICAL VIGNETTE

Use of a Proton Pump Inhibitor to Improve Palliative Care of a Patient with Inoperable Small Bowel Obstruction

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Background

Small bowel obstruction (SBO) is an important cause of morbidity and mortality, particularly among the elderly and those with gastrointestinal malignancy. It accounts for hundreds of thousands of hospital admissions annually in the United States and carries a mortality of greater than three percent.¹ The morbidity is profound, carrying a high burden of pain and decreased quality of life. There is a paucity of non-surgical treatment options for non-malignant small bowel obstruction and its associated symptoms.² This case report demonstrates the use of pantoprazole to suppress gastric secretions and promote removal of a nasogastric tube in the setting of a non-resolving SBO.

Case Presentation

A 94-year-old man presented with a one-week history of altered mental status, lethargy, nausea, and vomiting. He had recently been admitted to an outside hospital for influenza infection and discharged home, after which he re-presented to the hospital with new symptoms. His medical history was significant for advanced Alzheimer's dementia, atrial fibrillation, and hypertension. His surgical history was significant for a right hemicolectomy in the distant past. He lived at home with his adult son, who was his primary caretaker.

On admission, the patient was largely non-verbal and only able to communicate with grunts, which was not consistent with his baseline mental status. He was hemodynamically stable. His abdomen was soft and non-distended with absent bowel sounds and facial grimacing to deep palpation. His labs were unremarkable apart from hypokalemia to 3.3 mmol/L and Gram stain of his urine revealed Gram positive cocci, later speciated as *Enterococcus*. CT of his abdomen revealed a small bowel obstruction with the transition point in the proximal jejunum.

General surgery was consulted for the patient's small bowel obstruction, and it was felt that the patient was not a surgical candidate due to his advanced age and co-morbidities. He was therefore managed conservatively with bowel rest, electrolyte repletion, intravenous fluids, and placement of a large-bore nasogastric tube. He was started on piperacillin/tazobactam for concurrent complicated urinary tract infection. For seven days, the patient showed no signs of clinical improvement. He had no bowel sounds on physical exam and passed no flatus. He continued to have high output gastric secretions, producing be-

tween 1.5-2.5 liters/day through his nasogastric tube. Repeat CT on day six of admission revealed radiographic resolution of the obstruction, yet the patient continued to have high output through his nasogastric tube with no clinical return of bowel function. The nasogastric tube was not removed due to this continuous high output. On the seventh day of admission, Palliative care was consulted and intravenous pantoprazole 40 mg twice a day was initiated. Over the following day, nasogastric tube output dropped precipitously to 200 mL, and the patient passed flatus and had two small bowel movements. The nasogastric tube was removed on the ninth day and the patient tolerated a clear liquid diet during brief periods of wakefulness. On the 11th day of admission, the patient was advanced to a pureed diet.

Despite resolution of the small bowel obstruction, the patient never returned to his prior level of alertness. It was felt that the physical and mental strain of his prolonged hospital course, in addition to his poor baseline functional status, had caused a precipitous decline in his cognitive function. A meeting was held with the patient's son on the 13th day of admission to discuss goals of care, and the patient was transitioned to comfort care. On the 15th day of hospitalization, he passed comfortably.

Discussion

Current management of SBO is divided into surgical and non-surgical modalities.³ Surgery is often performed laparoscopically to reduce the risk of complications and is typically reserved for patients with signs and symptoms of complete SBO in whom the risk of strangulation is high. However, as small bowel obstructions often present in patients with multiple co-morbidities, many patients will not be operative candidates.⁴ In the absence of signs and symptoms of strangulation, ischemia, or peritonitis, conservative non-surgical management is generally considered to be appropriate for the first 72 hours of hospitalization.

Non-surgical management options for SBO are limited and typically include small bowel decompression with a large-bore nasogastric tube, keeping the patient *nil per os* (NPO), administration of intravenous fluids, and aggressive repletion of electrolytes. However, such management fails in approximately 10% of cases and causes significant discomfort to patients.⁵ Nasogastric tube placement has long been recognized as one of

the most painful procedures a hospitalized patient can undergo but is required for reduction of the intraluminal gastric pressure, a fundamental part of non-surgical management of SBO.⁶ The presence of a nasogastric tube is also associated with inherent risks due to impairment of normal function of the lower esophageal sphincter, including worsening of gastroesophageal reflux, esophagitis, and pulmonary aspiration of gastric contents. Therefore, while it is not routinely used, the pharmacologic suppression of gastric secretions should be considered in patients who require nasogastric intubation for treatment of SBO as an additional method of reducing gastric pressure.

