

P1-Intraoperative Real-time Local Field Potential Recording Analysis During STN DBS-clinical Application

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Objective: Increased beta activity of local field potential (LFP) in subthalamic nucleus (STN) is suggested to be a pathologic finding in patients with Parkinson's disease. It has been suggested that increased beta activity is clinically correlated to Parkinsonian symptoms. We thought it is clinically useful if we could record LFP in real-time during MER recordings to localize STN.

Material & Methods: We recorded intraoperative LFP and MER recordings in two patients with Parkinson's disease. LFP was recorded from the tip of microelectrode, referenced to exposed surface of the inner cannula. Real-time LFPs were sampled at 1000 Hz and analyzed frequency-based methods in every 10 seconds.

Results: Strongly increased beta activity was observed at the STN region, especially at the dorsal area. Increase high-gamma activities were noted in some area.

Conclusion: We could record real-time intraoperative LFPs and think it may be a useful tool for deciding optimal place for STN DBS, because we can get more information of STN in addition to single cell recording results.

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P2-Hemifacial Spasm Caused by Dolichoectatic Contralateral Vertebral Artery: A Case Report

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Objective: Hemifacial spasm, an involuntary contraction of the facial musculature, is usually caused by vessels of posterior fossa ipsilateral to the symptomatic side. Dolichoectatic vertebral (VA) artery is one of the offending vessels. We report an extremely rare case of dolichoectatic contralateral vertebral artery compressing ipsilateral REZ.

Case Presentation: From 1980 to 2010, 2446 patients underwent microvascular decompression (MVD) at our hospital by a single surgeon. Among them, this patient was the first to have contralateral VA as an offending vessel. The patient presented with progressive left hemifacial spasm started 1 year ago. There were no neurologic deficits except for mild ipsilateral facial palsy. From preoperative TOF and CISS MRI, right VA was dilated and elongated and was located at left CPA contacting to left REZ. The basilar artery seemed to be rotated due to extreme dolichoectasia of the VA. The brain stem was generally shifted to right side with the widening of left CPA area and with the left VA somewhat buried at ponto-medullary sulcus. AICA or PICA seemed to be also associated as possible offenders. MVD through left retromastoid suboccipital craniectomy was performed.

Results: From the intraoperative view, contralateral VA was firstly visualized between 7-8th nerve complex and 9-10-11th nerve complex after retracting floculus. Gentle mobilization of the VA showed compressed and indented REZ of 7th nerve. Ipsilateral AICA was running parallel to 7-8th nerve, also contacting with REZ at its loop. There was another loop of an artery compressing the REZ which seemed to be ipsilateral PICA. Teflon was inserted in a way that all of the three offending vessels could be mobilized away from the REZ thereby minimizing pulsatile forces driven to the REZ. Postoperatively the patient's involuntary facial spasm disappeared and there was no newly observed neurologic deficit. At postoperative three months, there was no recurrence of hemifacial spasm.

Conclusion: Hemifacial spasm caused by contralateral dolichoectatic vertebral artery is extremely rare worldwide. The authors achieved good surgical outcome after decompression with Teflon felt alone although the VA was extremely dolichoectatic and contralateral and there were two other offending vessels.

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P3-Bilateral Pallidal Deep Brain Stimulation for Cerebral Palsy Dystonia

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Objective: Cerebral palsy (CP) is subgrouped into spastic, dyskinetic, and ataxic form. And dyskinetic CP is further divided into dystonic CP with hypokinesia-hypertonia and choreoathetotic CP with hyperkinesia-hypotonia. We assess the effect of bilateral pallidal deep brain stimulation on choreoathetotic CP in our one case.

Methods and Materials: This 46-year-old female patient experienced left thumb weakness about 10 years ago. And about 5 years after that, her neck got extended involuntary more than half of her day. And 2 years ago, left arm became fixed on flexion posture, and she felt choking on swallowing and discomfort on speaking. Her sum of Burke-Fahn-Marsden dystonia rating scale on preoperative state was 78, and disability scale was 24.

