



Hyperbaric Oxygen Combined with Jiao's Scalp Acupuncture Improve Cognitive Functions after Brain Injury: A Case Report

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Abstract

Details of the clinical case: The case was a 72-year-old male with traumatic brain injury caused by a car accident. The main diagnoses were diffuse axonal injury, traumatic subarachnoid hemorrhage, and traumatic subdural hemorrhage. The duration of this study was 8 weeks. Patients were treated with hyperbaric oxygen alone at 1 to 4 weeks and with hyperbaric oxygen combined with Jiao's head acupuncture at 5 to 8 weeks. The results showed that patients' LOTCA scale scores showed an overall upward trend, and the increase was significant at 5 to 8 weeks. Nir functional brain imaging showed that the HbO values in the frontal and temporal lobes of patients were higher at 4 to 8 weeks than at 1 to 4 weeks.

Discussion: Cognitive impairment is a common complication of traumatic brain injury. This report is the first time to treat cognitive impairment after traumatic brain injury with hyperbaric oxygen combined with Jiao's head acupuncture. This treatment helps activate the cognition-related cortical function, increase oxygen supply to brain cells, and reduce cerebral edema and neuroinflammation, so as to achieve the purpose of cognitive function remodeling. The treatment regimen is safe, well tolerated, and has positive effects.

Case Presentation

The patient, a 72-year-old man, was diagnosed with diffuse axonal injury, traumatic subarachnoid hemorrhage, and traumatic subdural hemorrhage due to a severe car accident. The patient underwent conservative treatment (dehydration, nutritional nerve, brain protection, etc.). After consciousness, the EMG showed diffuse axonal injury; Nir functional brain imaging showed that the measured HbO value in the frontal lobe was 0.11 (mmol/L) * mm, the measured HbO value in the temporal lobe was 0.09 (mmol/L) * mm, and the LOTCA score was 28 points.

After the patient's vital signs and intracranial condition were stabilized, drug therapy (citicoline sodium, mecobalamin), physical therapy, occupational therapy, and other rehabilitation treatments were excluded. This study developed a treatment plan for the patient's cognitive dysfunction for 8 consecutive weeks, that is, simple hyperbaric oxygen therapy for 1 to 4 weeks, starting from 9:00 every day, oxygen concentration: 99%, pressure: 2.0 ATA, treatment time: 90 min, 5 to 8 weeks of hyperbaric oxygen combined with Joule needle treatment: 9:00 daily, acupuncture sites: Application area and vasomotor area (Figure 1), oxygen concentration: 99%, pressure: 2.0 ATA, treatment time: 90 min. Remove Joule's head needle after leaving the hyperbaric oxygen chamber.

In this study, near-infrared brain function imaging and the LOTCA cognitive rating scale were used to assess the cognitive function of patients, and the assessment time was the last day after the end of treatment every week. After 8 weeks of treatment, the patient's LOTCA scale score increased from 28 points to 43 points, and the increase was significant at 5 to 8 weeks (Figure 2). Near-infrared functional brain imaging showed that HbO in the frontal and temporal lobes of the patient increased significantly at 4 to 8 weeks (Figure 3).

Discussion

Cognitive dysfunction is a common complication of brain trauma, and its main injury mechanism is neuroinflammation resulting from a series of reactions such as necrotic cells mediated autophagy [1] and mitochondrial dysfunction [2,3] after brain ischemia and hypoxia caused by trauma [4].

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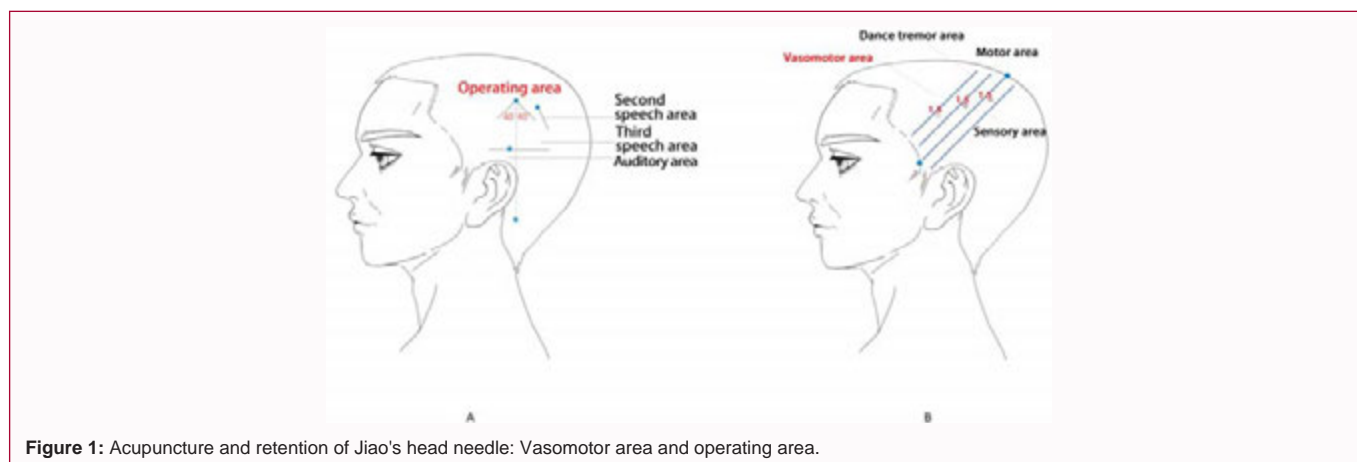


