Osteopathic Manipulative Treatment for Nausea and Vomiting Following Fine Needle Aspiration of the Neck

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CASE REPORT

Abstract

A 47-year-old woman underwent ultrasound-guided fine needle aspiration of an enlarged lymph node located in the right side of her neck. During this procedure, she began to experience nausea with vomiting, and later, she was hospitalized for intractable symptoms.

Upon discharge, the patient required scopolamine to control her symptoms. She followed up with her primary care provider in an outpatient family medicine clinic, and somatic dysfunction was appreciated on her osteopathic structural exam. It was postulated that the patient's symptoms had originated from vagal irritation sustained during the biopsy. Following osteopathic manipulative treatment (OMT), her nausea and vomiting resolved 4 days later, and she no longer required pharmacologic therapy for symptom management.

This case report suggests a potential role for somatic dysfunction and the application of OMT in suspected vagally mediated nausea and vomiting.

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Case Presentation

Patient History

A 47-year-old Caucasian woman underwent an ultrasound-guided fine needle aspiration of an enlarged lymph node in the right side of her neck, which was later found to be benign. Lidocaine was injected as a local anesthetic. During the biopsy, the patient experienced intense nausea followed by vomiting. She presented to the hospital 2 days later, and she was admitted for 4 days.

The patient's notable medical history included gastroesophageal reflux disease, dysphagia with regurgitation related to stricture and resolved with dilation, asthma, sleep apnea, and endometriosis. Her surgical history included gastric bypass surgery, cholecystectomy, abdominal hernia repair, and laparoscopy for endometriosis. The patient also had a history of smoking one half to a full pack of cigarettes daily for 20 years.

Upon admission, the patient was given intravenous promethazine (12.5 mg every 4 to 6 hours as needed) and pantoprazole (40 mg every 12 hours). She also was prescribed polyethylene glycol (17 g daily) and docusate sodium-sennosides (50/8.6 mg, 1 or 2 tablets by mouth, 1 or 2 times per day as needed) for constipation.

The patient demonstrated an inability to tolerate oral intake, and she underwent gastrointestinal endoscopy on day 4 of admission using IV sedation via a monitored anesthesia care protocol. A small hiatal hernia and a 1.5 cm–deep clean-based gastric ulcer in the anastomosis that was not actively bleeding were revealed. A 56-French Maloney dilator was used to dilate the esophagus. The patient was then discharged home on pantoprazole (40 mg by mouth 2 times per day for 30 days), which she continued, and ondansetron (4 mg rapid dissolving tablet every 6 hours as needed), which she discontinued due to ineffectiveness.

This patient was established with an ambulatory residency training facility, and she was seen 1 day after discharge by an osteopathic family medicine resident. She was provided with scopolamine 1.5 mg transdermal patches, and she was instructed to apply 1 patch every 3 days as needed for persistent symptoms.

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The patient was seen 11 days later at the same facility by her primary care provider, who is an osteopathic family physician and attending with the family medicine residency. The scopolamine patches had controlled her symptoms, but she was unable to stop the medication without her symptoms returning. Her osteopathic structural exam revealed somatic dysfunctions, and she was treated with osteopathic manipulation as presented in the Table.

Osteopathic Manipulative Treatment

Somatic dysfunctions present on structural examination and pertinent osteopathic considerations were used to determine an appropriate patient-centered treatment plan.

Linea alba myofascial release was utilized to address mesenteric ganglia tissue texture abnormalities to contribute to autonomic balance.[1] Thoracoabdominal diaphragm release and thoracic inlet myofascial release were performed to improve respiration and lymphatic and venous circulation.[2] Thoracic, sternum, and cervical spine somatic dysfunctions were addressed using either soft tissue or ligamentous articular release techniques in an attempt to remove biomechanical and fascial restrictions impairing fluid symmetry.[2,3] Rib-raising was implemented to improve rib motion, venous and lymphatic return to the thoracic cage, and to balance sympathetic tone.[2] Somatic dysfunctions of the occipital sinus, occipital condyles, and occipitoatlantal joint were addressed to establish normalized motion of the occiput on the atlas.[2,4,5] These were fundamental areas to restore due to the presence of vagal ganglia adjacent to

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Table. *Osteopathic structural exam and treatment*