We propose that the rapid efficacy of proton pump inhibitor (PPI) on volume of gastric secretions in this patient demonstrates a potentially important use in patients with bowel obstruction who are inoperable or high-risk for surgical complications. While impact on clinical outcomes of bowel obstruction is unclear, reduction of gastric secretions can improve pain control secondary to visceral distension, reduce nausea and vomiting of gastric contents, and hasten the removal of uncomfortable tubes or avoid them altogether. Therefore, use of anti-secretory medications should be considered as an important adjunct to anti-emetics and analgesics in the management of patients with bowel obstruction. In this patient, the beneficial effects of pantoprazole were particularly significant in improving his comfort and facilitating his transition to comfort care.

Other anti-secretory medications, such as the octreotide and scopolamine, have also been used to reduce gastric secretions as well. However, their use has been primarily studied in patients with inoperable bowel obstructions specifically due to advanced malignancy. In one systematic review of fifteen randomized controlled trials or observational reports, therapeutic success of octreotide in managing symptoms secondary to malignant bowel obstruction as reported to be 60-90%.⁷ Compared to scopolamine, one randomized controlled trial found octreotide to result in a more rapid reduction in frequency of vomiting as well as decreased intensity of nausea.⁸ Generally, the available evidence suggests that both octreotide and scopolamine can be considered first-line anti-secretory medications for malignant bowel obstruction, with a slight preference for octreotide.

Compared to octreotide and scopolamine, evidence supporting the use of PPIs and histamine-2 antagonists (H2 antagonists) to reduce gastric secretions is more scarce and remains limited to specific patient populations. One meta-analysis examined seven randomized trials comparing PPI versus H2 antagonists and on volume of gastric aspirate, concluding that H2 antagonists are more effective in reducing volume of gastric aspirate.⁹ However, the only studies that were suitable for the meta-analysis were in peri-operative patients undergoing elective surgery for the purposes of minimizing risk of aspiration with general anesthesia. In addition, more useful clinical parameters such as reduction of symptoms or overall outcomes were not examined.

In addition to anti-secretory medications, steroids have also been proposed as a viable treatment option in the management of non-operable bowel obstruction. One Cochrane review examined three randomized controlled trials and found a non-statistically significant trend toward resolution of bowel obstruction with intravenous dexamethasone.¹⁰ Another randomized controlled trial demonstrated a non-statistically significant reduction in symptoms in patients with inoperable bowel obstruction in the setting of known malignancy with use of intravenous methylprednisolone. This reduction in symptoms became statistically significant only in the subgroup of patients without nasogastric tube¹¹. The mechanism by which steroids promote resolution of bowel obstruction is unclear, but may be related to their anti-inflammatory properties, which can reduce tumor-associated edema. Moreover, their analgesic, prokinetic, and anti-emetic properties may mitigate symptoms associated with bowel obstruction.^{10,11}

More evidence is needed to identify the role of PPIs and H2 antagonists in reduction of gastric secretions for other patient populations such as those with advanced malignancy or inoperable bowel obstruction requiring non-surgical palliation. Demonstrating the utility of PPIs and H2 blockers, while adding more to our armamentarium of non-surgical management of bowel obstruction, could also serve to alleviate the burden of unnecessary cost to our healthcare system. More money is spent on palliation at the end of life than any other phase of care, and PPIs and H2 antagonists are more affordable than current first-line agents used for malignant bowel obstruction.

In summary, our case report highlights a practical role for PPIs in a non-malignant bowel obstruction with persistently high nasogastric tube output. While the use of other agents has been described in the medical literature, the majority of these studies investigated patients with advanced gastrointestinal malignancy or in peri-operative patients. PPIs and H2 blockers may play a role in reducing visceral pain, decreasing nausea and vomiting, and minimizing invasive measures, and are more cost effective than currently used agents in the non-surgical management of bowel obstruction.

Learning Points

- Anti-secretory agents, anti-emetic agents, and analgesics are mainstays in the non-surgical management of bowel obstructions, with octreotide and scopolamine being the most studied anti-secretory agents among patients with malignant bowel obstructions.
- PPIs and H2 blockers may be equally effective to other anti-secretory agents in their reduction of frequency and severity of symptoms in bowel obstruction and are more cost effective.
- More study is needed to determine the best first-line anti-secretory agents and to help establish guidelines for the non-surgical management of malignant and non-malignant bowel obstructions.

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