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Involuntary movements induced and remitted by indirect bypass surgery in a patient with moyamoya disease

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Object. Involuntary movement is an uncommon manifestation of moyamoya disease. We describe a patient who suffered from it after the first indirect bypass surgery but it improved dramatically after the second indirect bypass surgery. This rare case presentation has not been reported previously.

Clinical presentation. The patient is a 12-year-old boy who presented with motor weakness in upper extremities. Neuroradiological imagings revealed severe stenosis of the distal internal carotid arteries with collateral vessels.

Intervention. Initially, the patient underwent an encephalo-duro-arterio-myosynangiosis on the right side and encephalo-duro-periostealsyngiosis on the bifrontal side, which ameliorated his motor weakness in his left upper extremity. However, involuntary movement appeared in his right upper extremity. Brain magnetic resonance imagings revealed no newly developed infarcted and hemorrhagic lesions. Secondly, he underwent encephalo-duro-arterio-myo-periosteal synangiosis on the left side. After the second operation, the patient's involuntary movement completely resolved.

Conclusion. The present case shows that involuntary movement which appeared after first indirect bypass surgery disappeared after the second indirect bypass surgery. We speculate that the involuntary movement occurred by the unequal distribution of the blood flow in the basal ganglia.

2

Transient cerebral arteriopathy in children- Report of three cases.

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Objective: Etiologies of arterial ischemic stroke in children include Moyamoya disease, dissection, cardioembolic and systemic diseases like sickle cell disease, collagen disease, infection and vasculitis. Transient cerebral arteriopathy(TCA) is a rare condition causing ischemic stroke in children. We report our 3 cases of TCA and review previous literature to understand the nature and course of stroke in children.

Materials, Methods and Results: Transient cerebral arteriopathy is defined as ischemic stroke in children characterized by lenticulostriate infarction due to non-progressive , idiopathic and unilateral arteriopathies. Between 2006 and 2007, three children were hospitalized in our institution for arterial ischemic stroke that shared the features of transient cerebral arteriopathy. Illustrative case: 13-year-old girl presented with sudden headache and left hemiparesis during running. Laboratory findings did not show evidence of systemic diseases including infection and collagen disease. She was otherwise previously healthy. MRI revealed lenticulostriate infarction in the right side and angiography showed focal and segmental stenosis on the right M1. She was put on 50mg of aspirin per day. Her symptoms improved over the first month. MRA also showed improvement. And 4-year follow-up did not detect any new stroke. The two remaining cases are 15-year-old boy and 5-month-girl.

Conclusion: We experienced three rare cases diagnosed as transient cerebral arteriopathy. Although stroke in children is an uncommon disease, transient cerebral arteriopathy is one of the significant causes of stroke in children. It is necessary to understand these features to diagnose and manage stroke in children. We report the clinical characteristics, course, imaging and outcome.

3

The outcome after removal of hypertensive putaminal hemorrhage: Is mortality rate improved compared with 20 years ago?

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[Background and Purpose]Most of patients who suffer from cerebral hemorrhage have severe neurological deficits and some become fatal because it is a destructive disease. But whether mortality rate has been improved in the past two decades are not known in patients who underwent hematoma evacuation. We retrospectively examined differences of mortality rate in patients who suffered from hypertensive putaminal hemorrhage and underwent hematoma evacuation between in our hospital and in the past report. [Methods]We compared 308 cases of hypertensive putaminal hemorrhage in our hospital between January 2004 and December 2008, with 7010 cases in nationwide survey written by Kanaya et al. published in 1990. [Results]In our hospital, 56 of 308 patients underwent hematoma evacuation and mortality rate was 14%. In the past report, 2561 of 7010 underwent and mortality rate was 26%. [Conclusion]Mortality rate has decreased compared with the past report. But it is unclear whether outcome in all cases has been improved.

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Surgical complications in carotid endarterectomy

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Objective: To elucidate the postoperative complications of carotid endarterectomy (CEA) by investigating the outcome of the cases in our hospital retrospectively.

