Case Study of a CVA Accident Post Manipulation

Analysis of a healthy woman and her stroke following manipulative headache treatments.

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The reported risk of stroke following cervical manipulation varies. A 1985 study reported serious adverse incidents of one per 400,000.[3] A 1995 study that surveyed California members of the American Academy of Neurology noted that 29 percent of respondents had treated at least one patient who had suffered stroke following chiropractic cervical manipulation.[11]

After reviewing malpractice data, a 2001 study found the risk to be one in 5.85 million.[1] A 2001 population-based case-control study found the estimated rate ratio for risk to be between 5.0 and 5.5 in patients under the age of 45, although no statistically significant risk was demonstrated in patients over the age of 45.5 The risk of cerebrovascular accident has been shown to be independent of whether or not the patient had been previously manipulated.[4] However, higher number of visits are associated with higher risk of vertebrobasilar accidents.[5] The most frequently reported technique resulting in cerebrovascular accidents was a primary rotational component high-velocity low-amplitude thrust.[4]

Case Study

An otherwise healthy 30-year-old female underwent chiropractic cervical manipulation for a one-month history of daily right-sided headaches. Past medical history was unremarkable except two full-term normal pregnancies.

The patient's only medication was an oral contraceptive and she had no drug allergies. Family history was positive for a maternal grandmother with cerebral aneurysm and stroke. Social history was positive for tobacco use of a half-pack-per-day and otherwise negative. The patient worked as a substitute teacher and ran a daycare from her home; she is married and has two children.

Prior to seeking chiropractic treatment the patient had a work-up for her headaches including a MRI ordered by her primary care physician The patient reported that the results of the MRI were negative. She began having chiropractic cervical manipulation ten days prior to the adverse event. She was manipulated three times with relief of the headaches and without complications.

During her fourth treatment she experienced a sudden onset of counter clockwise vertigo, nausea, vomiting, blurred vision, diplopiia, upper right and lower extremity numbness and right facial numbness.

Upon arrival to the emergency department, physical exam revealed stable vital signs, mild dehydration, bilateral horizontal and vertical nystagmus, a mildly erythematous right tympanic membrane, and was otherwise unremarkable. Osteopathic structural exam revealed mild tenderness of the right side of the neck. CBC and chemistries were within normal limits.

Cervical spine x-rays and unenhanced CT of the brain was negative. Cerebral angiography demonstrated bilateral vertebral artery dissections and small bilateral (2mm and 4mm) suprarachnoid internal carotid artery aneurysms without evidence of subarachnoid hemorrhage.

On the second hospital day, the patient complained of left upper extremity numbness, left upper extremity altered temperature sensation, and hiccups.
Anticoagulation with heparin and coumadin was initiated. Neurology and Neurosurgery consults were obtained. A MRI of the brain showed a right lateral medullary infarction. A CT of the brain with and without contrast and MRI of the cervical spine were unremarkable.

Once anticoagulation with coumadin was achieved, the patient was discharged home on continued coumadin therapy. She was given an alternating eye patch for her diploplia and referred to a Neuro-Opthamologist for evaluation of her nystagmus. The patient's acute symptoms resolved within several weeks after discharge. The patient's sequale include depression, difficulty with concentration, and a mild right-sided facial droop that returns under times of stress.

Discussion

The case reports acute onset of right lateral medullary infarction and bilateral vertebral artery dissection following

chiropractic cervical manipulation. Similar cases have been well documented in the medical literature.[2, 6, 7, 8, 10] Additionally, the literature reports rare cases of adverse effects that include thalamic infarction, occipital infarction, and carotid dissection.[6, 7, 10]

The 30-year-old female patient in this case was a smoker and had a family history of congenital cerebral vascular malformation these characteristics may have put her at higher risk for adverse events than the general population. A few patient characteristics associated with higher risk of adverse outcome have been previously documented.[1, 4]

In one study, the average age of patients who experienced adverse outcomes was 36, and females were noted to be almost twice as likely than males to experience an adverse event.[4] In another study, the median age was 42.5, females to male ratio was roughly three to one, and cases where patients had history of oral contraceptive use, migraine headaches, and smoking where noted.[1] However, risk associated with family history of cerebral aneurysm and stroke have not been previously documented.[1, 4]

The patient in this case described the technique employed by the chiropractor to be consistent with a rotational high-velocity low-amplitude technique. This type of technique has been the most frequently reported as having an association with cerebrovascular events.[4] Unlike many of the cases reported in the literature, the diagnosis in this case was proven with both MRI and angiography.8 The acute onset of symptoms following manipulation along with the radiographic evidence suggests a direct cause-effect relationship between the patient receiving chiropractic cervical manipulation and experiencing a cerebrovascular event.

The long-term adverse outcomes reported in the literature focus on the long-term physical disabilities.[3] Although the physical disabilities experienced by the patient in this case resolved with anticoagulation and time, she continues to experience cognitive symptoms including difficulty with concentration and depression.

The risk of stroke and other serious adverse events following cervical manipulation are rare, and are reported to range between one in 400,000 to one in 5.8 million.[1, 3] Several cases of stroke resulting in death of the patient have been described.[3]

Serious adverse advents other than stroke include disk herniation, dislocations, fractures, and spinal cord compression.[3] Although these risks are rare, the seriousness of the risks and potential for long term complications should potentially obligate practitioners who perform cervical spinal manipulation discuss these risks with their patients prior to performing cervical manipulative techniques.

Summary

This case describes an occurrence of right lateral medullary infarction and bilateral vertebral artery dissection following chiropractic cervical manipulation. The diagnosis was proven with MRI and angiography. The patient's symptoms and radiographic findings are consistent with an acute vertebrobasilar accident. The patient's age, sex, history of smoking, type of manipulative technique used, area of arterial dissection, and location of infarct are all consistent with those most commonly reported in the literature.

In this patient, the family history of cerebral aneurysm with stroke may have contributed to a predisposed increased risk for adverse events. Because
of the family history of cerebral aneurysm with stroke, work-up with MR-Angiogram or arteriogram may have been prudent prior to initiating manipulative treatment with a thrust technique.

Although the risk of stroke and other serious adverse events following cervical manipulation are rare, practitioners engaging in cervical spinal manipulation might be compelled to discuss the risk of stroke and other serious complications with their patients prior to performing the manipulation especially if one of the pre-existing risk factors are present.

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