Spinal Fluid Leak After Chiropractic Manipulation of the Cervical Spine

Intracranial hypotension (ICH) caused by cerebrospinal fluid (CSF) leakage is a well-documented cause of severe headaches and neurologic deficits. Cerebrospinal fluid leaks most often occur as a complication of neurosurgical procedures, in particular lumbar puncture, or after accidental trauma.

Report of a Case. A 51-year-old woman had binocular horizontal diplopia for 4 weeks. She reported having headaches for several weeks, which had been treated by her chiropractor. After receiving cervical spinal manipulation on 3 separate occasions, she did not experience relief but instead escalation of the headache. One week after the last chiropractic treatment, she developed binocular horizontal diplopia prompting neuro-ophthalmic evaluation. Her visual function and ocular fundus were normal. Ocular motility testing revealed a right cranial nerve VI palsy with a 20–prism dioptr (PD) esotropia (ET) in primary gaze, upgaze, and downgaze; 35-PD ET in right gaze; and 1-PD ET in left gaze. Magnetic resonance imaging showed diffuse enhancement of the meninges and obliteration of the foramen magnum, suggestive of ICH (Figure A). Computed tomography–myelography of the cervical spine demonstrated a CSF leak at the level of C2 (Figure B), which was thought to be the causative lesion and treated with a blood patch. This led to prompt headache relief, but the diplopia, which had been worsening before intervention, did not resolve immediately. Ten days later, she had a 30-PD ET in primary gaze, increasing to 40 PD in right gaze with a 20% right abduction deficit. Since the patient was now headache free, she was followed up without further intervention. The ocular misalignment resolved completely over the ensuing 5 months.

Comment. Forceful flexion and distraction of the cervical spine is a well-established mechanism for causing dural tears and ICH. But even small insults, like Valsalva maneuvers, may lead to CSF leakage, usually in conjunction with a focal weakness of the thecal sac. There are only a few reports of dural tears with CSF leakage and ICH after chiropractic manipulation, none of which recount any neurologic symptoms besides headache. In our patient’s case, headache that worsened after each manipulation and the appearance of cranial nerve VI palsy shortly thereafter strongly suggest a cause-effect relationship between spinal manipulation and the radiologically proven CSF leak. Interestingly, the patient did not associate her escalating headache with the previous chiropractic treatment. This reflects a common public conception of the innocuous nature of chiropractic maneuvers. In fact, the estimated complication rate of chiropractic treatment ranges from 1 in 100 000 to 1 in 2 million manipulations with the most frequent serious complication being cerebral or cerebellar stroke caused by dissection or occlusion of the vertebral or internal carotid artery. Fortunately, unlike stroke, neurologic deficits caused by ICH usually resolve, albeit slowly, once normal intracranial pressure has been reestablished.

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