

## **HIGHLIGHTS OF THE INTERNATIONAL NEUROMODULATION SOCIETY WORLD CONGRESS**

New and emerging applications of neurostimulation, including for treatment of addiction, vegetative state, and OCD, were presented at the **Neuromodulation Society's World Congress** in Acapulco, Mexico from December 7 – 12. Highlights are described below including topline data from **Northstar Neuroscience's (NSTR)** trial investigating the use of cortical stimulation for depression and a new study using multiple implanted peripheral microstimulators to improve motor function after stroke.


Dr. Jiwen Xu of **Shanghai Jiaotong University** presented data on the use of bilateral deep brain stimulation in the nucleus accumbens to treat a 5 year heroine addict. The patient was followed-up for over two years and given random urine tests which showed that he had completely abandoned his drug use without any ancillary treatment. Temporary postoperative complications, including clouding of consciousness, somnolency and urinary incontinence, recovered within 2-3 days. Insomnia recovered after 4-5 months. Psychological assessment determined that the patient's intelligence, memory, and personality were intact.

Dr. Takamitsu Yamamoto of **Nihon University** discussed how DBS therapy allowed eight patients to emerge from a vegetative state. Twenty-one cases of a vegetative state (VS) caused by various brain injuries were evaluated three months after the injury. The mesencephalic reticular formation was selected as a target in two cases, and the thalamic centre median-parafascicular (CM-pf) complex was selected as a target in the other 19 cases. After 10 years of follow-up, eight of the 21 patients emerged from the vegetative state, and became able to obey verbal commands. They remained in a bedridden state except for 1 case.

Dr. Fiacro Jiménez-Ponce from the **General Hospital of Mexico** presented findings of his study on the use of neuromodulation on the orbitofrontal cortex in five patients who have not responded to conventional treatments for Obsessive Compulsive Disorder. Bilateral stereotactic implantation of tetra-polar electrodes was aimed at the inferior thalamic peduncle (ITP). Clinical changes were evaluated every 3 months for 12 months using the Yale-Brown Obsessive Compulsive Scale (YBOC-S) and Global Assessment Functioning Scale (GAF). By the end of the study

Y-BOCS score decreased 20 points ( $p < 0.001$ ), and GAF score improved from 20 to 70% ( $p < 0.0001$ ). Neuropsychological battery showed no changes and no side effects.

Dr. Brian Harris Kopell announced for the first time results from the use of **Northstar Neuroscience's Renova** cortical stimulator in the treatment of depression. The stimulator targets the left dorsolateral prefrontal cortex, an area of the brain that is hypometabolic in patients with MDD. 12 patients with treatment-resistant major depressive disorder (MDD) were implanted with *Renova* and for eight weeks, patients were randomly assigned to active or sham stimulation. Following this period, all patients received active stimulation. Data for the first 11 patients showed that active cortical stimulation lowered patients' levels of depression according Hamilton Depression Rating Scale (HDRS) and the Global Assessment of Function (GAF) and also indicated that CS may have a treatment effect that increases over time. At the 8-week primary endpoint, active stimulation patients decreased in HDRS by  $24 \pm 21\%$  whereas sham stimulation HDRS decreased by  $3 \pm 17\%$ . After 16 weeks of active stimulation for all patients, HDRS and GAF improvements doubled compared with 8 weeks, from 21% to 41% for HDRS and from 29% to 58% for GAF.

In a study presented by Dr. Ross Davis of the **Alfred Mann Foundation**, seven patients with post-stroke arm weakness and spasticity received radio-frequency microstimulator (RFM) implants on selected branches of their radial nerve/motor-points. The RFM is an implantable device, 2.4 mm in diameter and 16.7 mm long, which applies pulses of current to cause a contraction of skeletal muscles. The participants received a programmed stimulation to help them extend their elbows, wrists and fingers to augment functional activities for at least one hour a day, five days a week, for 12 weeks. The study demonstrated a mean improvement across all patients. Results are presented as mean (SD) and % changes in Action Research Arm Test: 4.9 (7.89) 21% and Target tracking: 57.3 (48.65) 70%. Significant reduction occurred in motor impairment measured by the Fugl-Meyer ( $P=0.027$ ). No infections or failed RFMs occurred. The greatest functional improvement was demonstrated in the three participants, whose stroke occurred within the past two years, suggesting that earlier intervention may be beneficial to rehabilitation. After 12 weeks of programmed stimulation, four of the seven participants could complete daily tasks without supplemental stimulation. 

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