CRI over MRI: A Cranial Approach to Dizziness

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CASE REPORT

Abstract

Dizziness is a nonspecific term that describes symptoms such as feeling "faint, woozy, weak or unsteady."[1] Dizziness can have various etiologies, but the diagnosis remains unclear in about 10% of presenting cases.[2] Our hypothesis is that osteopathic evaluation and treatment can aid in the management of undiagnosed cases of dizziness. A 46-year old female presented with a 5-year history of dizziness after recovering from a traumatic brain injury (TBI) secondary to a syncopal episode with fall onto a cement floor. Prior to her osteopathic examination and treatment, she had attempted medical intervention for vertigo and underwent imaging and hematological studies to no avail. After 4 applications of osteopathic cranial manipulative medicine (OCMM), including the v-spread, cranial bone lifts, venous sinus drainage, and other osteopathic manipulative treatment (OMT) techniques, the patient had zero dizzy episodes and has been able to return to daily activities with complete resolution of symptoms.

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Background

Dizziness is a nonspecific term used by patients and physicians to describe symptoms such as feeling "faint, woozy, weak or unsteady."[1] Dizziness is a common medical complaint, affecting 15-35% of the general population at some point in their lives.[3,4] The prevalence increases in the elderly population, reaching 38% in the older adult population.[5] Dizziness has various etiologies: 40% of dizzy patients have peripheral vestibular dysfunction such as benign paroxysmal positional vertigo, 10% have a brainstem vestibular lesion, 15% have a psychiatric disorder, 25% have other problems such as presyncope or disequilibrium, and the diagnosis remains unclear in 10% of patients.[2]

Dizziness is a limiting factor in the quality of life for those experiencing it. Individuals seek medical consultation, sick leave, have interruption of daily activities, and avoid leaving the house as a result of dizziness.[4] Age and sex adjusted health-related quality of life was also lower in individuals with dizziness and vertigo compared to individuals who did not experience dizziness.[6] The impact of dizziness is particularly high among the elderly.[3] More than 50% of affected elderly individuals were limited in their ability to exercise, shop, drive, and participate in social activities, while 25% of elderly respondents expressed difficulty in completing activities of daily living.[5] In addition to quality of life, dizziness and vertigo can exacerbate psychiatric problems such as generalized anxiety disorder, social phobia, and panic disorder.[7] From a financial perspective, dizziness ranks among the most common reasons for ambulatory care visits.[8] In 2010, 3.7% of all emergency department visits were due to complaints of dizziness.[9] These visits are costly, with 40% of presenting patients undergoing imaging such as computed tomography and magnetic resonance imaging.[9]

There is evidence in the literature that osteopathic manipulative treatment (OMT) can be useful in the treatment of dizziness.[10-12] OMT used to treat cervical somatic dysfunctions has demonstrated improvements in dizzy symptoms.[10,13] OMT modalities such as direct and indirect techniques aimed at the cervical spine and osteopathic cranial manipulative medicine (OCMM) were shown to be of benefit.[14] OMT was shown to be useful in the treatment of a patient with post-concussion syndrome with a main complaint of

(continued on page 22)

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(continued from page 21)

dizziness. In this case, OMT approaches, including balanced membranous tension, cranial bone lifts, venous sinus drainage, muscle energy, and myofascial release to the cervicothoracic spine, led to complete resolution of dizziness and other symptoms.

Lymphatic pump techniques have been shown to improve lymphatic flow.[15] It was recently discovered that a circulating system of channels associated with the glial cells (comprising 80% of brain tissue) may drain toxins, proteins, and inflammatory mediators.[16] These vessels may drain toxins and inflammatory mediators from the brain.[16] This system exhibits a pulsatile lymph fluid circulation in the brain.[17] OCMM and other OMT modalities applied to the upper cervical spine and cranium would assist in removal of toxins and waste products. OMT has also been shown to be useful in cases of benign paroxysmal positional vertigo.[12] Balanced ligamentous tension, fascial unwinding, and other direct and indirect techniques have been shown to be useful to alleviate dizziness and balance symptoms. Researchers investigating dizziness etiologies and interventions may be unaware of the cranial concept and that the central nervous system (CNS) exhibits an additional respiratory mechanism and pulsatile impulse similar to the cardiovascular system. Therefore, cranial somatic dysfunctions would not be a part of their thought processes. These findings provide the rationale for utilizing OMT on patients presenting with dizziness.

