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Letter to the Editor

Post-Concussion Syndrome is Related to Severity of Head Trauma and Extent of Functional and Structural CNS Abnormalities

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Letter to the Editor

We read with interest the article by Treleaven *et al*. on an observational study of the frequency of abnormalities in the vestibular, ocular, and cervical systems following concussion, which was investigated on the basis of 11 examinations of the vestibulo-ocular system and 7 examinations of the cervical system in 34 symptomatic patients with a history of concussion 1-6 months prior [1]. It was found that all three systems were impaired in 29% of patients, and it was concluded that the prevalence of impairments in the cervical, ocular, and vestibular systems is high in patients with a recent concussion, which is why such patients should undergo a thorough physical examination [1]. The study is impressive, but some points should be discussed.

The first point is that no imaging studies of the brain were reported [1]. Previous studies have shown that patients with concussion and symptoms in the cervical spine, eyes, and vestibular system may show lesions on routine brain imaging [2] or functional MRI [3]. In a study of 127 patients with post-concussion syndrome (PCS), 22% showed structural lesions of the white matter such as microbleeds and encephalomalacia [2]. Functional MRI examinations have shown that cerebral abnormalities occur after concussion, particularly in the cortical and subcortical gray and white matter, but also in the cerebellar regions [3].

The second point is that pre-existing abnormalities in the three systems examined were not sufficiently ruled out. Since the three systems examined are often caused not only by acute trauma but also by chronic overload, it is conceivable that, at least in some of the patients included, the abnormalities detected were already present before the trauma that led to the concussion. How many had previously cervical syndrome and how many had positional vertigo?

The third point is that the duration of unconsciousness was not considered a factor influencing the presence of abnormalities after a concussion [1]. More severe head injuries with prolonged unconsciousness can lead to more severe PCS than brief unconsciousness and mild traumatic brain injuries.

The fourth point is that the latency period between the head trauma and the examination varied between 1 and 6 months [1]. Since PCS usually improves gradually with increasing latency between trauma and examination, it is conceivable that, at least in some patients, the symptoms had already partially or completely subsided due to the long latency period between trauma and examination.

The fifth point is that PCS can manifest not only through vestibular-ocular and cervical deficits, but also through visual disturbances, sensitivity to light and noise, sleep disturbances, seizures, headaches, dizziness, memory and concentration problems, and emotional and behavioral changes such as irritability, anxiety, and depression [4].

Finally, no electroencephalography (EEG) results were reported [1]. Since head trauma can be complicated by seizures and visual and balance disturbances associated with non-convulsive seizures, it would have been useful to record EEGs in all included patients.

Overall, PCS requires not only clinical assessment but also instrumental examinations to detect subtle or obvious functional disorders or morphological abnormalities associated with PCS.

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