Healing After Hemiparesis: The Effect of Osteopathic Manipulative Treatment on Post-stroke Pain

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Introduction

The CDC estimates that every 40 seconds, someone in the US suffers a cerebrovascular accident (CVA), equaling over 795,000 stroke victims each year.[1] It has also been estimated that around 30% of stroke survivors experience pain sometime after.[1]

The middle cerebral artery (MCA) is the most common artery involved in acute CVA.[2] It branches directly from the internal carotid artery and provides blood supply to parts of the frontal, temporal, and parietal lobes of the brain, as well as deeper structures, including the caudate, internal capsule, and thalamus.[2] This vast blood supply means that a stroke involving the MCA territory can present with a multitude of symptoms.[2]

Case Presentation

HPI: 39 y.o. male patient presented to the osteopathic treatment center on 11/06/2020 with chief complaint of chronic low back pain following a CVA. The back pain was described as bilateral, constant, aching, and cramping in nature. Symptoms worsened in the morning, when being active, and when lying in bed. The patient denied radiation of pain. The patient stated his pain can be very severe at times, however, was unable to provide a pain scale due to cognitive deficits following the CVA. The patient also complained of intermittent pain associated with contractures and neuropathy. Baclofen had been discontinued due to mental clouding.
Past Medical History: Spontaneous right internal carotid artery dissection on 04/20/2019
CVA due to occlusion of the M2 segment of the right MCA on 04/20/2019 (Figure 1)
Past Surgical History: Decompressive hemicraniectomy on 04/21/2019 (Figure 2)
Cranioplasty on 06/12/2019
Medication: Gabapentin q.d., NSAIDs p.r.n.
Social History: The patient previously worked as an internal medicine physician, denies current or previous use of tobacco products, drinks one cup of coffee/day, and drinks alcohol socially.

Physical Exam:
General: The patient was alert and oriented. The patient exhibited left upper and lower extremity contracture and hemiparesis.
Neuro: Neurological exam revealed hyperreflexia and diminished muscle strength of the left upper and lower extremities. Dermatomal sensation was completely diminished in the C5-T1 and L2-S1 dermatomes on the left. Babinski reflex was present on the left.

Hypothesis

The use of Osteopathic Manipulative Treatment (OMT) can be effective in treating pain related to somatic dysfunctions caused by post-CVA contractures and compensation.

Imaging

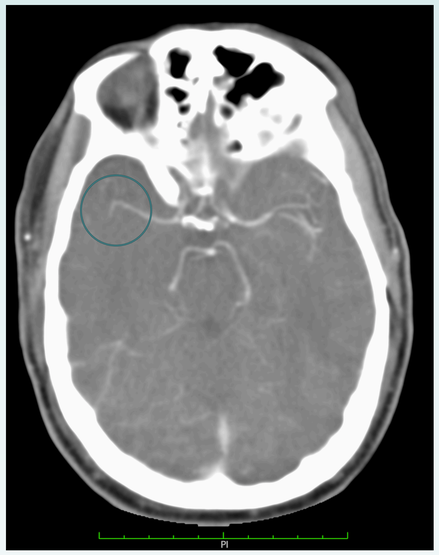

Figure 1. CT angiogram showing occlusion of the M2 segment of the right MCA

Figure 2. CT post-decompressive hemicraniectomy

Osteopathic Structural Exam

Region	Somatic Dysfunction
Thoracic spine	T5-9 NRrSl
Lumbar spine	L1-5 NRrSl
Innominate	Left posterior rotation
Sacrum	Right on right torsion
Lower extremity	Left posterior fibular head, left lower leg contractures consisting of a plantar flexed and inverted ankle
Upper extremity	Left arm and hand contractures consisting of flexion at the elbow, MCP, PIP, and DIP joints

Figure 3. Left hand contracture, pre-treatment (01/08/2021)

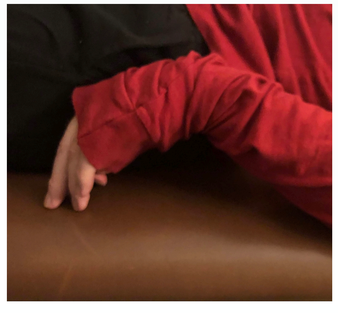

Figure 4. Left hand contracture, post-treatment (01/29/2021)

Methods

A variety of techniques were used to treat the patient but the most effective modalities were direct myofascial release, articulatory techniques, muscle energy, and balanced ligamentous tension. Treatment was directed towards addressing the skeletal somatic dysfunctions as well as the surrounding hypertonic musculature and contractures.

Results

The patient was treated on 11/06/2020, 12/01/2020, 01/08/2021, 01/29/2021, and 02/12/2021. The patient reported steady improvement of low back pain with each appointment. The patient explained that prior to receiving OMT, his severe level of pain made it difficult to engage in physical activities. Remarkably, the patient, who spent most of his time in a wheelchair, is now walking with a quad cane regularly since receiving OMT. He has also begun walking small distances without the cane. The patient attributed his improvements with ambulating to OMT. The patient's primary caregiver noticed a decrease in the patient's contractures and an increase in his ability to participate in physical therapy exercises comfortably. Over the course of treatment, we noticed an improvement in the patient's gait, posture, balance, and contracture relaxation (Figure 3, Figure 4).

Conclusion

This case report suggests the use of OMT can be effective in treating pain related to somatic dysfunctions caused by post-CVA contractures and compensation. Additionally, OMT may be beneficial in improving the quality of life in hemiplegic patients.

Future research should focus on the efficacy of OMT as complementary treatment of patients suffering from post-CVA musculoskeletal and neuropathic pain. The optimal therapeutic window for rehabilitation is believed to be restricted to the first 3 months post-CVA, with recovery ability plateauing by around 6 months after stroke and only about 12% of stroke survivors regaining complete functional recovery after physical therapy.[3] Considering the improvements noted in this case, future research should also investigate the effects of OMT on neurorehabilitation.

This study is limited by the lack of objective measurements, such as gait analysis and pain scale.

References

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