

Task-Specific and General Cognitive Effects in Chiari Malformation Type I

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Purpose

While headache and neck pain are the most common symptoms in CM, CM patients also may show motoric and cognitive symptoms, although studies using precise tests of these potential cognitive deficits are uncommon. Cognitive deficits in CM may result from direct injury of cerebellar or brainstem systems, or from less direct effects based on anxiety and depression which are commonly seen in CM patients with chronic pain. Our objective was to use episodic memory and executive function tests to determine whether or not Chiari Malformation Type I (CM) patients experience cognitive dysfunction.

Methods

We tested 24 CM patients who had undergone decompression neurosurgery and 24 age- and education-matched controls on measures of immediate and delayed episodic memory, as well as three measures of executive function.

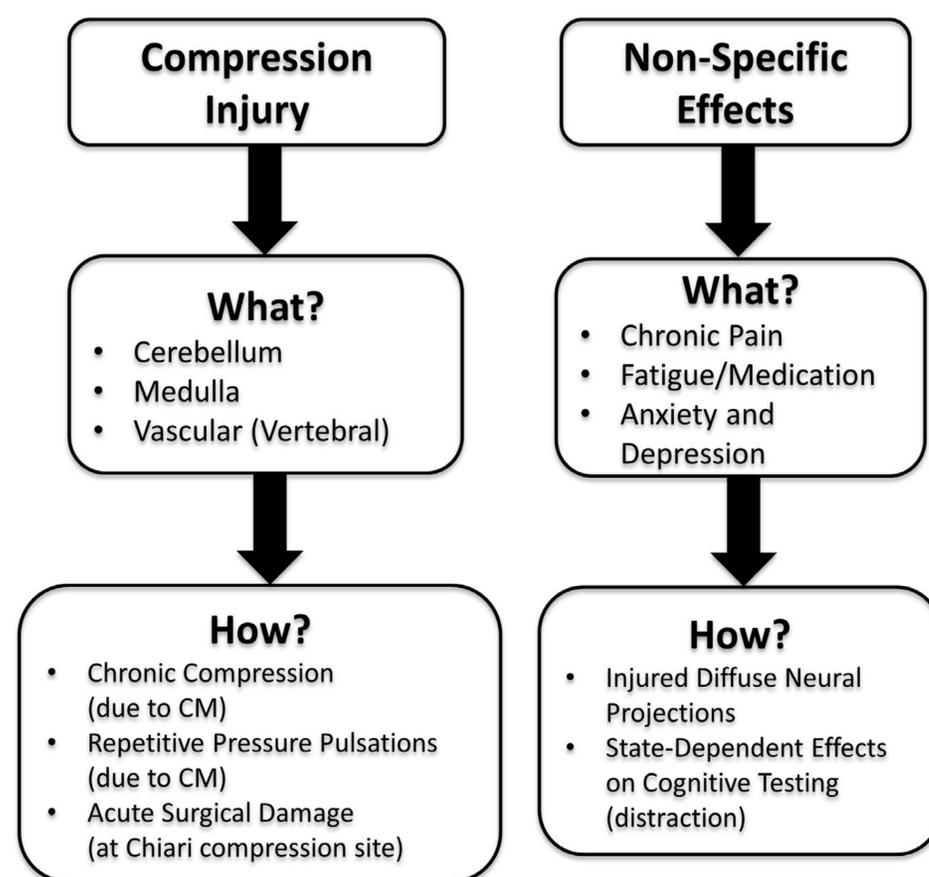
Results

The CM group showed performance decrements relative to the controls in response inhibition (Stroop interference), working memory computational speed (Ospan), and processing speed (automated digit symbol substitution task), but group differences in recall did not reach statistical significance. After statistical control for depression and anxiety scores, the group effects for working memory and processing speed were eliminated, but not for response inhibition. This response inhibition difference was not due to overall general slowing for the CM group, either, because when controls' data were transformed using the linear function fit to all of the reaction time tasks, the interaction with group remained statistically significant. Furthermore, there was a multivariate group effect for all of the response time measures and immediate and delayed recall after statistical control of depression and anxiety scores.

Conclusions

These results suggest that CM patients with decompression surgery exhibit cognitive dysfunction compared to age- and education-matched controls. While some of these results may be related to anxiety and depression (likely proxies for chronic pain), response inhibition effects, in particular, as well as a general cognitive deficit persisted even after control for anxiety and decompression.

A flow diagram of Chiari I Malformation compression injury and non-specific effects



The mean response time in Color Stroop task as a function of congruency between color and word (congruent vs. incongruent) for the Chiari Patients and Controls. Error bars represent the standard errors of the means.

