

PC-1. Comparison of Clinical Efficacy and Computed Tomography Analysis of Lead Position Between Three-column and Five-column Paddle Leads Spinal Cord Stimulation for Failed Back Surgery Syndrome

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Objective: The authors investigated the difference in clinical outcome of spinal cord stimulation (SCS) between three-column and five-column paddle lead SCS in patients with FBSS, and performed a computed tomography (CT) analysis of the position of paddle lead within the T9 spinal canal.

Methods: Twenty one patients who underwent paddle lead SCS at T9 (three-column [n=12] and five-column [n=9]) for FBSS were investigated. Clinical outcome was assessed with a 12-month follow-up numerical rating scale (NRS-11) and percent pain relief compared to baseline NRS-11. The position of lead within the posterior T9 spinal canal was assessed with CT assessment of contact angle and percent reduction of T9 canal area.

Results: There was no difference in the extent of paresthesia coverage of the painful area, success rate in trial stimulation, clinical outcomes, and percent pain relief between the two groups ($p>0.05$). Although there was no statistical difference in the contact angles between three-column and five-column paddle leads, the contact angle in the five-column group was generally greater than that of the three-column group ($p=0.067$). Overall reduction of $35.51\pm 4.76\%$ in the T9 canal was observed and there was no difference between two groups ($p>0.05$) and no correlation between the contact angle and percent T9 spinal canal reduction ($r=-0.247$, $p>0.05$).

Conclusion: Clinical efficacy of SCS using three-column and five-column paddle lead SCS was not different in FBSS. Some degree of inclination of paddle lead in posterior epidural space and significant reduction in T9 canal area were observed.

MEMO



PC-2. Secondary Trigeminal Neuralgia Caused by Metastasis of Breast Cancer with Literature Review

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Objective: Brain tumor and arteriovenous malformation have also been reported as rare causes of secondary trigeminal neuralgia. Trigeminal neuralgia is usually caused by vascular compression of the root entry zone of the trigeminal nerve. The offending vessel in most cases of trigeminal neuralgia is an arterial branch, such as the superior cerebellar artery, anterior inferior cerebellar artery, and others. We describe a clinical secondary trigeminal neuralgia patient and present the neuroimaging.

Methods: A 51-year-old female suffered pain attack on the right side of her face. She was conservatively treated with amitriptyline. Pain was paroxysmal and each episode lasted from few seconds to few minutes, with trigger points in the preauricular and postauricular region on right side of face. In addition, enhanced MRI was performed to identify the cause of neuralgia. An MRI of the internal auditory canal showed a enhancing metastatic brain tumor at the left parasellar, meckel's cave area from breast cancer. She received gamma knife radiosurgery. Postoperatively, she was completely free of trigeminal pain. She was monitored without recurrence of the pain for 2 years. Gamma knife surgery result and literature were reviewed.

Discussion: Recently, several treatment options have been introduced for trigeminal neuralgia, such as medication, gamma knife surgery, and MVD. GKS is one of wide accepted practice and is the least invasive procedures. GKS could be considered for patients from brain metastasis with many comorbidities and high-risk medical illness.

MEMO



PC-3. Two-year Follow-up Result of Vertebral Artery-associated Hemifacial Spasm Treated with a Novel Technique Using a Bioglue-coated Teflon Sling: A Retrospective Analysis of 42 Cases

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Objective: Microvascular decompression (MVD) for hemifacial spasm (HFS) involving the vertebral artery (VA) or vertebrobasilar dolichoectasia (VBD) can be technically challenging. The aim of this study is to present and analyze two-year follow-up results of 42 cases of HFS where a bioglue-coated Teflon sling was employed on the VA during MVD.

Methods: A bioglue-coated Teflon sling was crafted by the surgeon and applied for 53 HFS patients whose neurovascular compression was caused by the VA or VBD between 2005 and 2015. Forty two out of 53 patients were selected, for their follow up was two years or longer. The radiologic data, intra-operative findings, along with the clinical outcomes of each patient were reviewed and analyzed.

Results: As for forty two patients who were included for analysis, there were 22 females and 20 males and the average follow-up duration was 76 months (24-132 months). Intra-operative investigation revealed that in all cases, another artery beside the VA was responsible for the neurovascular compression: PICA and AICA in 23 (54.7%) and 11 (26.2%) patients, respectively. Every patient became spasm-free after the MVD. Neither recurrence nor post-operative procedure-related serious neurologic deficit was noted during the two year follow up, except for one patient who developed permanent deafness. CSF leak was complicated in three patients and one of them required a dural repair.

Conclusion: The authors demonstrated that transposition of the VA using a bioglue-coated Teflon sling is a safe and effective surgical technique for the VA related HFS. A prospective study to compare clinical outcomes between groups with and without use of this novel technique will be followed in the future.