Materials and Methods: From April 2007 to March 2010, 64 consecutive patients with carotid stenosis were treated with CEA (55 men, 11 women; mean age, 71.5 years). Other 11 cases were performed CAS, because of the higher lesion, restenosis after initial treatment or radiation induced lesion. In CEA, intraoperative shunt placement was performed on all the patients. Nasotracheal intubation was selected in cases with higher lesion. All but one case that had cardiac pacemaker were performed MRI DWI and MRA after the operation within 24 hours.

Results: No patient presented new neurological deficit related with cerebral ischemia after the operation. No positive DWI was detected in all patients that were performed postoperative MRI. Postoperative wound hematoma which needs surgical evacuation was observed in two patients. One developed the cervical hematoma two hours after the operation, the other 10 days after. In one case, acute cervical ICA occlusion was detected in postoperative MRA. Emergent cerebral angiography revealed distal cervical ICA dissection, probably caused by balloon inflation of distal shunt tube. Fortunately, the patient showed no neurological deficit. Immediate CAS was successfully performed, the following MRI showed no DWI positive lesion.

Conclusion: These results suggest that CEA can be performed with relatively low risk, but postoperative MRI and close observation are inevitable.

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Time-course Evaluation of Cerebral Hemodynamics in Patients with Moyamoya Disease using Tc-99m ECD SPECT

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Back ground: Time-course evaluation of the cerebral hemodynamics is important for patients with moyamoya disease due to the decision of treatment. **Purpose:** To analyze the time-course change of cerebral hemodynamics using Tc-99m ECD SPECT in adult patients of moyamoya disease. **Materials and Methods:** A total of 12 (5 men, 7 women) patients and 22 hemispheres with adult moyamoya disease, who underwent the initial and the follow-up examination using Tc-99m ECD SPECT from 2005 to 2009, were included in this study. Rest cerebral blood flow (CBF) and acetazolamide-activated CBF were examined quantitatively using three-dimensional stereotactic ROI template (3DSRT). Time-course changes of rest CBF and cerebrovascular reserve (CVR) in the region of middle cerebral artery were analyzed, considering with or without ischemic event, hemodynamic disorder and revascularization surgery. **Result:** Rest CBF and CVR in the group with ischemic event were significantly lower than those in the group without ischemic event in the initial SPECT study. However, in the follow-up SPECT study, no significant difference showed in rest CBF and CVR between two groups because of the efficacy of revascularization surgery. CVR in the group with hemodynamic disorder, excluding the cerebral hemisphere undergoing revascularization, significantly decreased in the follow-up SPECT study. Rest CBF and CVR in the group undergoing revascularization significantly increased in the follow-up SPECT study. **Conclusion:** Time-course evaluation using Tc-99m ECD SPECT was useful to evaluate the cerebral hemodynamic change in adult patients with moyamoya disease. Revascularization surgery was improved rest CBF and CVR in moyamoya patients with hemodynamic disorder. The scheduled hemodynamic study is important for the patients with hemodynamic disorder to evaluate risk of the cerebral ischemic attack.

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The efficacy of Middle Meningeal Artery Embolization for Refractory Chronic Subdural Hematoma

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Object: The purpose of this study is 1) to clarify the recurrence rate of Chronic Subdural Hematoma (CSDH) in our department and 2) to clarify the efficacy of Middle Meningeal Artery (MMA) embolization for refractory CSDH. Methods: 519 patients with CSDH admitted to our department between January 2001 and March 2009 were retrospectively studied. Age, sex, radiographical findings, treatment, histological findings and clinical course were reviewed. Results: 44 (8.5%) out of 519 patients were presented with refractory CSDH and received surgical treatment. Among them, 7 patients were treated with MMA embolization in combination with surgical treatment. All seven patients were men and median age was 77.3 years old (65-84). Initial treatment was simple drainage for all seven patients. For refractory CSDH, angiography was carried out and MMA selective angiogram showed abnormal vascular network. MMA embolization was carried out for all seven patients and burr hole surgery or craniotomy was followed in 6 patients. No recurrence after MMA embolization was detected during follow up period. Histologically, vascular connection between dura mater and outer membrane of hematoma were revealed. Discussion: For refractory CSDH, several methods were reported effective. However, MMA embolization can be an effective treatment option, as the vascular network and blood supply from MMA to hematoma membrane was considered as one of the causes of refractory CSDH.

