A Case of Resolved Vincristine-Induced Constipation Following Osteopathic Medicine in a Patient With Infantile Fibrosarcoma

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Vincristine-induced constipation is a common side effect in pediatric oncology patients. We report the case of an infant with histologic diagnosis of infantile fibrosarcoma who developed significant constipation because of ongoing vincristine administration. She was treated with osteopathic manipulative treatment and had significant improvement in symptoms. She was able to stop her home lactulose bowel regimen without signs or symptoms of constipation. This case demonstrates the benefit of osteopathic manipulative treatment for chemotherapy-induced constipation as an effective and simple supportive care option without added adverse events.


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Chemotherapy-induced constipation (CIC) is a common side effect in pediatric oncology patients. Constipation is the third most common symptom in patients receiving cytotoxic chemotherapy. Specifically, thalidomide, cisplatin, and vinca alkaloids such as vincristine, vinblastine, and vinorelbine induce severe CIC in up to 80% to 90% of patients. The mechanisms underlying CIC are poorly defined and often difficult to distinguish from secondary constipation caused by other agents. Current management of CIC aims to reduce the severity of symptoms, rather than combating the pathophysiologic mechanisms of dysfunction. Standard-of-care management includes trial and error with a combination of bulk-forming and osmotic laxatives with stimulant laxatives. Rectal medication administration is not recommended because patients are often neutropenic, and the risk of introducing infection is high. After receiving CIC-inducing medications, patients are generally prescribed age-appropriate laxatives or stimulants for 24 to 48 hours after chemotherapy.

Using osteopathic manipulative treatment (OMT) in patients without cancer has been shown to reduce reported pain, decrease nausea and vomiting, decrease constipation, and improve quality of life. Pilot studies have shown that OMT may decrease abdominal pain, bloating, and drug use for adult patients. These hands-on treatments range from gentle stretching of tissues to targeted techniques for specific muscle groups, blood vessels, nerves, or other structures to improve function. We present the successful use of OMT in a pediatric patient with infantile fibrosarcoma who had Grade 2 CIC related to vincristine. Grade 2 CIC is defined by persistent symptoms with regular use of laxatives or enemas.
Report of Case
A girl was born at 40 weeks and 2 days to a 31-year-old mother who had received routine prenatal care starting in the first trimester. This was the mother’s first pregnancy; both pregnancy and delivery were uncomplicated. At birth, the child had a large, right-sided, firm-to-hard facial mass. She had normal vital signs at birth, with a heart rate of 125 bpm, respiratory rate of 44 breaths per minute, temperature of 98.2°F, Apgar score of 9 and 9 at 1 and 5 minutes, respectively, no clinical evidence of respiratory distress, and successful feeding by mouth. The tumor was consistent with infantile fibrosarcoma, and treatment for the child began at 6 weeks of age. Chemotherapy consisted of vincristine (0.05 mg/kg), dactinomycin (0.025 mg/kg), and cyclophosphamide (25 mg/kg) (VAC). Each cycle of chemotherapy was approximately 4 weeks. Throughout cycle 1 of chemotherapy, the patient’s bowel regimen consisted of lactulose after vincristine for 24 hours. Lactulose was chosen because of her young age, and she had multiple soft stools daily.

Seven days after cycle 2 of chemotherapy, she was admitted for fever and abdominal distension; computed tomography of the abdomen and pelvis was consistent with diffuse pneumatosis of the colon. She was treated with antibiotics, total parenteral nutrition, and medical observation, and she was discharged after 9 days in the hospital. The patient restarted VAC therapy with slow-dose escalation of her chemotherapy throughout cycle 3. Lactulose was scheduled for 48 hours after doses of vincristine, and, by cycle 6 of chemotherapy, she had difficulty stooling without lactulose. Her parents reported that she produced 1 to 2 hard stools per day for the week after her chemotherapy treatment and required lactulose for 48 hours after vincristine and intermittently throughout the week. She did not receive any other medications, vitamins, or acupuncture to alleviate constipation.

Osteopathic Structural Examination and OMT
OMT was introduced at 7 months of age. The patient was alert, oriented, and in no distress upon examination. Vital signs were within normal limits for her age; her weight was 7.8 kg, and her length was 62.5 cm. The osteopathic evaluation was performed by 2 osteopathic physicians who specialize in pediatrics (J.B., along with another physician noted in the Acknowledgments section). Her physical examination was unremarkable except for the large right facial mass. The initial osteopathic structural examination demonstrated right condylar decompression, fascial restrictions with poor diaphragmatic motion bilaterally, restriction of the right paraspinal musculature adjacent to the thoracolumbar junction, fascial restriction of the abdominal wall in the left lower quadrant, and hypertonicity of the inferior mesenteric ganglion. Additionally, myofascial restrictions were noted in the thoracoabdominal diaphragm and mesentry. She had left sacroiliac joint restriction and palpable stool in her colon.