MEMO



PC-4. Sacral Nerve Stimulation for Intractable Neuropathic Pelvic Pain

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Sacral nerve stimulation (SNS) is an effective treatment for bladder and bowel dysfunction, and also has a role in the treatment of chronic pelvic pain. We report the intractable neuropathic pelvic pain associated with cauda equina syndrome (CES) or conus medullaris infarction that were treated by SNS. The first patient suffered from intractable pelvic pain with urinary incontinence and fecal incontinence after surgery for a herniated lumbar disc. The other patient underwent surgery for treatment of a burst fracture and developed intractable pelvic area pain, right leg pain, excessive urinary frequency, urinary incontinence, voiding difficulty and constipation one year after surgery. A SNS trial was performed on both patients. Both patients' pain was significantly improved and urinary symptoms were much relieved. Central cord pain is very difficult to relieve, even with the many kinds of medical and surgical treatments available. Following spinal cord infarctions, central cord pain can develop. The problems that may arise could include limb pain, pelvic pain, difficulties voiding, and difficulties defecating. We are reporting a case of central cord pain caused by a spinal cord infarction of the conus medullaris. Limb pain was reduced by spinal cord stimulation. Voiding and defecation difficulties and pelvic pain were reduced by sacral nerve stimulation. Thus, in a case involving both intractable limb and pelvic pain, a combination therapy of these two stimulations might be an effective treatment modality. Although the mechanism of action of neuromodulation remains unexplained, sacral neuromodulation has also been used to control various forms of pelvic pain. We believe that SNS can be a safe and effective option for the treatment of some intractable neuropathic pelvic pain.

MEMO



PC-5. Percutaneous Inserted Unilateral Lead Migration-Salvaged with Paddle Electrode in Patient with Postplegic Neuropathic Pain

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Percutaneous Electrode lead migration is not uncommon complication of spinal cord stimulation. This 44 year old male patient who had spinal cord injury 7 years ago have paraplegia on low extremity and severe chronic neuropathic pain. He underwent percutaneous spinal cord stimulation procedure for 6 times because unilateral lead migration. So I considered spinal cord stimulation via operation with laminectomy, not percutaneous procedure. I was able to salvage this implant with a paddle electrode (2×4 channel) placed on the inside of the curve without removal of all electrode.

Percutaneous spinal cord stimulation electrodes have a propensity to migrate longitudinally, which is a costly complication that often compromises therapeutic effect. Instead of removal of all electrode and changing into paddle electrode, We used combination of previous lead and paddle. Percutaneous inserted unilateral lead migration- salvaged with paddle electrode is useful to decrease removal of all electrode and improve efficacy of pain reduction with combination previous lead and paddle combined stimulation.

MEMO



PC-6. Clinical Efficacy of Pulsed Radiofrequency Neuromodulation for Intractable Meralgia Paresthetica

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Background: Meralgia paresthetica (MP) is a neurologic disorder of the lateral femoral cutaneous nerve (LFCN), which is characterized by a localized area of paresthesia and numbness on the anterolateral aspect of the thigh. In most patients with MP, symptoms can be successfully managed with conservative treatment. However, in a small group of MP patients who are refractory to medical treatment, more aggressive low-risk treatment should be considered.

Objective: The objective of this study was to evaluate clinical outcomes of pulsed radiofrequency (PRF) neuromodulation of the LFCN in MP patients refractory to conservative treatment.

Methods: We retrospectively reviewed the clinical data of 11 patients with medically intractable MP who underwent PRF neuromodulation of the LFCN. These patients with MP underwent a diagnostic LFCN block using 2.0% lidocaine. Temporary pain relief $>50\%$ was considered to be a positive response to the diagnostic nerve block. Following a positive response to the diagnostic nerve block, patients underwent PRF neuromodulation at 42°C for 2 min. Patient pain was evaluated using a 10-cm visual analog scale (VAS). In MP patients who received PRF, we statistically evaluated VAS scores and the presence of any complications for 6 or more months after the procedure.

Results: The mean initial patient VAS score was 6.4 ± 0.97 cm. This score was decreased to 0.91 ± 0.70 cm, 0.82 ± 0.75 cm, and 0.63 ± 0.90 cm at the 1-, 3-, and 6- month follow-ups, respectively ($p < 0.001$). 63.6% of patients achieved complete pain relief (pain-free) in the last follow-up, whereas 27.3% of patients achieved successful pain relief ($\geq 50\%$ reduction in pain as determined by the VAS score). Furthermore, we did not observe any complications after the procedure.

Conclusion: PRF neuromodulation of the LFCN provides immediate and long-lasting pain relief without complications. Therefore, PRF of the LFCN can be used as an alternative treatment in patients with MP who are refractory to conservative medical treatment.

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