Results: Bilateral pallidal deep brain stimulation electrode was inserted under local anesthesia with microelectrical recording, and the stimulation parameters were as followed; on right IPG-amplitude 3.5v, pulse width 210us, frequency 50 Hz; on left IPG- 4.0v, 210 us, 50 Hz. After 6 months of chronic stimulation, she was partially able to grasp with her left hand, and felt her neck pulling and pain was much more improved than before. But the improvement of BFM DRS was just mere.

Conclusion: Bilateral pallidal DBS could be a treatment option for patients with choreoathetotic CP dystonia. But in our patient, the effect was not so prominent on BFM DRS score. Much more cases of bilateral pallidal DBS for CP dystonia must be collected to verify its effectiveness because of the heterogenic characteristics of motor appearance.

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P4-Deep Brain Stimulation of the Globus Pallidus in a 7-year Girl with Early-onset DYT1

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Introduction: Early-onset dystonia usually starts in a limb and frequently progresses to generalize and lead to disability. Deep brain stimulation (DBS) at the globus pallidus internus (GPi) has been established as a safe and effective modality for control of medically refractory primary generalized dystonia. However, the experience of pediatric GPi-DBS in the treatment of early-onset DYT1 generalized dystonia is still limited. We report the surgical experience of bilateral GPi-DBS in a 7-year-old little girl with early-onset DYT1 generalized dystonia.

Material and Method: A 7-year old little girl presented with genetically confirmed DYT1-dystonia, resulting in progressive generalized dystonia. She was relatively healthy until Oct. 2007, when she began with the left arm dystonia accompanied by difficulty writing. Next the dystonia progressed to involve the left upper limb and then, the lower leg. And finally progressed to involve her hip and trunk on April 2009. she had difficulty writing, dystonic flexion of the left leg at the knee, and severely impaired walking or required assistance with difficulty maintaining erect standing position. She had difficulty in feeding by herself. She demonstrated little response to a variety of medications, including anticholinergic agent, rivotril, levetiracetam, and tetrabenazine, etc. After the failure of all available medications for dystonia, she underwent bilateral implant of DBS electrodes at the GPi under general anesthesia using microelectrode recording on July 9, 2009.

Result: No significant peri-operative complication occurred. Progressive and sustained improvement of her dystonia was noted. The patient was able to walk with erect standing position from 10 days and run from 3 months after DBS surgery. She was practically dystonia free except for some difficulty in hand writing. She was able to feed by herself. She and her family have been very satisfied with the procedure now.

Conclusion: This case report demonstrates that GPi-DBS is an effective method for the control of medically refractory early-onset DYT1 generalized dystonia. DBS surgery may be safely performed on children.

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P5-Delayed Intracranial Hemorrhage in Parkinsonism Patient Following DBS: Two Cases Report

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Objective: DBS is very effective for parkinsonism, essential tremor, dystonia, epilepsy, pain, psychiatric disorders, etc. But sometimes hardware-related complications is developing.

Material and Methods: We operated 168 DBS surgeries, 288 DBS lead implantations. 2 among them developed hemorrhage after 2,10 days operation.

Results:

Case 1: A74-year-male parkinsonism patient operated both STN, 2 nd IPG inserted 9 days later. 10 days later (STN DBS surgery, 1 day later after IPG insertion), both STN bleeding was developed. He had medicated and hemorrhage was resolved. 11 months now, he is rehabilitation state.

Case 2: A 56-year-male parkinsonism patient operated both STN, 2 days later early morning, Lt basal ganglia bleeding was developed. He had medicated and hemorrhage was resolved. 7 months now, he is rehabilitation state.

The risk factors of delayed hemorrhage is male, parkinsonism patients, etc.

I will reviewed the literatures.