Figure 1: Acupuncture and retention of Jiao's head needle: Vasomotor area and operating area.

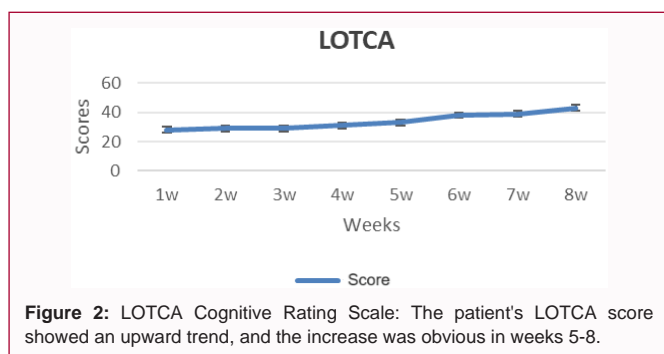


Figure 2: LOTCA Cognitive Rating Scale: The patient's LOTCA score showed an upward trend, and the increase was obvious in weeks 5-8.

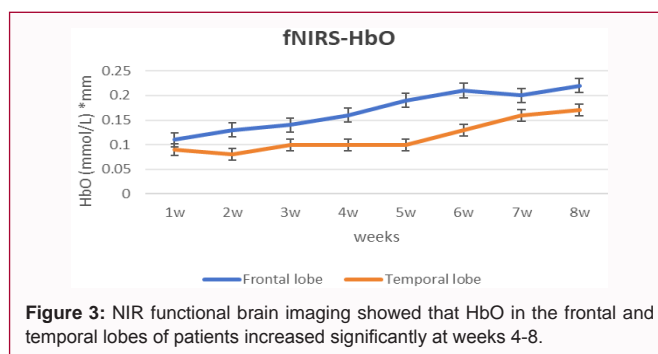


Figure 3: NIR functional brain imaging showed that HbO in the frontal and temporal lobes of patients increased significantly at weeks 4-8.

At present, most of the treatment programs focus on improving brain oxygen supply, nourishing nerves, establishing collateral circulation, improving blood viscosity, and removing dead nerve cells for cognitive function remodeling. Studies have shown that the mechanism of hyperbaric oxygen improving cognitive function may include: Increasing oxygen partial pressure, increasing blood oxygen and tissue oxygen content; Increasing oxygen dispersion rate and effective dispersion distance; Promoting the expression of endogenous vascular endothelial factors, thereby promoting the formation of collateral circulation blood vessels; Inhibit nitric oxide in endothelial cells, thereby inhibiting nerve cell apoptosis [5-8]. Jiao's head acupuncture is based on the functional positioning of the cerebral cortex as the theoretical basis. Compared with the international standard head acupuncture, point selection is more accurate and detailed, which can generate more targeted stimulation to the injury of different parts of the brain and activate the role of fixed neural pathways in the brain [9], so as to achieve the purpose of improving cognitive impairment. In this study, by comparing the treatment of cognitive impairment after traumatic brain injury with hyperbaric oxygen therapy alone and hyperbaric oxygen combined with Jiao's head acupuncture, the results showed that the treatment of hyperbaric oxygen combined with Jiao's head acupuncture could improve the cognitive impairment of the patient more significantly. It may be that the combined effects of the two theoretical methods have positive effects on the functional remodeling of nerve cells, the reconnection of neural synapses, the removal of oxygen free radicals, and the improvement of brain metabolism.

Summary

The results show that hyperbaric oxygen combined with Jiao's head acupuncture therapy has a positive effect on improving

cognitive dysfunction after brain injury through the combination of traditional therapy and modern therapy, and provides a new idea for clinical application.

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