Severe Viscerosomatic Neck Pain from Refractory Gastroesophageal Reflux

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CASE REPORT

Abstract

This is a case of a 73-year-old female with achalasia, hiatal hernia, and prior failed laparoscopic Heller myotomy with Dor fundoplication suffering from severe gastroesophageal disease. The patient developed debilitating neck pain associated with her severe gastroesophageal reflux disease (GERD). She underwent a comprehensive musculoskeletal workup that included a cervical computed tomography (CT) scan and magnetic resonance imaging (MRI). The radiologic imaging results proved unremarkable for identifying the cause of her neck pain. Pain management, neurology, and neurosurgery consultations were unable to provide an etiology that explained her symptoms. Searching for methods of treatment to relieve her neck pain, she received osteopathic manipulative treatment (OMT) focused on somatic dysfunction of both the musculoskeletal system and viscera. The results of osteopathic treatment significantly improved her symptoms. Although OMT provided temporary relief of her neck pain, her GERD symptoms persisted and her neck pain gradually returned. Since a comprehensive workup for neck pain revealed no etiology and she had positive responses to OMT, including treatments focused on the viscera, we attributed her neck pain to a viscerosomatic response of gastrointestinal disease. This case report demonstrates the benefit that osteopathic manipulative treatment provides in diagnosis and treatment of uncommon causes of neck pain such as that resulting from viscerosomatic reflexes. Identifying viscerosomatic reflexes can broaden differential diagnoses and lead to better patient care.

Background

One of the tenets of osteopathic medicine is the philosophy that the body is a unit. A second tenet is that structure and function are reciprocally interrelated. The concept of viscerosomatic reflexes, in which inflammation activates afferent neurons that lead to segmentally related tissue texture and motor changes, is well documented. Numerous animal studies in the mid-1900s support the viscerosomatic concept. In these studies researchers placed stress on specific viscera. After the stress was applied, the researchers noted contraction or relaxation of musculature in the axial spine or limbs.^{1,2} A common example of this interrelationship is seen From the Carilion Clinic in Roanoke, VA (Uhrig) and the Family Medicine Residency Program at OhioHealth O'Bleness Hospital in Athens, OH (Rettos).

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with emotional distress or other psychological influence on irritable bowel syndrome symptoms through vagal regulation.³

Despite the widespread acceptance of this phenomenon, many physicians still overlook its importance during the workup and treatment of various symptoms. As of 2010, it was estimated that chronic pain affects 100 million Americans and has associated costs in the United States between 560 and 635 billion dollars annually.⁴ As health care professionals, a key part in solving these cases is identifying and treating the correct source of pain. By recognizing the precise sources of pain, physicians can provide successful treatments which avoid unnecessary and costly diagnostic and treatment approaches.

This case report describes a woman with persistent neck pain linked to her severe gastroesophageal reflux disease (GERD). The upper gastrointestinal tract has sympathetic innervation from spinal cord levels T5-9. Parasympathetic innervation of the upper gastrointestinal tract is from the vagus nerve (cranial nerve X).⁵ The vagus nerve originates at the medulla oblongata and exits at the base of the cranium through the jugular foramen. After exiting, the vagus nerve travels through the cervical and thoracic regions to provide

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parasympathetic innervation to much of the viscera. In the thorax and abdomen, the vagus nerve provides innervation to the heart, lungs, stomach and most of the intestines. The vagus nerve is critical to proper function of the stomach. One method of surgically treating severe GERD is cutting the vagus nerve (vagotomy). This procedure has been used as a treatment for refractory peptic ulcer disease, and chronic duodenal ulcers. Vagotomy is effective by decreasing the hyperacidic environment in the stomach by denervating parietal cells.⁶

Report of Case

This is a 73-year-old female with at least 15-year history of achalasia and hiatal hernia with prior laparoscopic Heller myotomy with Dor fundoplication four years ago for persistent gastroesophageal reflux disease (GERD). About one year after her initial surgery, she began to have regurgitation of food while lying supine. At the same time, she experienced severe musculoskeletal cervical pain. She described a severe aching pain deep at the base of the skull, near C1, more prominent on the right side. She denied any history of similar neck pain or recent trauma to the area. Her neck pain was noted to be worse when she experienced reflux which included burning pain, difficulty swallowing, and regurgitated food. She had intermittent dizziness with her neck pain but did not have any focal weakness, numbness, or visual changes.

