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INTRODUCTION

The use of osteopathic manipulative treatment (OMT) in the setting of acute traumatic brain injury (TBI) with intracranial bleed is generally considered an absolute contraindication to OMT. This case is one example in which the careful application of OMT in acute TBI was well tolerated and was associated with improvement of somatic dysfunction and clinical symptoms.

CASE PRESENTATION

History of Present Illness

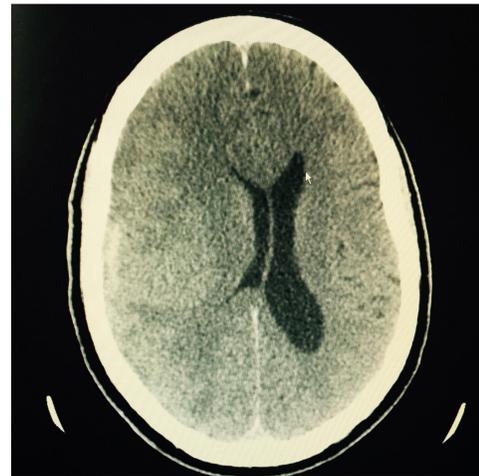
The subject is a 54-year-old male who presented to the St. Barnabas Hospital (SBH) emergency room (ER) with a complaint of dizziness and weakness. Fifteen days earlier he was a pedestrian struck by a car and was admitted to another local hospital, where he was found to have a 6 mm subdural hematoma (SDH) in the right frontotemporoparietal area. He was discharged after repeat CT scans were stable and his mental status returned to baseline. Since his discharge however, he complained of progressively worsening dizziness that ultimately caused him to fall in his bathroom and hit his head again. It was this second fall and the subsequent headache and increased dizziness that prompted him to come to the SBH ER the following day. CT imaging found an increased right-sided SDH measuring 8.6 mm with midline shift and mass effect, and a new subarachnoid hemorrhage. He underwent a craniotomy with evacuation, and the Osteopathic Manipulative Treatment (OMT) service began seeing the patient post-operative day one. Upon initial consult, he complained of dizziness and headache.

Past Medical/Surgical History

Pedestrian struck by a car two weeks prior to presentation, with a 6 mm SDH

Physical Exam

No acute distress, breathing comfortably. BP 132/68; soft, non tender abdomen. GCS 15, alert and oriented to person, place and time; no slurring of speech; moving all extremities bilaterally. His head was wrapped in clean/dry bandages, with a JP drain coming from the right parietal area draining serosanguinous fluid.



Osteopathic Structural Exam

Head: decreased motion at the sphenobasilar symphysis (SBS); fluid congestion in right two-thirds of cranium
Cervical: C2-3 ERSr
Thoracic: T1 ERSr, T2 FRSI, TL junction FRSr
Lumbar: upper lumbar left-rotated
Sacrum: intraosseous strain at S3-4
Pelvis: left innominate anteriorly rotated
Lower Extremity: left hip externally rotated
Upper Extremity: mild bilateral supraclavicular congestion
Ribs: left lower ribs inhaled
Abdomen: left hemidiaphragm inhaled

Assessment and Plan

This is a 54-year-old with a known SDH who presented to SBH after falling at home, and was found to have an expanding SDH with midline shift, and a subarachnoid hemorrhage. OMT began the day after his craniotomy. The patient initially had chief complaints of dizziness and headache which corresponded to his most salient structural exam findings in the upper back and neck, and cranial dural membranes. The treatment plan focused on improving his proprioceptive/vestibular function and relieving his headache by attending to his upper cervical and cranial dysfunction particularly. The primary techniques used were balanced ligamentous tension, Osteopathy in the cranial field, and myofascial release.



Hospital Course

Over the course of seven days and five treatments, the patient's primary somatic dysfunctions evolved and improved, mirroring his clinical improvement and significant reduction in his subdural collection seen on CT. After his third treatment he was able to ambulate to the bathroom on his own, and reported no more dizziness or headache. He remained asymptomatic through his discharge day.

DISCUSSION

While acute head trauma with intracranial bleed is often seen as an absolute contraindication to OMT, some authors acknowledge that OMT has been empirically useful in patients with traumatic brain injury. In the above scenario, both of the patient's main complaints of dizziness and headache resolved with the careful application of OMT, according to the improvement of his somatic dysfunction. In particular, the improvement of the patient's dizziness as it relates to his upper cervical dysfunction highlights the importance of the early application of OMT. We suspect the dizziness which led to his second fall and thus more serious medical consequences was caused by unresolved somatic dysfunction produced by the original injury.

Humans maintain their balance and orientation to gravity by coordinating inputs from various systems in the body including the cervical proprioceptive system. This system consists of mechanoreceptors in the cervical intervertebral joints – especially in the joint capsules of C1 and C2, neck muscles and ligament insertions, as well as muscle spindles located in the deep short muscles. Dysfunction of a cervical joint can cause tension in the joint, irritating the mechanoreceptors and creating

uncoordinated inputs to the vestibular system. This confusion can alter the vestibulo-spinal and vestibulo-ocular reflexes and lead to symptoms of vertigo. Whiplash injury, for example, is often followed by symptoms of imbalance, thought to be the result of post-traumatic modification of cervical proprioceptive afferents. And deficits in tests of head and eye movement control and postural stability are measurable in patients with neck disorders of traumatic origin.

In this case, the patient had significant somatic dysfunction in his upper cervical spine, most notably an extended and right-rotated C2 vertebra. We did not have a baseline structural exam on the patient, but we deduced that this dysfunction was part of the traumatic pattern he incurred with his head injury. As this dysfunction resolved over the course of treatment, so did his dizziness. There is ample precedent in the manual medicine literature for manual techniques helping cervicogenic dizziness, both in the short and long term, by improving functional mechanics through the cervical spine.

Our patient also complained of headache after his craniotomy. Headache is a common finding after craniotomy and is the most frequent type of pain after a traumatic brain injury in general. Up to 80% of patients experience severe pain after a craniotomy, and 50% continue to experience chronic headache months after their surgery. The brain parenchyma lacks nociceptors, so the mechanisms of this pain may be due in part to inflammation and meningeal fibrosis, nerve compression or traumatic neuromas. Over the course of treatment with our patient, cranial strain patterns emerged, evolved, and resolved, including a left torsion and strains through the falx cerebri and right tentorium cerebelli. By the fifth and final treatment, we noted improved motion through the SBS and symmetric temporal bone motion. Encouraging organized motion through the membranes, fluid drainage from the head was fostered, reducing inflammation and ultimately mitigating his headache pain. At one-month follow up visit to neurology he continued to be free of his dizziness and headache symptoms.

This case study is an example of how OMT can improve function and aid healing in a patient with an acute head injury with intracranial bleed. Even more, it makes a case for the early application of OMT in this setting. It is possible if OMT was initiated sooner, after the patient's initial head injury, that his somatic dysfunctions relating to his dizziness may have been attended to. Perhaps then, the second fall which led to his craniotomy may have been avoided altogether. More research into the careful use of OMT in the TBI setting is warranted to help guide a path for effective Osteopathic care of these patients.

[SBH IRB Approved 2015.12]