Idiopathic spinal cord herniation – a case report -

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Idiopathic spinal cord herniation (ISCH) is defined as the prolapse of the spinal cord through its dura. Here we report a patient whose symptom was progressive myelopathy.

The patient is a 59-year-old man had a wound to his back 20 years ago. He had presented with progressive Brown-Sequard syndrome for 6 years. CT myelography and MRI revealed spinal cord herniation at Th3-4 intervertebraldisc level. We performed dural plasty with artificial dura. Neurologic status improved postoperatively.

The cause of ISCH is not elucidated. ISCH happens only in thoracic vertebral level. The chief symptom is progressive myelopathy. Frequently present in Brown-Sequard syndrome. Diagnosis can be made with computed Tomographic (CT) myelography or magnetic resonance imaging (MRI). Many surgical techniques have been applied by various authors. We chose the surgical technique with artificial dura.

When we examined an adult patient with slowly progressive myelopathy, it is necessary to consider ISCH.

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Intramedullary spinal cord high grade astrocytoma associated with neurofibromatosis type 1

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Objective

Patients with NF1 have a tendency to develop both benign and malignant tumors. We report a case of high grade astrocytoma in the medulla oblongata with spinal dissemination associated with neurofibromatosis type 1 (NF 1).

Case description

A 41-year-old man complained of headache and gait disturbance. MRI of the brain showed T2 hyperintensity in the medulla oblongata associated with contrast enhancement on its ventral surface. MRI of the spine showed multiple spinal dissemination. The patient underwent Th2-3 hemilaminectomy and biopsy of the disseminated mass lesion. Pathological diagnosis was high grade astrocytoma. The patient received postoperative irradiation and chemotherapy with Temozolomide.

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Primary experience of intrathecal baclofen therapy at Tsukuba University Hospital

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Objective Intrathecal baclofen (ITB) therapy for severe spasticity has been introduced to our hospital since 2007. We evaluated the efficacy of ITB and discussed some points of management.

Materials and Methods Twelve patients had undergone ITB screening trial. Seven of 12 patients underwent ITB catheterization. Of these seven patients, sex, primary disease, baclofen maintenance dose of baclofen, effectiveness and side effect were evaluated.

Results In these seven patients, mean age at operation was 27.5 years (13-61 years). There were 5 men and 2 women. The primary disease of patients were cerebral palsy in four, hypoxic encephalopathy in two and paraplegia due to syringomyelia in one patient. In the patients with cerebral palsy, the catheter tip was positioned Th5 to 6 and optimal maintenance dose were 100-120 mcg per day. In the patients with hypoxic encephalopathy, catheter tip was positioned on the level of Th7, and maintenance dose were 150 and 600 mcg per day. For the patient with paraplegia due to syringomyelia, catheter tip was positioned on the level of Th8, and maintenance dose was less than 25 mcg per day for improvement of gait disturbance. Two patients had constipation after ITB therapy, however both were well controlled by medication.

Conclusion The optimal dose of baclofen infusion was 100-120 mcg per day for relatively young patients of cerebral palsy. The positioning of the catheter tip on the level of T5 or 6 can be effective for reducing muscle tone of upper extremities. The patients with hypoxic encephalopathy show a tendency to require higher baclofen dose than patients with cerebral palsy. For older patients, especially having long term history of gait disturbance due to paraplegia, care should be taken for worsening of gait disturbance after introduction of ITB because rigidity has stabilized their gait. Further experience will be needed to maintain ITB therapy precisely.

