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## Traumatic Brain Injury Patients Partially Recover from Disorders of Consciousness: Study

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At the International Neuromodulation Society's 11th World Congress, Dr. Stefanos Korfias of the Department of Neurosurgery at the University of Athens will present the results of a clinical study led by Professor Damianos Sakas, which showed that two of six in-patients studied at Evangelismos Hospital in Athens steadily emerged from minimally conscious state after receiving intrathecal baclofen (ITB) after traumatic brain injury.

The drug relaxes spasticity that can result from brain injury and may be used to facilitate care, but is not normally used to restore function. The patients, a 24-year-old man and a 29-year-old man, had been in minimally conscious states for three years and 18 months, respectively. Their scores on a revised coma recovery scale (with a maximum of 23) increased from 10 – 19 and 11 – 22, respectively.

Minimally conscious state is defined as a consciousness disorder in which a patient shows fluctuating, but not reproducible, signs of self-awareness and the surroundings. Most patients in a minimally conscious state also have moderate to severe spasticity as a result of their injuries.

Dr. Konstantinos Margetis, who contributed significantly to this study, notes that some sporadic case reports have suggested a potential beneficial effect of ITB in recovery from disorders of consciousness. He and colleagues decided to search for the effect in a systematic way. ITB was indicated in this study, he said, and in the previous case series, to reduce spasticity since it facilitates care and probably minimizes some spasticity complications.

"The improvement in the level of consciousness was a very pleasant observation for us," he said. "It might have been due to an additional beneficial effect of receiving intrathecal baclofen in this group of patients." All six patients improved spasticity scores with treatment, and the two who also made gains in recovering consciousness apparently retained some ability, despite their brain injury, to sustain an awake, alert, and oriented state that might have been enhanced by the treatment. He hypothesizes the mechanism of this observed effect could be associated with the action of baclofen on receptors in the orexin system, which plays a role in maintaining wakefulness, and in the thalamic reticular nucleus, a brain structure associated with consciousness.

Next he would like to see a larger, multi-center study evaluate such factors as brain and nervous system activity observed in functional and neural pathway imaging (fMRI and DTI MRI respectively); analysis of changes in neurotransmitters in the cerebrospinal fluid; and tracking electrical activity in neural networks or response to a stimulus (EEG and evoked potential recordings).

"A complete research protocol designed with input from other disciplines will attempt to investigate every facet of this complex subject," he remarked. "A study like that will allow for definite conclusions about the role of intrathecal baclofen in the recovery of the disorders of consciousness. While we feel that the current results might lower the threshold for intrathecal baclofen treatment in spasticity patients with disorders of consciousness, should a multi-center study establish a definite role for intrathecal baclofen in disorders of consciousness, then the potential will be very promising indeed."

The finding comes on the heels of other neurostimulation research into disorders of consciousness:

- In 2012, INS congress faculty Dr. Takamitsu Yamamoto, professor of Applied System Neuroscience and Neurological Surgery at Nihon University School of Medicine, Tokyo, and colleagues reported in World Neurosurgery on patients who were in a minimally conscious state or a more profound persistent vegetative state. Twenty-one patients who had been in a vegetative state for three months, and five who had been in a minimally conscious state, were treated with deep brain stimulation. Another 10 patients who were in a minimally conscious state were treated with spinal cord stimulation. Of those, eight of the 21 patients recovered from vegetative state and were able to follow verbal instructions. The patients who had been in a minimally conscious state were reported to show marked functional recovery. He will discuss neuromodulation for persistent vegetative state and minimally conscious state in scientific sessions at the congress a day after Korfias' talk, on Friday, June 13.
- A multi-center research team led by researchers at Weill Cornell Medical College reported in 2007 in the journal Nature that a New Jersey man who had been in a minimally conscious state for six years after a head injury regained some ability to feed himself, speak a little when prompted, and brush his teeth and hair, following deep brain stimulation to a network of cells in the central thalamus that control arousal and attention, as well as exerting influence over cognitive and motor regions.

Source: [Newswise](#)

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