Conclusions: DBS is effective for movement disorders. But delayed intracerebral hemorrhage is developed after DBS surgery

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P6-Congenital Muscular Torticollis of a Woman Aged 58 Years Satisfactorily Treated with Surgical Release

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Congenital muscular torticollis (CMT) refers to unilateral contracture of the sternocleidomastoid (SCM) muscle that restricts the range of motion at the neck, with the head tilted toward the shortened SCM. The torticollis, when untreated, sometimes results in cosmetic deformity and limitation in the neck movement. The result of surgical release of the tightened muscle are good in the infants, even with older children. However, little importance is available on the surgical treatment of adult CMT. We present a 58-year-old woman with CMT treated by bipolar release of the SCM. She was satisfied with cosmetic and functional results. Even adult CMT may obtain the benefit of surgery.

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P7-Evaluation of the Accuracy of the CyberKnife Xsight Spine Tracking System

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Introduction: The CyberKnife Xsight spine tracking system has enabled the increasing use of radiosurgery to ablate spinal lesions. The Xsight spine tracking system enables the continuous tracking of spinal lesions based on anatomical landmarks instead of surgically implanted fiducials. The Xsight system localizes spinal targets by direct reference to the adjacent vertebral elements. The purpose of this study was to evaluation of the accuracy of the CyberKnife Xsight spine tracking system.

Methods: The Xsight integrates with the CyberKnife radiosurgery system to eliminate the need for implantation of radiographic markers or fiducials prior to spinal radiosurgery. It locates and tracks spinal lesions relative to spinal osseous landmarks.

The accuracy of the spinal radiosurgical procedure was assessed with an anthropomorphic head and cervical spine phantom. Using this device, all tracking modalities provided by the CyberKnife system can be simulated: fiducial tracking, 6D skull tracking and Xsight tracking for spinal targets. Dose planning was based on 1.0 mm thick computed tomography slices in which an inverse treatment planning technique was used. The end-to-end test was conducted 10 times. The total targeting error is calculated as the length of the distance vector.

Results: The total targeting error of the 6D skull tracking system and fiducial tracking system were 0.53 mm and 0.74 mm. And total targeting error of the Xsight spine tracking system was measured to be 0.53 mm.

Conclusion: The Xsight spine tracking system is practically important because it is accurate and eliminates the use of implanted fiducials. Fiducial-free spinal radiosurgery has a significant advantage for spinal radiosurgery in terms of time, cost of treatment, and quality of the life of the patient.

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P8-Whole Spine OPLL 환자에서 SCS 후 발생한 하반신마비 진행 1예

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목적: 척수자극요법은 척수수술 후 동통, CRPS 등에서 효과적인 치료법이나 드물게 예기치 못한 상태 악화를 동반할 수 있다.

대상 및 방법: 48세 의료급여 1종 여자 환자로 whole spine OPLL, 양하반신마비, 대소변장애 인지되어 정형외과에서 경추부 및 흉추부 후궁부분절제술을 시행하였으나, 하반신동통이 악화되어 흉추 8, 9번 척추 후궁전절제술, 척수자극요법 시행 후 하반신마비(MP:3/52/5), 대소변장애 진행, 호흡곤란증이 발생되어 전극을 제거하였고, 재활치료 및 타 병원 전원되어 재활치료하였다.

결과: 환자는 수술 전 생명보험사에서 1급 장애인으로 보험금을 수령하였고, 법원소송을 하여 수술 전 정상이었다는 위증 및 술자를 2년간 미행, 같은 교회에 다니는 간병인이 술자의 동태를 감시하였다. 고등법원에서 9천5백만원을 지불하라는 선고와 대법원 기각 판정을 받았다.

결론: Whole OPLL 의료급여 1종, 이전에 장애 1급의 하반신마비 환자에서 치료는 신중을 기해야 할 것으로 사료된다.

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P9-Neuromodulation of Facial Pain: A Case Report

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Introduction: Treatment of chronic neuropathic pain in the region of the head and face presents a challenge for pain specialists; patients who do not respond to conventional treatment modalities usually continue to suffer from pain due to the lack of reliable medical and surgical approaches. Peripheral nerve stimulation (PNS) has been used to treat neuropathic pain for many decades, but only recently has it been applied systematically to the craniofacial region. To advance the study of this treatment option, the authors present their initial experience with this approach, summarize published data on the use of PNS in treatment of craniofacial pain, and discuss some technical details of the craniofacial PNS procedure.