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-Dense Array EEG for the Tuberous Sclerosis Complex with Epileptic Seizure and Intraventricle Tumor-

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Objective

Tuberous Sclerosis complex (TSC) is classically defined with the trias of epilepsy seizure, mental retardation and angiofibroma. There is also sub-category including systemic hamartoma in addition to the trias. The death is mostly caused by the renal failure, central nervous system lesion including brain tumor and followed by heart failure. The epilepsy seizure also highly affects to the high mortality rate and has started being considered surgical treatment.

Materials and Methods

The patient is 9-year-old right handed boy with TSC. He exhibited gelastic seizure, restlessness seizure and choking spell. We captured the gelastic seizure and restlessness seizure during conventional long term video EEG monitoring. However the seizure onsets of both types of seizure were unclear. Enhanced MRI showed multiple cortical tubers and homogeneously enhanced intraventricle tumor, considered to be giant cell astrocytoma. We used 256ch-dense array net type EEG(d-EEG) for this patient.

Results

We captured the gelastic and restlessness seizures during the d-EEG. The d-EEG data showed right frontal and temporal onsets independently under the visual analysis. The analysis of Local autoregressive analysis (LAURA) inverse solution for the interictal epileptiform discharges also estimated the focus over the right frontal and temporal regions on the MNI Typical Brain

Conclusion

The d-EEG could detect the focus which the conventional EEG could not. The d-EEG has better spacial resolution. Even patients with mental retardation and uncooperative patients are able to be evaluated by d-EEG for the focus diagnosis.

Verification of accuracy of Tractography in neuronavigation by direct 3D-positioning of motor tract by a subcortical electrode

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Introduction: Tractography has been integrated in the neuronavigation system during surgery and used as a reference to estimate the localization of pyramidal tract.

Objectives: We evaluated whether 3D information of tract is reliable by direct electrical stimulation with bipolar needle electrode prior to resection of tumor tissue adjacent of pyramidal tract.

Methods: NY Tract Finder II, an electrode designed for navigation-assisted detection of motor tract in cerebral white matter, was used during the resection of glioma in eloquent area in 15 patients. Among them seven patients underwent intraoperative detection of pyramidal tract with the guidance of tractography integrated in neuronavigation system. Brain tissue was continuously stimulated between the tips of electrode needle. The mMEPs were recorded to alert surgeons that the electrode tips had reached at motor fibers. The actual point of electrode tips was also captured in navigation system and compared to the tractography on navigation image.

Results: This technique enabled the detection of the pyramidal tract adjacent to glioma. There were discrepancies between positional data of tractography integrated into neuronavigator and actual neurophysiological localization of pyramidal tracts. The shift distances were form 0mm to 10mm. No regularity was recognized in the shift distance and shift direction. Postoperative MRIs revealed that the tumors were resected close to the primary motor cortices and pyramidal tracts. None of the patients presented postoperative neurological deterioration.

Conclusions: Information of tractography in neuronavigation system should be used with great caution when resection is done close to pyramidal tract to avoid unexpected postoperative neurological deterioration. Discrepancy of tractography and direct subcortical mapping may be caused by the intraoperative brain shift and/or by the inaccuracy of motor tract bundle size drawn by DTI software. The combination of two modalities is easy usefull technique in the glioma surgery in eloquent brains to preserve motor function.

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Facial tremor treated with thalamic Vim deep brain stimulation

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[Background] Involuntary movements in the face are usually either facial spasm or blepharospasm, and tremor is rare. We experienced a case of bilateral facial tremor successfully treated with thalamic Vim. deep brain stimulation (DBS).

