Prevention of paralytic ileus utilizing alvimopan following spine surgery

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Abstract

Postoperative ileus affects a substantial proportion of patients undergoing elective spine surgery, especially in cases of spinal deformity correction and where an anterior lumbar approach is utilized. Though the first line of treatment for postoperative ileus is conservative management, recent advances in pharmacology have yielded promising options for both treatment and prevention. We report a case of a patient who underwent a two-stage posterior spinal fusion. The patient suffered with a severe, prolonged ileus after her initial surgery. To prevent ileus following her second spinal surgery, alvimopan (a μ-opioid receptor antagonist) was administered and she had a rapid return of bowel function with no signs of ileus. Alvimopan, has been shown to reduce the rate of ileus in colorectal surgery patients, and may be useful for preventing ileus in high-risk orthopedic and spine surgery patients, although prospective studies will be needed to test this hypothesis.

Introduction

Approximately 3.5% of patients undergoing elective spine surgery develop paralytic ileus[1,2] Paralytic ileus results due to temporary cessation of gastrointestinal (GI) peristalsis, followed by intestinal dilation and accumulation of secretions and gas within its lumen.[3] Patients suffering from this complication complain of abdominal distention and discomfort, nausea, emesis, constipation, bloating. It may lead to substantial morbidity and even mortality in severe cases.[1,4-10]

Treatment of postoperative ileus begins with conservative management by making the patient nil *per os* (NPO), encouraging early ambulation, and placing a nasogastric tube when bloating and nausea are severe. If these measures fail, management options include pharmacological treatment and surgery in rare cases.[8,11-24]

Prevention of ileus is an important area of research, due to the fact that ileus leads to prolonged hospital stay and increased cost. Alvimopan, a μ-receptor antagonist specific to the GI tract, is commonly used for pharmacologic prevention of ileus in patients after bowel resection, but, to our knowledge, it has not been previously reported in a spine surgery patient.

We report a case of a patient who underwent a two-stage posterior spinal fusion. Her first-stage surgery was complicated by severe and prolonged postoperative ileus. Alvimopan was provided to the patient prior to and immediately following her second-stage surgery, and she did not develop paralytic ileus or any other GI complications.

Case Report

A 73-year-old female with a past medical history of Wolff-Parkinson-White syndrome, vitamin D deficiency, polio, and idiopathic scoliosis, presented with progressive, painful thoracolumbar scoliosis with positive sagittal balance (Figure 1). She underwent posterior spinal instrumentation and fusion with posterior element osteotomies at T11-12, T12-L1, and fusion from T4 to L4 as stage 1 of her treatment (Figure 2). On postoperative day #2, she developed severe abdominal pain, nausea and bloating consistent with paralytic ileus. Her initial postoperative pain control regimen consisted of standing acetaminophen, oral oxycodone, and intravenous hydromorphone on an as-needed basis, but narcotics were discontinued following ileus development. Abdominal x-ray was consistent with a persistent ileus and a gastroenterology consult was obtained (Figure 2). The patient was made NPO and a nasogastric tube was placed. Symptoms resolved after 6 days, and the patient was discharged on postoperative day 9.

Five weeks later, the patient was taken to the operating room for the second-stage procedure, consisting of instrumentation and fusion to the pelvis with a pedicle subtraction osteotomy at L4 (Figure 3). Given her previous prolonged ileus, the patient was placed on alvimopan 12 mg twice a day starting 12-hours preoperatively to prevent ileus formation and promote gastrointestinal motility. Her pain regimen consisted of standing acetaminophen, as needed oral oxycodone, and as-needed intravenous hydromorphone (same protocol as procedure 1). She had return of bowel function with formed stool on the second day after surgery. An abdominal radiograph obtained on the third post-operative day demonstrated stool in the colon and no signs of ileus (Figure 4). The patient was discharged to home after clearing physical therapy on post-operative day 4.

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Discussion and Conclusions

Ileus in spine surgery patients

Postoperative ileus is a complication that commonly affects patients undergoing elective spine surgery.[2,4,24,25] Certain approaches and procedures performed on the spinal column place patients at higher risk of ileus. The anterior approach to the lumbar spine necessitates manipulation of the peritoneal cavity to access the retroperitoneal space and the lumbar spine, which increases the risk of ileus. A retrospective study examining ileus in over 200,000 spine surgery patients found an overall incidence of 2.6% when undergoing a posterior lumbar spinal fusion, 7.5% when undergoing an anterior lumbar spinal fusion, and 8.4% when a patient underwent both anterior and posterior approaches. In this study, patients who developed ileus had a longer length-of-stay by 2.5 days and greater hospital costs by $7000.[2] Lateral access spine surgery may also place patients at higher risk of ileus. A retrospective review of lateral lumbar spine surgery reported an incidence of ileus at 7% and noted that gastroesophageal reflux disease and posterior instrumentation were independent risk factors for ileus development.[4] Spinal deformity patients are also at high risk of ileus, especially those undergoing corrective lumbar osteotomy. A study of patients with ankylosing spondylitis undergoing opening wedge osteotomy had a higher rate of ileus than in patients with closing wedge osteotomy (16.7% *vs* 5.9%).[25]

