Cerebral Blood Flow in Chronic Posttraumatic Headache

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Background and Purpose.—Headache is the most common neurologic symptom following minor closed head injury. There is often a lack of objective evidence supporting an organic basis of cerebral pathology in these cases. This pilot study considers the possibility of alterations in cerebral blood flow, indicating evidence of an organic disorder in posttraumatic headache.

Methods.—Regional cerebral blood flow studies of 35 patients with chronic posttraumatic headache (PTH) (International Headache Society criteria), identified retrospectively from our cerebral blood flow data base, were compared with those of 49 nonheadache controls and 92 migraineurs (Ad Hoc Committee criteria). Regional cerebral blood flow (initial slope index method) was measured using the xenon Xe 133 inhalation technique.

Results.—Compared to migraineurs and controls, and after adjusting for differences (analysis of covariance) in baseline variables such as blood pressure, hematocrit, and Poo2, patients with PTH had: (1) significantly lower mean initial slope indices (F=0.001, P=0.002, respectively); (2) regional interhemispheric flow differences (rIFD), with higher distribution of regional asymmetrical probe pairs (rIFD≥7%): P[PTH versus control]=0.006, P[PTH versus migraine]=0.016; rIFD≥10%: P[PTH versus control]=0.011, P[PTH versus migraine]=0.003, and (3) more hemispheric asymmetries (P[PTH versus control]=0.023, P[PTH versus migraine]=0.57). Lower mean initial slope and hemispheric asymmetry (mean interhemispheric flow difference ≥3.2%) predicted PTH over control (P=0.023 and 0.002, respectively). Lower mean initial slope indices predicted PTH over migraine (P=0.002).

Conclusions.—Patients with PTH have reduced regional cerebral blood flow, and regional and hemispheric asymmetries. These cerebral hemodynamic alterations support an organic basis to chronic posttraumatic headache.

Key words: headache, closed head injury, cerebral blood flow

Abbreviations: mCHI minor closed head injury, PTH posttraumatic headache, CBF cerebral blood flow, rCBF regional cerebral blood flow, ISI initial slope index, rIFD regional interhemispheric flow differences, mIFD mean interhemispheric flow differences

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SUBJECTS AND METHODS

Subjects.—Data from 1546 rCBF studies were entered into the Henry Ford Hospital rCBF database between January 1989 and January 1994. Forty-two studies were coded with the diagnosis of PTH. We reviewed the hospital charts of the 42 patients and selected the 35 which fulfilled the IHS criteria for chronic PTH with minor head injury (IHS 5.2.2). The causes of