Case presentation: A review of prospectively collected data in 2 patients who underwent PNS surgery for craniofacial pain was performed. One female patient was 66 years old. She suffered severe electrical shock-like pain on the left forehead for 10 years. She underwent microvascular decompression as a diagnosis of trigeminal neuralgia 10 years ago. But 1 month after pain was relapsed and refractory to medication. So, she underwent PNS on the supraorbital branch of facial nerve, and pain frequency, duration and intensity was improved over 50 percent. Another male patient was 33 years old. He had allodynia, hypesthesia, hyperalgesia and intractable cold-sensitive pain on the right forehead after mild head trauma since 1 year ago. Several times of nerve block were carried out but there were no effect of pain reduction and medical treatment, neither. After PNS on the supraorbital branch of facial nerve, the pain intensity decreased 50 percent and improved allodynia markedly. Both patients proceeded with implantation of a permanent system after the trial and there was no complication.

Conclusions: Peripheral nerve stimulation appears to be a safe and effective approach in the treatment of craniofacial neuropathic pain.

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P10-Long Term Effect of Thalamic Deep Brain Stimulation for Pain due to Brachial Plexus Injury

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Introduction: Brachial plexus injury is associated with intractable long-term pain of the upper limb in up to 20 to 30%. Deafferentation pain is the result of avulsion of the root from the spinal cord. Traction on the brachial plexus results in rupture of the rootlets from the cervical spinal cord. Chronic intractable pain resulting from brachial plexus avulsion is the major indication for the DERZ (dorsal root entry zone) coagulation procedure. Recently, deep brain stimulation (DBS) is known to be another tool for the treatment of chronic pain states that do not respond to less invasive or conservative treatment options. The authors report a case of thalamic DBS for the relief of recurrent deafferentation pain after DREZotomy.

Purpose and Methods: The patient was a 53-year-old female who presented neuropathic pain on right shoulder and upper extremity since she was 12 years old due to brachial plexus injury. Preoperative electromyography and scapular magnetic resonance imaging revealed brachial plexopathy and atrophy of rotator cuff and supraspinatus muscle. In 2000, the patient underwent DREZotomy on C3-C5 level with resultant pain relief. Preoperative Visual Analogue pain Scale (VAS) was 9, decreasing to 2 after the DREZotomy. But the same symptom had recurred in 3 months after DREZotomy. In 2001, The authors performed left VPL nucleus (ventral posterior lateral nucleus of thalamus) stimulation.

Results: After the DBS, paresthesia has reduced in the preoperative painful area. Preoperative VAS was 8, decreasing to 2 immediately after the DBS. A good relief of the pain was achieved after the DBS. In August 2010, the patient experienced significant pain reduction during long-term follow-up monitoring and her pain medication has been dramatically reduced. Her pain has been reduced to 50%, and almost daily attack of pain episodes have been reduced to 1 to 2 episodes per week. The VAS has been steady 2 to 3 as well.

Conclusion: Chronic intractable pain resulting from brachial plexus avulsion is the major indication for the DREZotomy. However, the authors think many neurosurgical institute might experience recurring cases of deafferentation pain after DREZotomy for the brachial plexus injury. In this report, the authors assumed that DBS can be helpful and effective treatment in recurrent deafferentation pain due to the brachial plexus injury.

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P11-Lmonitoring of Altered Free Fatty Acid Metabolic Patterns in rat Plasma Following Hemorrhagic Stroke

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To uncover the physiological changes occurring after hemorrhagic stroke, we analyzed 24 free fatty acids in plasma as tert-butyldimethylsilyl derivatives by gas chromatography-mass spectrometry from control and intracerebral hemorrhage rats. Hematoma volume decreased, and hemorrhage-induced behavioral abnormalities recovered overtime. Altered fatty acid metabolism at 7 days after hemorrhagic stroke spontaneously recovered to normal control levels at 14 days. The deformed star patterns of hemorrhagic stroke group were readily distinguished from the tetracosagonal shape of the control mean. Thus, the present method may be used for monitoring of biochemical and physiological events in hemorrhagic stroke.

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