Report of Case

We present a case of a 46-year old Caucasian female who presented to the Dr. Kiran C. Patel College of Osteopathic Medicine (KPCOM) Osteopathic Treatment Center at Nova Southeastern University (NSU), referred by her primary care physician from the same facility. She had a chief complaint of persistent dizziness for five years. She related that she experienced significant dizzy episodes on a daily basis. The dizziness did not alter in severity, however; it occurred not only when transferring from supine to seated, as is common for patients reporting dizziness, but also, when transferring from seated to supine. The patient reported no headaches, tinnitus, loss of smell, anxiety, depression, or unintentional weight loss. She reported no prior history of concussions, memory loss, or dizziness, save a brief history of vertigo after this traumatic brain injury.

The patient had past medical history significant for a syncopal episode at work 5 years ago where she fell onto a cement floor striking the posterior left cranium. The cause of the syncope was unknown. The patient was subsequently airlifted to the hospital and diagnosed with a brain hemorrhage. She spent 3 days unconscious, and a total of 2 weeks in the intensive care unit (ICU). Her treatment in the intensive care unit was supportive in nature. Surgical intervention and respiratory assistance was not warranted as the patient demonstrated gradual signs of improvement throughout her stay in the ICU. After 2 weeks, the patient was transferred to a general floor, where she was discharged from the hospital soon thereafter. After discharge from the hospital, the patient noticed persistent dizziness on a daily basis with positional changes. She was diagnosed and treated for benign positional paroxysmal vertigo (BPPV) with the Epley maneuver, which initially relieved her dizzy symptoms for 2 weeks. In addition, she was given Meclizine 25mg to take as needed for her vertigo, which provided no relief. Unfortunately, the positional dizziness returned and she did not respond further to BPPV treatment. She underwent many diagnostic studies to try to determine the root of her dizziness: imaging studies revealed no abnormalities, hematological studies from an endocrinologist revealed normal blood values, and a thyroid biopsy was negative.

The patient's past surgical history was unremarkable. When the patient presented to the osteopathic treatment center at NSU, she was not taking any medications and did not have any known food, environmental, or drug allergies that could contribute to her dizziness. The patient's social history included no exercise as a result of her symptoms, poor diet, social use of alcohol, and no illicit drug use. Prior to her incident, the patient exercised regularly. Her symptoms and the inability to exercise affected her quality of life.

Physical Examination

A thorough physical examination was performed on the patient. Her vital signs demonstrated a blood pressure to be 110/70 with a pulse rate of 74. She was afebrile and her respirations were normal. Her general appearance was normal for her age, she was well-nourished, awake, alert, and oriented x3. She had no signs of physical deficiency. Her head was normocephalic and atraumatic. Her pupils were equal, round, and reactive to light and accommodation. Examination of her neck demonstrated no evidence of lymphadenopathy or thyromegaly. Her heart demonstrated a regular rate to auscultation without evidence of murmurs. Her lungs were clear to auscultation bilaterally. Her abdomen was non-obese, non-tender, and demonstrated normal bowel sounds without rebound or guarding. Extremities demonstrated no evidence of cyanosis, clubbing, or edema. Her distal pulses in her lower extremities were normal. Muscle strength was 5 out of 5 bilaterally in the upper and lower extremities. Grip strength was normal. Neurologically, cranial nerves II through XII were grossly intact without focal deficits. Deep tendon reflexes were 2+/4 in the upper and lower extremities. The Hallpike-Dix and Romberg tests were negative. An osteopathic

(continued on page 23)

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(continued from page 22)

structural examination was performed at each visit, and revealed significant cranial somatic dysfunctions. Upon initial presentation, the patient had a significant restriction of the occipitomastoid suture on the left. The lack of motion in this suture held the left temporal bone in internal rotation. Other osteopathic somatic dysfunctions can be seen in Table 1.

Treatment and Outcomes

Goals of Treatment

1. Reduce number of dizzy episodes.
2. Normalize cerebrospinal fluid (CSF) fluctuation and release membranous tension.
3. Correct cranial articular strains.
4. Normalize palpatory findings associated with the above somatic dysfunction.

The patient was treated at the NSU Osteopathic Treatment Center for a total of 4 treatments over a period of 6 weeks. At the first follow-up visit 2 weeks later, the patient reported only 1 dizzy episode, a significant reduction from the multiple dizzy episodes she had experienced every day with positional changes. At each visit thereafter, multiple somatic dysfunctions were addressed, but the treatment focused on the restrictions at the occipitomastoid suture and temporal bone (Table 1). These gentle techniques are taught at the end of the second year of most osteopathic principles and practice (OPP) courses at colleges of osteopathic medicine. They are taught in detail in the introductory training courses offered by The Osteopathic Cranial Academy and the Sutherland Cranial Teaching Foundation. Upon completion of 4 visits, the patient reported being symptom free for the first time in 3 years and had zero dizzy episodes. She was able to return to her daily activities without any symptoms.