[Case] A 64-year-old-woman, who had noticed tremor in her upper limbs 10 years previously, was presented with a chief complaint of involuntary movements in the face for last 2 years. She had no familial history of movement disorders. She had been treated with various medications without any effects. On examination, her upper limb tremor was compatible with essential tremor. However, she had symmetrical facial tremor that did not appear when lying down or during conversation. The tremor was not observed in her head, trunk, neck, tongue, or throat, and her speech was normal. The facial tremor was symmetric, regular and was not observed in the masticatory muscles. The symptom was clearly distinct from hemifacial spasm, Meige syndrome or dyskinesia. We considered it as a variant of essential tremor. We finally performed bilateral Vim. DBS targeting slightly more medial regions than for upper limb tremor. After the operation, the tremor both of the upper limbs and the face was controlled.

[Discussion and Conclusion] Head tremor is occasionally seen in essential tremor, but facial tremor is very unusual. Thalamic Vim. DBS is a well-established treatment for limb tremor, but its effect on facial symptoms has been scarcely documented. This is the first report of facial tremor treated successfully with bilateral Vim. DBS.

Chronic subthalamic stimulation decreased beta band power on electroencephalography in Parkinson's disease

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Objective: Deep brain stimulation provides improvement of motor fluctuation and severe dyskinesia in advanced Parkinson's disease. Stimulation of deep brain structure may influence oscillation of in the cortical electroencephalography (EEG). However, electrical artifacts from implantable pulse generator (IPG) make it difficult to performed EEG. We evaluated the effects of beep brain stimulation to EEG with reducing artifact from IPG.

Method: We evaluated consecutive 10 patients (4 men and 6 women) with Parkinson's disease who underwent bilateral subthalamic deep brain stimulation. The disease duration was 5-20 years (mean 12.1 years). The disease status was followings: UPDRS Part I 3.1; Part II (on/off) 9.5/24.1; Part III (on/off) 21.3/51.5; Part IV 8.1. L-dopa equivalent dose (LED) was 974.1 (525-1250) mg. Scalp EEG was recorded at 3-6 weeks after implantation of the intracranial electrodes. After artifact rejection, the total length of EEG records was 30 s for each setting. Spectral analysis was performed and we detected the artifact from implantable pulse generator (IPG) in preliminary study and deleted band power generated from IPG. Each band power was defined as the ratio to total band power. Following factors effecting to EEG were analyzed: Channel (1-16); stimulation; age; gender; disease duration; preoperative LED; dopa-response.

Results: Stimulation-on reduced alpha activity and increased theta activity. Aged patients and patients with long disease duration had reduced beta and alpha activity and increased theta activity. High pre-surgical LED reduced theta activity and increased beta and alpha activity.

Conclusion: Subthalamic stimulation affects EEG band power in relatively early postoperative state of Parkinson's disease who underwent surgery for subthalamic deep brain stimulation. Age, disease duration, preoperative LED also affected EEG band power.

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Management of bone-invasive, hyperostotic sphenoid ridge en-plaque meningioma

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Objective:

The hyperostosis occasionally associated with sphenoid ridge en-plaque meningioma. In past 11 years period, we had 5 patients with meningioma en plaque in the sphenoid ridge with extensive bone invasion. Based on our experience , we discuss its clinical characteristics and surgical issues.

Materials and Methods:

The author reviewed the records of 60 patients with parasellar meningiomas who underwent surgery by the senior author between 1998 and 2009. Sixteen patients of all 60 had involvement of the sphenoid ridge, and 5 of them had the distinguishing characteristics of extensive bone invasion and en-plaque dural involvement.

Results:

All 5 patients were female, with ranging age between 48 to 61 years (mean 52.6 years), and underwent surgery via frontotemporal approach with zygomatic osteotomy. Grossly total removal was achieved in 4 cases. The cavernous sinus involvement was seen in only one case. Preoperative embolization of the feeding arteries was done in two cases. Radical resection was followed by bone and dural reconstruction using various materials to obtain good cosmetic results. Visual acuity improved in two of 3 cases postoperatively. No deaths and serious complications occurred in association with surgery. Reconstruction was followed by tumor resection using titanium mesh or ceramic. If the bone defect may extend to the convexity part, it is necessary to estimate the resection area and prepare order made ceramic bone to obtain good cosmetic result. Because meningioma invading in en-plaque fashion, often infiltrate to the arachnoid membrane and pia mater, microsurgical technique is mandatory to tumor dissection from the brain structures.

