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Management of Mild Traumatic Brain Injury Symptoms in a 31-Year-Old Woman Using Cervical Manipulation and Acupuncture: A Case Report

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Abstract

Objective

The objective was to describe chiropractic and acupuncture care of a patient with acute mild traumatic brain injury (mTBI) symptoms.

Clinical Features

A 31-year-old woman had acute neck pain, headache, dizziness, nausea, tinnitus, difficulty concentrating, and fatigue following a fall. She was diagnosed at an urgent care facility with mTBI immediately following the fall. Pharmaceutical intervention had been ineffective for her symptoms.

Intervention and Outcome

The patient was treated with chiropractic adjustments characterized as high velocity, low amplitude thrusts directed to the cervical spine and local acupuncture points in the cervical and cranial regions. The patient received care for a total of 8 visits over 2.5 weeks with resolution of concussive symptoms.

Conclusion

This patient with mTBI responded favorably to a conservative treatment protocol with the combination of chiropractic and acupuncture care.

Key indexing terms: Brain injuries, Brain concussion, Neck pain, Manipulation, chiropractic, Acupuncture points

Introduction

Mild traumatic brain injury (mTBI) has gained media attention over the effects of repetitive head injuries on brain development and health in both athletes and trauma patients. Approximately 75% of the 1.7 million brain injuries in the United States are classified as concussions or mTBI annually.¹ This figure reflects the sharp increase in mTBIs incidence from 521.0 reported injuries per 100,000 people to 823.7 per 100,00 from 2001 to 2010.² The mechanism of injury is largely attributed to local head trauma from biomechanical forces.³ Currently, there is a large focus on a young, athletic population with injuries from contact sports, although the majority of mTBIs occur after traumatic falls and motor vehicle crashes.⁴ As a result of the trauma, current evidence suggests that there is a rapid hyperglycolysis in the neural tissue followed by a prolonged period of hypoglycolysis, altered permeability of the blood brain barrier, increased inflammation, and a rise in interleukin levels.⁵ Symptoms arising from these cellular events include nausea, dizziness, headache, tinnitus, acute pain, and cognitive deficits.⁶ Symptoms typically resolve over weeks to months, although 36% of patients diagnosed with mTBI continue to report persisting symptoms for 6 months or longer.⁷ In addition, the Centers for Disease Control and Prevention reported that as many as 15% of patients with diagnosed mTBI experience persistent, disabling problems associated with concussive symptoms.⁸

Consistently, the literature reports rest as the most common treatment method for mTBI symptoms.^{5, 9, 10, 11, 12, 13} Symptom education and material on future prevention are also commonly given as postconcussive treatment especially in an athletic population where return to play is a major focus.^{6, 13} Although rest and education have been found to reduce some mTBI symptoms, these can be insufficient as a treatment strategy in an adult, working population where symptoms often can be triggered by occupational duties and can greatly impact daily activities. Pharmaceutical treatment options, such as DDAVP, have demonstrated little positive effect on symptoms.^{5, 13, 14} Self-management with over-the-counter options like nonsteroidal anti-inflammatory drugs has also been shown to be ineffective in symptom reduction despite the inflammatory cascade that occurs during mTBI.⁵

Chiropractic management of mTBI has a prominent focus on an athletic population within the literature. Multiple reviews outline the high incidence of mTBI and indicated that chiropractors as first-contact providers should have awareness of symptoms, educational materials for patients, and stress rest before a return to play or activities.^{1, 15, 16} In addition, manual adjustments both with and without soft tissue therapies have been shown to be effective in the treatment of some mTBI symptoms including somatic pain related to mTBI, whiplash, headache, migraine, loss of motion in the cervical spine, and additional sequelae from trauma.^{17, 18, 19, 20}

In Traditional Chinese Medicine (TCM), it is theorized that external trauma such as in mTBI often causes a TCM condition known as *blood stasis* which causes pain and dysfunction in the injured area and can be alleviated with TCM treatments such as acupuncture. Acupuncture has been found to have longer-lasting therapeutic effect for acute headache after trauma when compared with pharmaceutical options.^{21, 22, 23, 24, 25} Local needling produces analgesic effects in areas of injury by locally increasing the blood supply through the release of vasodilatory neuropeptides and thereby increasing local oxygen and cytokines along with reducing inflammation.^{26, 27} Acupuncture also has been indicated as having a positive therapeutic effect on other mTBI-related symptoms such as headaches, neck pain, and nausea.^{28, 29, 30, 31}

Because of the prevalent nature of mTBI injuries, there is need for additional treatment protocols to be available for injuries sustained by adults in nonathletic situations. The purpose of this case report is to describe the management of an adult patient with mTBI injury through the use of manual cervical chiropractic manipulation, soft tissue therapy, and acupuncture.

Case Report

A 31-year-old woman presented to the chiropractic clinic for treatment of acute mTBI symptoms after a traumatic fall 3 weeks prior. She reported that she slipped on ice and landed prone, striking her face on the ground. She lost consciousness for a period of 3-4 minutes. The patient presented to urgent care with symptoms of acute neck pain, frontal and occipital headaches, nausea, dizziness, tinnitus, fatigue, and cognitive "fogginess." She was diagnosed with mTBI and prescribed Flexeril and Vicodin. Medical intervention temporarily alleviated her symptoms, but she found the relief to be short lived.

The patient described her physical and cognitive symptoms as unchanged from her initial presentation to urgent care. She reported constant dull neck pain with intermittent episodes of sharp pain into her arms bilaterally and upper back associated with movement. The symptoms made it difficult to sleep, perform her occupational duties, and participate in physical activity. She noted her neck pain to be 9/10 on a verbal Numeric Pain Scale (NPS) and headache pain to be 9/10 NPS upon initial evaluation.