Prevention of postoperative ileus

Chewing gum is one method suggested for prophylactic prevention of ileus. Level I studies in the general surgery literature have shown that the act of masticating stimulates the cephalic-vagal circuits leading to increased GI motility and reduced rates of ileus.[21,26,27]

Pharmacologically, alvimopan, a selective μ-opioid receptor antagonist with high receptor affinity for GI receptors, has been utilized and studies as a prevention medication. Recent trials have demonstrated its efficacy for preventing postoperative ileus in patients undergoing abdominal surgery.[16,17,19,28]

Alvimopan was utilized in this case to prevent the development of postoperative ileus. The efficacy of alvimopan for preventing ileus following bowel surgery is well documented, and side effects are minimal which include abdominal cramping, nausea and flatulence. The hazard ratio for return of bowel function in randomized study comparing alvimopan to placebo have been reported as 1.45 to 2.29.[16,17]

Although it is certainly possible that this patient would not have developed an ileus following her second-stage procedure, this case highlights a strategy which may be utilized in spine surgery patients who are at high risk of post-operative ileus. The patient had a lengthy hospital stay after her initial surgery due to post-operative ileus, but when prophylactically dosed with alvimopan 12 mg twice a day following her second surgery, she had spontaneous return of bowel function on the second post-operative day. Her narcotic use was similar during both hospital stays.

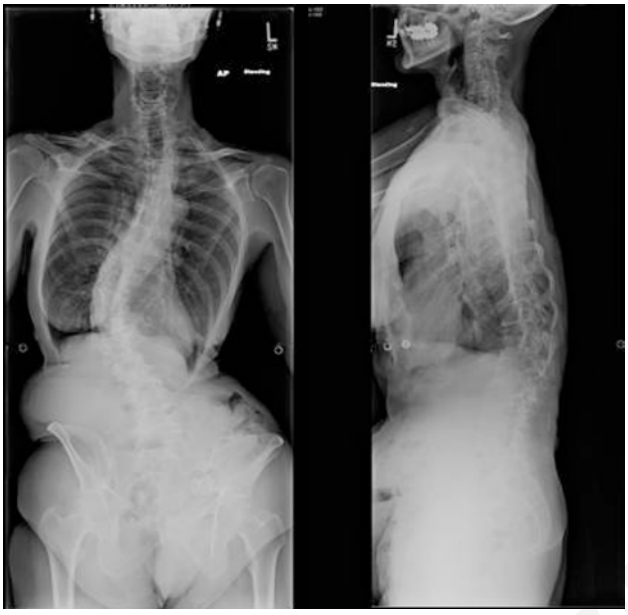

Figure 1. Preoperative radiographs of the patient who underwent two-stage posterior spinal fusion for her degenerative scoliosis.

Figure 3. Postoperative radiograph after the patient's second operation where the patient was prophylactically given alvimopan for prevention of postoperative ileus. No dilated loops are seen; air is seen throughout the gastrointestinal tract.

Figure 2. Postoperative radiograph after the patient's first operation showing the presence of air-filled, dilated bowel loops consistent with paralytic ileus.

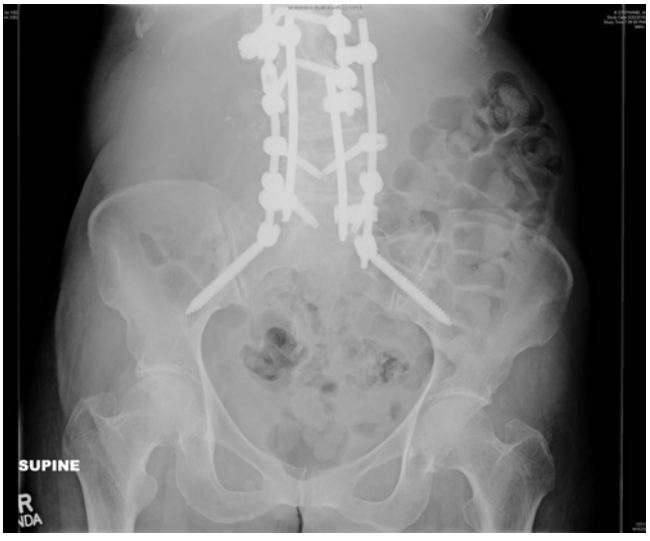

Figure 4. An abdominal radiograph obtained on the third postoperative day demonstrated stool in the colon and no signs of ileus.

Formal trials investigating alvimopan and its effectiveness for preventing ileus in orthopedic and spinal surgery patients at high risk of postoperative ileus may help elucidate advantages and potential disadvantages of routinely using this drug. If ileus rates are decreased with this or other interventions, morbidity and mortality rates, in addition to the costs of prolonged hospitalization, may be reduced.

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