Conclusion:

Good surgical result requires extensive bone drilling of the invaded bone, excision of the involved dura and microsurgical technique. Planning of cranioplasty is also important for satisfied cosmetic outcome.

Extended endoscopic endonasal transsphenoidal resection for clival chordoma

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We report a our case of clival chordoma removed successfully with extended endoscopic endonasal transsphenoidal approach.

A 66-year-old woman,complained of right abducens nerve palsy.Magnetic resonance imaging (MRI) showed a clival mass lesion extending to pituitary fossa and left cavernous sinus. Brain stem was compressed by the tumor. Based on the radiological finding, preoperative diagnosis was clival chrdoma. This patient underwent extepanded endoscopic endonasal surgery. During the operation, left pterygopalaine fossa was opened to improve the visualization for laterally extending tumor. The Pathological diagnosis was chordoma. Proton beam irradiation is planed for the residural tumor.

Generally, Microscopic endonasal transsphenoidal approach is indicated for centrally located clival chordoma. But this approach is not suitable for laterally extending tumors due to narrow operative corridor. Endoscopic endonasal transsphenoidal approach with opening of pterygopalatine fossa could overcome this problem.

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Radiation-induced glioma 2 decades after the initial radiotherapy for the childhood brain tumors: three case reports

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Radiation therapy has contributed to the improvement of outcome for most childhood malignant CNS tumor since 1980s, despite of the late-occurring adverse consequences, including impaired cognitive function, cerebrovascular disease and subsequent primary neoplasm. However, we report three long survivors of childhood brain tumors whom radiation-induced subsequent primary glioma was occurred 2 decades after the initial radiotherapy.

The first patient received 50 Gy whole brain irradiation and 30 Gy whole spine irradiation for mixed germ cell tumor at the age of 7, and suffered pontine high-grade glioma 25 years after the initial treatment. The second patient, who had been diagnosed as medulloblastoma at 15 and treated with radiation therapy, developed multiple oligodendrogliomas 28 years later. The third patient, 25-year-old woman, developed anaplastic astrocytoma in her right frontal lobe 19 years after 40Gy in whole brain, 56 Gy in local and 25.5 Gy in spine for choriocarcinoma. All three gliomas were progressed despite of the administration of temozolomide.

Carbon-11-methionine uptake was shown in all tumors, and MET-PET could be essential for the pre-operative diagnosis as neoplasm and the location of the tissue sampling. In The Childhood Cancer Survivor Study (CCSS), exposure to radiation therapy is the most important risk of a new CNS tumor in survivors, the median time to the occurrence is 9 years, and only 10% are diagnosed after 15 years. However, all three patients in our report spend approximately 20 years of normal life. We could see more long-survivors developing subsequent glioma in the advancements of the treatment for childhood CNS tumors not far in the future

Surgery of A Central Neurocytoma: Tips for Total Removal and Avoidance of Complications

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Central neurocytoma (CN) accounts for approximately 10% of intraventricular neoplasms. The most important therapeutic modality for CN is surgery. Safe and maximum resection confers the best long-term outcome. Based on our experience, we formulated tips for total removal and avoidance of complications in surgery for CN.

I will present surgical video of a case with a typical central neurocytoma.

Tips for Total Removal

Preoperatively operators should grasp anatomy and relationship between tumor and other surrounding structures including fornix, foramen of Monro, and septum pellucidum.

Surgical corridor should be decided by imagining the shape of ventricles both in dilated (before removal) and shrunken state (at the latter half of tumor removal). With removal of the tumor, dilated lateral ventricle shrinks; thalamus protrudes and obstructs the vision to the residual tumor. For typical CN, cortical incision should be placed in frontal pole just lateral to sulci and passing through the superior wall of the anterior horn. As tumor is fragile, easy to bleed and consequently hard to be controlled, dissection should precede removal of the tumor. Bloodless operation field provides correct orientation.

