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F11 Neural Stimulation - Humans

(352) Transcranial direct current stimulation (tDCS) for the treatment of chronic pain

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tDCS has shown potential to alleviate pain in patients with various pain syndromes but evidence is still limited. This is a retrospective review of medical records of 100 patients who received either anodal (excitatory) tDCS over the motor cortex or cathodal (inhibitory) tDCS over the somatosensory cortex in five 20-min sessions on 5 consecutive days, at 2mA, for chronic pain of different etiologies (59 neuropathic, 28 nociceptive/somatic, 6 central pain, 6 headaches, 1 nociceptive/visceral), between November 2008 and September 2010 at BIMC. Patients provided self-ratings of pain on the 11-point NRS before and after each tDCS treatment, and ratings of pain characteristics using the Neuropathic Pain Survey (NPS) before and after the five-day treatment course. In 4 charts, patient's ratings were missing and could not be evaluated. A decrease in pain intensity of more than 30% on NRS after the five-day treatment was considered clinically meaningful. The chart review was approved by the IRB. A pain reduction $\geq$30% was reported by: 44 patients (76%) in the neuropathic pain group [The highest percentages of responders were patients with facial pain (91%, n=11), post-herpetic neuralgia (83%, n=6) and complex regional pain syndrome (77%, n=13)]; 20 patients (77%, n=26) in the nociceptive/somatic group [73% of those were with back pain]; 83% of patients in the headache group; 20% in the central pain group. No serious AEs occurred. The most frequently reported non-serious AEs were: i) unpleasant sensation under the electrode during the stimulation (in 4.2% of anodal and 7.9% of cathodal tDCS visits; ii) transient headache after the stimulation (2.5% of anodal and 1.1% of cathodal stimulations); iii) fatigue (1.1% of anodal, 0 cathodal stimulations). These findings support the evidence of analgesic efficacy of tDCS in a diversity of chronic pain types.

(353) What is the role of pulsed radiofrequency of trigeminal ganglia in the management of burchiel classification TN2 trigeminal neuralgia

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Facial pain has been classified by Eller and colleagues based on information from the patient's medical history. This classification appears to be simple and reproducible. TN2 is described when idiopathic trigeminal facial pain is aching, throbbing, burning for more than 50% of the time. Pain in TN2 patients has been shown to be more difficult to treat, and anti-convulsants have only been found to be marginally effective. We present a retrospective review of the case notes of these twelve patients with TN2 pathology from a single tertiary referral hospital. We looked at demographics, medication use and treatment outcome. Of the 92 patients on the database, classification based on Burchiel et al., resulted in identification of 12 patients with TN2. The age range was from 41-78 years (median-61years). Of the 12 patients, 7(58%) were female and the rest were male. All these patients were initially tried on at least two anti-convulsants (one of which was Carbamazepine) before resorting to Pulsed radiofrequency either due to poor pain control or intolerable side effects of the medication. We have found consistent improvement with a standardized Pulsed radiofrequency regime. Our patients gained benefit for an average of 10 months (range 6-36months). Other outcome measures include the BPI-facial and Burchiel's outcome grading (2). We also report that almost two-thirds of our patients are currently either off medication or their pain has improved but still on medication (at tolerable doses). Currently, 4 of the patients are medication free, 3 each are on Carbamazepine and Gabapentinoids. We conclude that management of TN2 should be multidisciplinary but Pulsed Radiofrequency appears to have a role. We propose a further study into optimal management of this particular subset of patients for whom standard treatments for trigeminal neuralgia are of uncertain benefit. (Burchiel K, J Neurosurg, 2010.)

(354) Successful treatment of neuropathic pain in Waldenström's Macroglobulinemia with spinal cord stimulation: a case report

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A 69-year-old male presented in our clinic with one year history of pain on upper and lower extremities. Patient has been diagnosed Waldenström's Macroglobulinemia(WM) for 2 years and electrodiagnostic study suggested peripheral neuropathy consistent with IgM monoclonal gammopathy. He has already completed 4 cycles of rituximab chemotherapy with good response to M spike and IgM level but minimal pain improvement. The pain was burning/lancinating, constant with worsening when weight bearing, and accompanying paresthesias on all extremities. His activity of daily living has been significantly limited by the pain. On examination, patient demonstrated decreased pinprick/vibration/proprioception sensation on distal extremities with a wide-base, unsteady gait, otherwise he has no significant abnormal neurological or musculoskeletal findings. After failed response to multidisciplinary management including medication (NSAIDs, anticonvulsant, Serotonin–norepinephrine reuptake inhibitors (SNRIs) , narcotics), physical therapy, and injection(stellate ganglion block), he was proceeded to a spinal cord stimulation(SCS) trial which provided excellent coverage of pain areas. He was therefore implanted 2 sets permanent dual 8-contact leads at C5 and T10 to cover the pain on upper and lower extremities, respectively. Patient has been followed up over one year since initial SCS implantation. He is satisfied with the pain control, functional improvement and minimal narcotic intake. WM is a lymphoproliferative disorder characterized by high blood level of immunoglobulin M (IgM) and malignant bone marrow lymphoplasmacytic infiltration. Neuropathy in WM is very heterogeneous involving sensory/motor fibers with axonal/demyelinating process due to simple deposition/infiltration of IgM and/or antibody-mediated nerve damage by IgM paraprotein containing anti-myelin-associated glycoprotein (anti-MAG) antibodies. Treatment includes plasmapheresis, chemotherapy and anti-neuropathic medications. However, this is the first report, to our knowledge, suggesting that SCS offers a therapeutic option for WM patients with peripheral neuropathic pain who have exhausted conservative management. (Silberman, Hematol Oncol 2008;Baldini, Am J Hematol 1994).

(355) Cervical spinal cord stimulation for neuropathic pain after brachial plexus avulsion injury: case report

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Brachial plexus avulsion is a rare and debilitating condition frequently associated with severe, intractable neuropathic pain. Treatment modalities include dorsal root entry zone lesioning, stellate ganglion blockade, and neuromodulation. We present a case of a 42 year old female with left upper extremity brachial plexopathy and complex regional pain syndrome (CRPS) type 2 following a motor vehicle accident. Her pain report consisted of constant "crushing" pain, radiating from the left shoulder into her entire left upper extremity. Additionally, she reported muscle spasms, and constant sensations of burning, numbness, and tingling. On physical examination, she presented with gross atrophy from the left shoulder girdle distally. Motor control was limited to trace movements in her distal 4th and 5th digits. She exhibited increased temperature of > 3°C; localized swelling; and violaceous color tone as compared to her unaffected limb. Palpation to light touch revealed allodynia and hyperalgesia. MRI of the cervical spine was negative for obvious spinal cord or root pathology. MRI of her brachial plexus was unremarkable; however, electrophysiologic studies demonstrated upper and middle trunk lesions. Previous unsuccessful interventions included repeated stellate ganglion blockade, transcutaneous electrical nerve stimulation (TENS), and opioid medication. Present pain medications included Gralise® 600 mg TID, tramadol 50 mg PRN, and baclofen 10 mg BID. On these medications, her average pain level was consistently 9/10. After a successful trial of cervical spinal cord stimulator leads, she went on to an uneventful permanent implantation procedure. The left and right leads were positioned with their cephalad-most contacts at the C2-3 and C4-5 levels respectively. At two-week follow up her mood and sleep were both 90% improved and her average pain report decreased to 1/10. Spinal cord stimulation is an effective treatment for neuropathic pain secondary to brachial plexopathy refractory to pharmacotherapy and conventional interventional attempts to modulate pain.