The patient had 4 weekly 10-minute OMT sessions. During each session, myofascial release was applied to the abdominal and thoracic regions to the respective somatic dysfunctions in those regions. Her abdomen was treated with mesenteric release and colonic milking (including manipulation of the ascending, transverse, and descending colon). These techniques were used to stimulate colonic peristalsis, which is theorized to be part of the mechanism for OMT.14 The innominate somatic dysfunction was treated with balanced ligamentous tension. Her occiput dysfunction was treated with condylar decompression with a focus on the right side. In addition, 2 techniques (mesenteric release and colonic milking) were demonstrated to her parents, and they were instructed to perform the techniques daily for 5 minutes each morning and evening at home. OMT was consistently well-tolerated without adverse effects. The patient’s chemotherapy regimen and diet were not modified during this time.
After 1 week of OMT, the patient required 6 doses of lactulose between week 1 and week 2 vincristine administrations (Figure). She had a mean of 3 to 4 soft, formed stools daily without straining. The osteopathic structural examination during week 2 showed improvement in condylar compression, decreased restriction in the thoracic and lumbar areas, as well as resolved left innominate restriction. The patient had continued palpable stool in the descending colon with sustained abdominal fascial restrictions. Between weeks 2 and 3, she required no lactulose at home and continued having 3 to 4 soft, formed stools daily without straining. Weeks 4 and 5 of her osteopathic examination demonstrated continued improvement of her condylar compression, resolved restriction of thoracic and lumbar areas, and no palpable stool on her abdominal examination. She continued to demonstrate minimal but improved abdominal fascial restrictions. OMT was performed at home by both parents with consistent twice daily use of mesenteric release and colonic milking with no missed treatments.

Discussion
We present a pediatric oncology case of CIC secondary to vincristine that was successfully managed with OMT. There have been rare previous case reports of pediatric patients successfully treated with OMT for constipation15,16; however, none have focused on using OMT as management for CIC in adults or children. Although there is little clinical research to elucidate the underlying causes of CIC, it is hypothesized that it may result from the effects of chemotherapy on nerve endings in the intestinal system.17

Constipation is often complicated and multifactorial. Chronic use of medications to regulate bowel habits can be linked to medication dependence for bowel motility; therefore, when treating patients with OMT, practitioners should consider neurologic, circulatory, and biomechanical causes that influence bowel dysfunction. These considerations led the physician in this case to evaluate and treat the occiput, pelvis/sacrum, dia-

Figure.
Lactulose doses prior to and throughout OMT. Abbreviation: OMT, osteopathic manipulative treatment.
at the thoracolumbar junction and synapses in superior and inferior mesenteric ganglia before innervating the proximal and distal colon, respectively. Many autonomic fibers and lymphatic vessels are carried in the abdominal mesenteries, reflecting the parietal peritoneum. Understanding these innervation pathways led to the evaluation of the occiput, sacroiliac joint, and thoracolumbar junction, all of which showed somatic dysfunction in this patient. OMT was directed to these regions to normalize and balance autonomic function and improve the neurologic function of the GI tract.18

It is important to consider fascial restrictions in the mesentery because they play a biomechanical role in limiting GI tract motility, as demonstrated in this patient’s osteopathic structural examination. The diaphragm plays a critical role, given the direct relationship and coordinated movements with the pelvic diaphragm. This relationship allows for the generation of increased intraabdominal pressure necessary for defecation. The diaphragm also influences GI motility directly, particularly in the proximal GI tract. OMT allows improved biomechanical functioning, which in turn improves the mobility of fluids through the abdomen. This mobility improves the delivery of oxygen, nutrients, and arterial blood flow. Improved diaphragmatic excursion increases venous and lymphatic drainage, allowing the removal of waste products from cellular metabolism.18 The diaphragm’s biomechanical and circulatory influences led to the assessment and management for somatic dysfunction in the diaphragm.

Managing constipation with nonpharmacologic techniques is important, especially in a patient population at risk for infection or other secondary complications, such as pediatric oncology patients. Current therapies for CIC include both general and pharmacologic interventions, including increased physical activity, increased fluid and fiber consumption, and elimination of medical factors that could contribute to constipation. These interventions are difficult for children undergoing chemotherapy because of fatigue, mucositis, and nausea, and developmental or age limitations. Oral and rectal medications have helped combat CIC; however, oral medications become problematic if patients cannot swallow because of pain or nausea, and such patients are often left without a feasible treatment for constipation.

This report is limited because it is based on a single patient’s case, and there is a limited understanding of CIC pathophysiology to correlate with OMT. Our patient received VAC therapy, and only vincristine is known to have constipation as a side effect, which makes it difficult to extrapolate our findings to other patients receiving multimedications regimens that result in constipation.

Conclusions

Although standard medical treatment for CIC in pediatric patients is effective, there are many moderate to severe potential side effects. In contrast, OMT could represent a long-term, effective, noninvasive, and well-tolerated therapy. This case highlights a case of a pediatric oncology patient with CIC who was successfully treated with OMT. Additionally, it highlights the feasibility of parental involvement with performing OMT techniques at home. Based on the positive results with this patient, our institution is enrolling patients in a prospective study to examine the safety and feasibility of OMT in pediatric oncology patients. Future studies investigating efficacy and improvement in quality of life are necessary to demonstrate the effect of OMT in the pediatric oncology field.

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References