Region	Description of dysfunction(s)	Description of treatment
Head	Restriction of the occipital condyles and occipital sinus Right suboccipital muscular tension Decreased cranial motion	*Occipital sinus drainage:* Fingers were placed from the inion to the suboccipital tissues with steady pressure until a release was felt.[4] *Condylar decompression:* Condylar processes were approximated with index and middle fingers while cephalad and lateral force was used at the base of the occiput to facilitate a release.[4] *Occipitoatlantal articulation:* Middle finger contact was made with the posterior tubercle of the atlas while the head was maintained in flexion to allow intrinsic forces to correct any strain present.[5] *Compression of the fourth ventricle:* Thenar eminences contacted the lateral angles of the occiput medially to the occipitomastoid sutures; medially directed compression was applied during the extension phase of primary respiration while the flexion phase was resisted; a still point was reached; and flexion and extension phase were equally supported once cranial motion was restored.[2]
Neck	Right cervical paraspinal muscle tightness	*Cervical spine soft tissue:* Hands were placed on the neck to assess for paravertebral tension; pressure was applied in an attempt to restore balanced motion of cervical tissues; and force was held until relaxation was appreciated.[2] *Cervical spine ligamentous articular release:* Anterior and superior pressure were applied to the dysfunctional segments with finger pads; compression was provided by the thenar eminences at the occiput and tentorium cerebelli; a release occurred; and there was balance between the positions of monitoring.[3]
Thoracic	Bilateral thoracic paraspinal muscle tightness	*Thoracic spine soft tissue:* Finger pads and thenar and hypothenar eminences were used to contact and balance hypertonic thoracic paraspinal musculature bilaterally by engaging local tissue forces and adapting contact based on individual freedom of motion at each level.[2]
Rib	Sternum restriction Thoracic inlet restriction Thoracoabdominal diaphragm restriction	*Sternum ligamentous articular release:* Using the heel of the hand, the manubrium was contacted and shifted posteriorly and inferiorly until a point of balanced tension was achieved.[3] *Thoracic inlet myofascial release:* One hand was placed beneath the patient and the other hand on the patient's chest in a transverse fashion at the level of the first and second ribs; and anterior and posterior translation, superior and inferior translation, rotation, and sidebending tissue preference was used to treat indirectly.[2] *Rib-raising:* Rib angles were contacted with finger pads, and traction was applied until ease within the tissue was appreciated.[2] *Thoracoabdominal diaphragm release:* Hands were placed on the thorax at the level of the diaphragm with thumbs angled toward the xiphoid process; restriction was addressed indirectly using respiration as an activating force until a release was felt and balanced diaphragmatic excursion was appreciated.[2]
Abdomen	Celiac, superior mesenteric, and inferior mesenteric ganglion tissue texture abnormalities	*Linea alba myofascial release:* Fingers were placed perpendicular to the abdomen, bridging the xiphoid process and the umbilicus, and tissue tension was exaggerated until the region satisfactorily released.[3]

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the jugular foramen, which could have been impacted by suboccipital restriction.[1,6] Lastly, compression of the fourth ventricle was executed to provide balance to the cerebrospinal fluid circulation.[2] The patient may have been particularly affected by this treatment because the vagus dorsal motor nucleus is located on the floor of the fourth ventricle as is the chemoreceptor trigger zone.[6,7]

It also was crucial to address the psychosocial barriers to health relevant to this patient's experience, including her frustration with her recent hospitalization and the inability of the treatment team to discover the cause of her symptoms, the loss of wages from her time spent hospitalized, and her continued symptoms seemingly unresolved by medical therapy. These factors were managed by partnering with the patient and participating in shared decision-making as health was pursued.

Results

After a single session of OMT, the patient returned for a follow-up appointment 14 days later. She reported that her nausea and vomiting resolved 4 days after the treatment. She had discontinued the scopolamine patches, but she continued the pantoprazole, as it had been prescribed previously and was one of her chronic medications.

Comment

The first consideration made when approaching this clinical case from an osteopathic perspective was to determine the role of somatic dysfunctions in affecting the body's capacity to react to the disease state.[2] This was accomplished by assessing the tissue for an osteopathic diagnosis, providing individualized treatment, and following the response of the patient's body to the treatment and the impact it had on the disease.