She was seen by a gastroenterologist, who performed esophagogastroduodenoscopy (EGD) and BRAVO reflux recording which revealed esophageal ectasia consistent with a slipped fundoplication as well as Los Angeles Grade D reflux esophagitis. Testing for Helicobacter Pylori was negative. She was referred to a tertiary care center for further evaluation. Ultimately, after several further evaluations, she was recommended to have repair of her fundoplication. Due to the extent of disease, surgical intervention was unsuccessful. She continued to experience significant reflux, as well as neck pain, after the repair. She was kept on a combination of proton pump inhibitors (PPI) with H2 blockers along with sucralfate, which improved her symptoms, but did not resolve them.

The patient had extensive workup and consultation for her neck pain, including a CT scan of the cervical spine which showed mild facet arthropathy from C2 through C6 but no other arthritic changes. She had old compression fractures at C7 and T2 which were unchanged from exams prior to her new symptoms. There was no significant central canal stenosis seen on imaging. Follow-up MRI demonstrated consistent findings and also revealed no stenosis of the spinal canal or foramen. During workup, she also had brain MRI which showed no related abnormalities. She sought consultation with pain management, neurology, and neurosurgery specialists who agreed that there were no local musculoskeletal findings which could explain her symptoms. In looking for alternative treatments, she pursued osteopathic manipulative treatment (OMT) for her symptoms. In evaluation, she had significant dysfunction not only of the upper cervical spine but also of the epigastric abdomen.

She underwent several osteopathic treatment modalities including visceral and myofascial techniques. She responded well to osteopathic treatment focused on her neck with improved mobility and symptomatology. We chose to treat her neck pain primarily with functional positional release (FPR) of the cervical spine since she tolerated indirect treatments well. Gentle muscle energy was used, if needed, to fully release the muscle tension in the upper cervical region.

Interestingly, she had even greater improvement in her neck pain with OMT focused on her abdominal distress. We used indirect myofascial techniques for release of restriction primarily in the epigastric region. To help with resetting aberrant sympathetic responses, we used celiac ganglion and superior mesenteric ganglion release along with FPR of thoracic vertebrae as needed. Parasympathetic tone from the vagus nerve was addressed with suboccipital release and cranial techniques such as CV-4 decompression and vault hold. Improved cranial rhythm was noted after treatments. Lymphatics were addressed with thoracic outlet, abdominal, and pelvic diaphragm releases.

This sequence of treatments did well to lessen her abdominal discomfort, reflux, and neck pain. However, resolution of her pain was temporary. Her neck pain would return after a few days since her reflux did not ever fully resolve due to underlying structural dysfunction from her prior failed surgery and chronic inflammation. On repeat examination, she had recurrent paraspinal hypertonicity in the upper cervical area as well as epigastric fascial restrictions.

She underwent physical therapy and trigger point injections of the upper right cervical spine, both of which improved her neck pain marginally. Muscle relaxers were helpful but not tolerated well due to dizziness. Ibuprofen and acetaminophen both marginally improved her symptoms. Opioids gave her symptomatic improvement but were not tolerated well due to dizziness and near syncopal episodes even at small doses.

Despite progress with manual therapies, the results were short lived. She continued to have significant structural abnormalities of the

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stomach and gastric mucosa which did not allow her underlying gastroesophageal conditions to fully remit. To seek further relief, she consulted with several pain management physicians for more aggressive treatments. She eventually underwent radiofrequency ablations of the Greater Occipital, Lesser Occipital, Third Occipital, and Greater Auricular nerves which did not help her pain. Unfortunately, soon after these ablations she had worsening gastric motility and retained food in her stomach which led to hospitalization. Her care team there discussed placing a jejunostomy feeding tube for nutrition purposes although she decided against this therapy. Due to inability to take proper nutrition by mouth with retained gastric contents, she met with palliative care and opted to enroll in palliative and hospice care.

Despite this setback, she has continued with similar OMT treatments as part of her therapy and has slowly improved. Since her hospitalization, she is once again able to tolerate food and has quit hospice care since her condition is no longer considered terminal. Although she continues to suffer from GERD, she has had significant improvements in her discomfort and is no longer requiring supplemental pain medication for her neck.

Discussion

This case illustrates a woman with physical neck pain related to visceral distress. Although the relationship between visceral and somatic systems is highlighted in osteopathic medical schools and residencies, seasoned practicing physicians can still overlook common connections between these systems. This case illustrates the importance of keeping these diagnoses on the differential diagnosis for patients, especially with atypical symptomatology.