On examination, the patient had a loss of active cervical rotation 5° - 10° bilaterally and was noted to have static rotational changes to her occiput. Her neurologic examination was nonfocal, and she had no evidence of cranial trauma. Vitals were within normal limits. Plain radiographs of the cervical spine demonstrated a loss of cervical lordosis and a mild right lateral convexity of C4-C7, with minimal signs of vertebral body elongation inferiorly on C4, C5, and C6. Result of Romberg test was negative on orthopedic examination. Local pain and tension were noted during cervical compression, foraminal compression test, and shoulder depression. Motion palpation found rotational restriction of C3 on the left and C7 on the right. The patient did not have a personal or family history of migraine, neck pain, or significant medical history. The working diagnosis was mTBI with cervical sprain/strain, cervicogenic headache, segmental dysfunction of the cervical spine, and muscle spasm.

Treatment visits consisted of high-velocity, low-amplitude manipulation of C3 and C7. Trigger point therapy was applied to the upper trapezius and suboccipital muscles bilaterally for 10-15 seconds per point. Therapeutic stretching of the upper trapezius muscles was augmented with intersegmental traction for 10 minutes. Cryotherapy with ice packs was applied for the first treatment only. Treatment frequency was 3 visits per week for 2 weeks. After 6 treatments of manual manipulation to the cervical region and soft tissue therapies, the patient reported decreased pain levels in the neck from 9/10 NPS to 2/10 NPS. Headache intensity decreased from 9/10 NPS to 4/10 NPS. Reevaluation found full cervical range of motion.

Despite pain reductions, the patient continued to endorse nausea, dizziness, fatigue, and tinnitus. Acupuncture was performed with DBC Spring Ten stainless steel needles (0.20×30 , 0.20×15) in addition to chiropractic treatments for her continued symptoms during the subsequent 2 visits. Points included cervical huatuoji points (perpendicular insertion with slight angle towards the spine; depth, 0.5-1.0 cun), Fengchi (GB-20, angled towards the nose tip; depth, 0.5 cun), Jianjing (GB-21, perpendicular insertion with slight medial angling; depth, 0.3 cun), and Houxi (SI-3, perpendicular insertion; depth, 0.5 cun) locally and Kunlun (BL-60, perpendicular insertion; depth, 0.5 cun) distally. These points were chosen because of the channels' course passing through the affected area and their

traditionally accepted therapeutic effects. The needles were inserted with a dispersing technique (including scraping and thrusting) and retained for 20 minutes each visit. Auricular endocrine, thalamus, omega 2, Point Zero, and shenmen were needled bilaterally at a depth of 0.1-0.2 cun perpendicularly for pain relief and were retained for 20 minutes.

After 2 treatments combining chiropractic manipulation and acupuncture over 3 days, the patient reported neck and headache pain levels to be 0/10 NPS and a complete resolution of the physical and cognitive mTBI symptoms. In addition, she was able to participate in all of her former activities without symptoms returning. She continued with follow-up care for an additional 4 weeks at 1-2 visits per week without relapse or regression of her symptoms. Examination, treatment, and follow-up evaluation were performed by the author. The patient gave her written consent for use of her personal health information as it related to this case.

Discussion

This case report outlined the care of an adult female patient with a fall-induced mTBI with both physical and cognitive symptoms. The management and treatment of patients with mTBI have been a popular topic within the literature, as the reported incidence has increased rapidly over the last decade.² Currently, there is no one standard of care for mTBI outside of rest and avoidance of reinjury.^{5, 9, 10, 11, 12, 13} This treatment method has been shown to decrease symptoms with time and reduce the risk of reinjury in athletes.^{1, 10, 11, 12, 16} In this case, the patient's mTBI symptoms interfered with her work duties and daily activities. Often, her daily tasks also increased the intensity and frequency of her symptoms, but she was unable to discontinue aggravating activities due to being unable to be away from work. This made rest an ineffective treatment due to her inability to maintain compliance with provider recommendations. In addition, the patient did not experience relief with medications aimed at reducing her symptoms.

In this patient's case, manual chiropractic manipulation of the cervical spine, soft tissue therapies, and acupuncture treatments expedited the reduction in her symptom frequency and intensity after a fall resulting in an mTBI. Notably, her pain levels decreased, range of motion improved to normal limits, and she reported a complete resolution of dizziness, nausea, tinnitus, and fatigue after 8 visits over the course of 2.5 weeks. This rate of improvement and return to regular activities was much quicker than the reported rate for rest alone.⁷ She did not relapse over the following 4 weeks of follow-up care, marking the treatment method as potentially long-lasting in nature.

Limitations

It is possible that the patient's mTBI symptoms improved regardless of care because 5 weeks had passed from the initial injury to when she reported to be symptom-free. The patient also may have engaged in other therapeutic activities that she did not report during the 2 weeks of treatment for active symptoms. It is also difficult to gauge the level of disruption to the patient's daily activities because of the information being collected verbally rather than through the use of a validated questionnaire, such as the activity of daily living questionnaire, SCAT3, or Neck Disability Index. The findings of this case report may not necessarily be applicable to other patients with similar symptoms. More participants in a more distributed population are needed to test the results of these treatment methods with more objective evaluation measures.

Conclusion

The treatment outlined in this case report describes an active approach to mTBI treatment rather than rest and patient education alone. The use of gentle spinal manipulation, soft tissue therapies, and acupuncture reduced the patient's symptoms, improved her range of motion, and increased her quality of life by achieving full return to daily activities in a treatment period of 2 weeks.

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No funding sources or conflicts of interest were reported for this study.

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