Avoidance of Complications

Careful dissection should be done not to injure vessels in the ventricles. Confirm hemostasis very carefully and sedation should be continued until the next morning to prevent postoperative ventricular hemorrhage. Install ventricular drainage to keep a watch on postoperative ventricular hemorrhage or unexpected hydrocephalus. Ventricular drainage is essential unless the lateral ventricle is communicating.

Urinary 8-OHdG level in a rat model of Parkinson's disease in relation to behavioral and immunohistochemical analysis

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Objective: Parkinson's disease (PD) is a progressive degenerative disorder of the central nervous system that manifests clinically after the pathological changes of dopaminergic neurons have deteriorated into an advanced stage. Increased oxidative stress contributes to pathogenesis of PD. 8-hydroxy-2'-deoxyguanosine (8-OHdG), is the oxidation product most frequently measured as an indicator of oxidative DNA damage. Several studies have shown increased 8-OHdG in PD patients. There are few basic laboratory data examining 8-OHdG levels in animal models of PD. This study was designed to help to clarify the status of underlying pathology in PD and whether 8-OHdG correlates with the disease progression.

Materials and Methods: In this study, we utilized hemiparkinsonian model of rats induced by intrastriatal injection of 6-hydroxydopamine (6-OHDA). The urinary 8-OHdG level was measured in relation to behavioral analyses and pathological changes of nigrostriatal dopaminergic neurons. All rats were evaluated behaviorally using elevated body swing test (EBST), cylinder test, rotarod test and amphetamine induced rotation test for 42 days. Every 7 days we collected urine samples with subsequent measurement of 8-OHdG level using ELISA kits. For immunohistochemical evaluation, tyrosine hydroxylase (TH) staining of the nigrostriatal dopaminergic pathway was performed.

Results: Significant increments in urinary 8-OHdG level were observed continuously until day 35 compared to control group, which reached the peak at day 14. Such elevated urinary 8-OHdG level significantly correlated with all of the behavioral deficits, suggesting that urinary 8-OHdG level provides a good index of severity of parkinsonism. Urinary 8-OHdG level also had a significant positive correlation with the survival rate of dopaminergic fibers or neurons, advancing the concept that oxidative stress during the early phase of 6-OHDA neurotoxicity may correspond to disease progression closely approximating neuronal degeneration in the nigrostriatal dopaminergic system.

Conclusion: The present results demonstrate that alterations in urinary 8-OHdG level closely approximate onset and disease progression in PD. Examination of urinary 8-OHdG stands as a useful biomarker for early diagnosis, as well as therapeutic monitoring of PD.

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Role of apoptosis in early brain injury after subarachnoid hemorrhage

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Objects: The major causes of death and disability in subarachnoid hemorrhage (SAH) may be early brain injury (EBI) and cerebral vasospasm (CV) after SAH. Although CV has been studied and treated by a lot of drugs, outcome is not improved even if CV is reversed. Based on these data, EBI is considered as a primary target for future research and apoptosis may be involved in EBI after experimental SAH.

Methods: We reviewed the published literatures written about the relationship between SAH induced EBI and apoptosis in the PubMed. Also, we studied EBI-induced apoptosis using sodium orthovanadate which has an anti-apoptotic effect.

Result; Most available information can be obtained from the endovascular filament perforation animal model. After onset of SAH, intracranial pressure is increased and then cerebral blood flow is reduced. Many factors including global ischemia, acute vasospasm, and subarachnoid-blood toxicity are involved in the mechanism of apoptotic cell death in EBI after SAH. Some antiapoptotic drugs were studied and demonstrated the protective effect against EBI after SAH. Moreover, we demonstrated that sodium orthovanadate reduced brain edema and neurological deficit after SAH via caspase-dependent pathway.

Conclusions: Apoptosis in EBI after SAH has been little studied and further studies will provide us more beneficial findings.