Temporal relationship between the appearance of reflux and neck pain supported the suspicion that symptoms were the result of a viscerosomatic reflex. In addition, a comprehensive work up by numerous specialists which included CT scan, MRI, and EGD, did not establish an alternative etiology. Procedures such as nerve ablation by pain management did not offer even symptomatic relief. The patient's response to osteopathic treatment including visceral manipulation provided the most substantial relief for her symptoms. OMT is an effective treatment and in this case provided improvement of the patient's symptoms that could not be achieved by traditional medications and procedures. An additional benefit was improvement of the patient's symptoms without the added risk of complications and side effects from medications.

The combination of OMT techniques was used to treat not only the neck pain, but also the GERD since we believed this to be the underlying cause for her condition. We focused on techniques which would be well tolerated. Other options for the axial spine could have included strain-counterstrain or functional methods since these are both gentle indirect techniques which can be very effective at correcting dysfunction. Aberrancy of the sympathetic and parasympathetic responses was crucial to treating the visceral component of her condition. Since she had a chronic abnormality of her gastric function, these systems were expected to have dysfunction which was found on exam with irregular sympathetic and parasympathetic findings.

Her symptomatology is understandable due to the course of the vagus nerve which travels to the stomach after exiting the cranium through the jugular foramen and through the cervical region. The patient had pain on the right side of her head and neck near the jugular foramen. Visceral dysfunction, such as that from the stomach and esophagus, influences both sympathetic and parasympathetic nervous systems. Visceral input through a viscerosomatic reflex manifests itself as pain in distant parts of the body. Although we could not completely inhibit the viscerosomatic response and restore normal gastric function with OMT, the patient's pain would temporarily resolve. Because of the chronic disease and prior failed surgery, she had structural disease which was not compatible with allowing the gastritis to fully resolve. Since this was still present, she suffered repeat flares even after treatment. This made complete symptom resolution challenging due to the severe damage to the esophageal and gastric mucosa and we believe this was our greatest barrier to correcting her symptoms.

Another interesting finding in this patient's case was the sudden worsening of symptoms after the radiofrequency ablation. This relationship is harder to explain but perhaps the ablation process could have led to a separate somatovisceral response, thus leading to decreased gastric motility. Although the ablated nerves do not directly connect to the abdominal viscera, muscles such as the trapezius travel through both the cervical and thoracic regions, influencing sympathetic innervation. The gastric and esophageal sympathetic innervation found in the thoracic region directly influences the upper GI tract leading to a significant change in the ability of the system to optimally function.⁵

Despite her grim outlook after her hospitalization, she has had slow but remarkable improvement with the help of OMT. We feel the treatments outlined have helped to progressively restore musculoskeletal and visceral motion as well as sympathetic, parasympathetic, and lymphatic function to allow for a remarkable recovery.

Conclusions

This case is of a 73-year-old female with refractory neck pain coinciding with symptoms of severe gastroesophageal reflux disease. She had a comprehensive workup for a musculoskeletal etiology for her neck pain. The workup did not provide a conclusive diagnosis. She responded well to OMT targeting both somatic and visceral dysfunction. OMT directed specifically at her visceral dysfunction would improve her neck pain. Our conclusion is that her neck pain was related to a viscerosomatic response from her gastroesophageal disease. This case shows that a consideration of viscerosomatic causes of pain may lead to better and more effective patient care. Of course, a comprehensive workup to rule out other causes of pain is recommended. However, if visceral or somatic dysfunction remain likely causes for the symptoms, OMT can be beneficial options to help patients and improve outcomes.

References

- 1. Evans MH, McPherson A. The effects of stimulation of visceral afferent nerve fibres on somatic reflexes. *J Physiol.* 1958;140(2):201-212.
- McPherson A, Skorpil V. Effects of micturition on leg reflexes. *The Lancet*. 1966. 288:7458, 309-312.
- Mayer EA, Bradesi S, Schwetz I. Irritable bowel syndrome. In: Masland RH, Dallos P, Firestein S, Bushnell MC, Kaas JH, eds. *The Senses: A Comprehensive Reference.* Amsterdam: Elsevier; 2008:571-578.
- Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. Washington (DC): National Academies Press (US); 2011.
- Savarese RG, Capobianco JD, Cox JJ. OMT Review: A Comprehensive Review in Osteopathic Medicine. 3rd ed. Jacksonville: OMT Review. 2009:103-105.
- 6. Pearson FG, Stone RM, Parrish RM, Falk RE, Drucker WR. Role of vagotomy and pyloroplasty in the therapy of symptomatic hiatus hernia. *Am J Surg.* 1969;117(1):130-137. ■