Somatic Dysfunction	Treatment Modalities
Cranium: Left temporal bone internally rotated, Left occipitomastoid suture restricted, Left torsion of sphenobasilar synchondrosis (SBS), Left parietal bone externally rotated, Frontoparietal suture restriction, Venous sinus congestion, Right lateral strain of SBS.	V-spread technique to sutures, temporal decompression, parietal lifts, venous sinus drainage.
Cervical Spine: Atlanto-occipital (OA) joint bilaterally compressed. Left subcranial myofascial tissue hypertonicity. Left sternocleidomastoid (SCM) and scalenes taut. OA NSLRR, Atlanto-axial (AA) joint rotated left, OA ESLRR, C2NSRRR.	OA decompression, soft tissue technique to subcranial fascia, SCM, and scalenes, muscle energy to OA and AA.
Thoracic Spine: Right trapezius hypertonicity in mid-thoracic region	Soft tissue techniques to mid-thoracic region.
Sacrum/Pelvis: Right posterior rotation of pelvis. Left on right sacral torsion. Left posterior rotation, Left margination of sacrum. Left on left torsion of sacrum.	Ligamentous articular strain to pelvis. Articulation to sacrum.
Lower Extremity: Bilateral patellar fascial restriction, Right anterior talus.	Indirect myofascial release to patella. Ligamentous articular strain to talus.

Table 1. *Somatic Dysfunctions and Treatment Modalities Utilized.*

Discussion

The reciprocal relationship between structure and function, highlighted as one of the four pillars of the philosophy of osteopathic principles and practice, allows us to make the conceptual connections needed to understand the potential for cranial dysfunctions to affect central nervous system function and create symptoms. Any trauma can cause disruption and/or malfunction in cranial rhythm and health.[3] Therefore, it is no surprise that the direct cranial trauma that the patient endured produced a palpable imbalance in the cranial environment. The vestibulocochlear nerve has a close association with the temporal bone: the nerve root originates from the medulla of the brain stem, then extends into the internal auditory meatus contained within the posterior petrous portion of the temporal bone. Shortly after the nerve enters the internal auditory meatus, the superior fibers and inferior fibers separate forming the vestibular nerves and the cochlear nerves. The patient presented with an internally rotated temporal bone, which is a common somatic dysfunction described by osteopathic cranial practitioners. This is thought to result in an asynchronous input from vestibular apparatus to the brainstem. Consequentially, the patient was not able to accommodate positional changes without symptoms. Temporal bone dysfunction is commonly associated with symptoms such as dizziness. Correction of cranial somatic dysfunction with OMT can resolve this dizziness.

This patient had significant and rapid improvement of her dizzy symptoms with OMT. Since the patient had experienced debilitation and reduced quality of life from her dizziness for more than 4 years, the quick resolution of her symptoms was a happy surprise for the patient. There may be many patients suffering from dizziness from a variety of causes in which OMT may provide significant improvement of symptoms and significant improvement to quality of life such as occurred in this patient. Ideally, if a patient has dizziness that is not responsive to traditional medical

(continued on page 24)

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(continued from page 23)

management, referral to a doctor of osteopathic medicine with OCMM training should be considered. OCMM can provide an additional level of treatment that may alleviate the need for advanced imaging in patients whose dizziness can be resolved with a few treatments. One limitation of this case study was that the patient did not follow up once her symptoms had resolved. It would have been interesting to know if she continued to be free of dizziness long-term; however, the authors cannot be sure. Larger scale studies investigating the effects of OCMM and other OMT techniques on different causes of dizziness would be of benefit to the literature. Investigating the long-term effects of OMT on dizziness would also be of interest.

Conclusion

With 10% of nearly 3.9 million emergency department visits due to dizziness being unspecified, this case report lends support to the idea that osteopathic treatment, specifically osteopathic cranial manipulative medicine treatment, can play an important role in the resolution of dizzy episodes, resulting in improved quality of life.[9] Current statistics on the prevalence of dizziness may be compiled by individuals or entities without any concept of OCMM or temporal bone dysfunction. Osteopathic examination and treatment may provide an adjunct, or in some cases an alternative, to costly imaging procedures and curb the financial costs incurred by the healthcare system and individuals like our patient. Furthermore, there is a need for more research characterizing the association between cranial somatic dysfunctions and CNS symptoms to enhance the evidence-base for an osteopathic cranial component in the evaluation and treatment of dizziness. This case provides additional support for the long 80-plus year history of empiric practice and experience treating dizziness with OCMM. Additional clinical evidence has the potential for creating a significant convergence with the flood of basic science research into the newly discovered glymphatic system.

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