Evaluation of somatic dysfunctions was significantly enhanced by recognizing parasympathetic, sympathetic, lymphatic, biomechanical, and psychosocial factors pertinent to this case.[1,8]

Particular attention was paid to the parasympathetic autonomic nervous system, for it innervates visceral organs and blood vessels of the head, neck, thorax, abdomen, and pelvis.[8] Cranial nerve X, the vagus nerve, is responsible for parasympathetic innervation of the gastrointestinal tract to the level of the splenic flexure within the transverse colon.[1,2]

The vagus, which comes from the Latin word *vagari* and means *wandering*, originates from 8-10 rootlets located in the ventrolateral medulla, exits the cranium through the jugular foramen, and

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extends throughout the body.[1,6] Fibers originating in the nucleus ambiguous of the medulla innervate the pharynx, larynx, and skeletal muscle of the esophagus, while other fibers travel into the superior mediastinum along the mediastinal wall and course posteriorly to the lung, where branches innervate the cardiac, pulmonary and esophageal plexuses.[8] Afferent fibers can contribute to vomiting by way of mechanoreceptors and chemoreceptors present in the oropharynx, esophagus, stomach, and upper part of the small intestine.[7,9] Once activated, these receptors initiate the vomiting response by stimulating the chemoreceptor trigger zone present in the area postrema, which is situated along the caudal wall of the fourth ventricle within the medulla.[6,7]

In addition to understanding relevant parasympathetic innervation, sympathetic, lymphatic, and biomechanical factors were evaluated. It was important to recognize that esophageal and stomach sympathetic innervation exists from T1 to T9 and T5 to T9 respectively.[2] Additionally, it was valuable to identify that the celiac, superior mesenteric, and inferior mesenteric plexuses, which are interconnected abdominal autonomic plexuses, contain both sympathetic and parasympathetic fibers.[8]

Considering that somatic dysfunctions can impair lymphatic circulation in a patient presenting with nausea and vomiting, the following regions were assessed: thoracoabdominal diaphragm, thoracic inlet, suboccipital triangle, tentorium cerebelli, and diaphragma sellae.[3] Somatic dysfunctions of postural and spinal elements were analyzed, particularly within the cervical and thoracic spine, because restriction in these regions can limit overall range of motion and impair normal body functioning.[8]

Psychosocial factors were addressed due to the direct influence they can have on the health of an individual.[8] Furthermore, osteopathic physicians are uniquely trained and qualified to address such psychosocial factors when it comes to patient care as demonstrated by Carey and associates.[10] Osteopathic physicians display distinguishing approaches to communication especially with regard to psychosocial considerations, which can potentially contribute to a more complete, comprehensive, and holistic patient experience focused on a strong patient-physician relationship that respects patient emotions.[10]

It is recognized that there could have been other factors impacting the patient's presentation and symptoms. For example, lidocaine administered prior to the patient's biopsy could have triggered her nausea and vomiting, and healing of her ulcer discovered on endoscopy with the assistance of medication could have impacted her recovery. However, considering the proximity of the procedure site to the anatomical course of the vagus nerve, and the timing of symptom onset, it was hypothesized that the etiology of the patient's nausea and vomiting was influenced by somatic dysfunction originating from vagal irritation sustained during an ultrasound-guided fine needle aspiration.

It is accepted that trauma to the neck causing injury to the vagus nerve can result in symptoms such as dysphagia, hoarseness, dysphonia, or even aphonia and inspiratory stridor.[1] Unfortunately, there is limited literature available that reports the incidence and treatment of nausea and vomiting after ultrasound-guided biopsy of the lateral neck. Therefore, this case report suggests the potential benefit of recognizing somatic dysfunctions and utilizing osteopathic manipulative treatment in the setting of nausea and vomiting following fine needle aspiration of the neck.

Conclusion

This case report presents a patient who developed intractable nausea and vomiting soon after undergoing ultrasound-guided fine needle aspiration of the neck and whose symptoms resolved 4 days after the somatic dysfunctions were resolved.

The patient's symptoms resolved completely, and scopolamine was no longer required. It was suggested that vagal irritation resulting in somatic dysfunction contributed to the maintenance of the patient's symptoms until osteopathic manipulation was provided.

The results of this case report propose a role for somatic dysfunctions and the implementation of OMT in the evaluation and management of suspected vagally mediated nausea and vomiting.

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