The effects of temozolomide administered by convection-enhanced delivery in the rat brainstem GBM allograft modelJunichi Yoshimura¹⁾, Siu IMei²⁾, Thomale Ulrich³⁾, Jallo George²⁾

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Objective: Diffuse pontine gliomas have been regarded as inoperable. The treatment is limited to radiotherapy or chemotherapy and the prognosis is dismal. Thus, it seems essential to develop new therapeutic options. We report our initial experience of temozolomide (TMZ) administration into brainstem by convection-enhanced delivery (CED) using the guiding screw technique in a rat brainstem glioblastoma (GBM) allograft model. **Materials and Methods:** A total of forty-eight Fischer 344 female rats were

used. In a feasibility study various doses of CED-TMZ (1-10 mg) were administered into the brainstem using AlzetTM pumps in order to evaluate survival rates and neurotoxicity. For tumor implantation rats received an injection of 105 9L gliosarcoma cells. For local therapy, five days after inoculation, a total amount of 1 mg of TMZ or saline was administered into brainstem at 1 μ l/hr over 7 days (n=8/group). For systemic therapy, rats were treated with a orally administered maximum daily dose of 50mg/kg TMZ for 5 consecutive days. Time of survival as well as neurological deficit was recorded as outcome parameters.

Results: In the neurotoxicity study, low dose TMZ (1mg) was feasible to be administered into brainstem over 7 days without neurological deficit. Using high dose TMZ (5-10mg), marked neurotoxic effect was observed. In the brainstem tumor study, survival was significantly prolonged in low dose CED-TMZ group compared to control rats (median survival 23.5 versus 29.5 days; p-value less than 0.01). Systemic therapy with maximal oral-TMZ dose resulted in longer survival time compared to low dose CED-TMZ group (median survival 33.5 versus 29.5 days; p-value less than 0.01).

Conclusions: CED-TMZ is feasible and effective against rat brainstem GBM allograft. However, we could not show superior potential of CED-TMZ compared to oral-TMZ administration. Modification of TMZ infusion for wider distribution or combination of systemic therapy with local treatment warrants future investigations for convection-enhanced delivery into brainstem.

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Macrophages Promote Axon Regeneration with Concurrent Neurotoxicity

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Activated macrophages can promote regeneration of CNS axons. However, macrophages also release factors that kill neurons. These opposing functions are likely induced simultaneously but are rarely considered together in the same experimental preparation. A goal of this study was to unequivocally document the concurrent neurotoxic and neuroregenerative potential of activated macrophages. To do so, we quantified the length and magnitude of axon growth from enhanced green fluorescent protein-expressing dorsal root ganglion (DRG) neurons transplanted into the spinal cord in relationship to discrete foci of activated macrophages. Macrophages were activated via intraspinal injections of zymosan, a potent inflammatory stimulus known to increase axon growth and cause neurotoxicity. Using this approach, a significant increase in axon growth up to macrophage foci was evident. Within and adjacent to macrophages, DRG and spinal cord axons were destroyed. Macrophage toxicity became more evident when zymosan was injected closer to DRG soma. Under these conditions, DRG neurons were killed or their ability to extend axons was dramatically impaired. The concurrent induction of proregenerative and neurotoxic functions in zymosan-activated macrophages (ZAMs) was confirmed *in vitro* using DRG and cortical neurons. Importantly, the ability of ZAMs to stimulate axon growth was transient; prolonged exposure to factors produced by ZAMs enhanced cell death and impaired axon growth in surviving neurons. These data show that a single mode of activation endows macrophages with the ability to simultaneously promote axon regeneration and cell killing.

Clinical fellowship in USA: Comparison with the Japanese Neurosurgical Training

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I have worked as a clinical fellow in Department of Neurological Surgery, Mayo Clinic, Rochester MN from July 2003 to June 2005. At that time, the department had 10 staff neurosurgeons and 15 trainees (Residents). Number of surgical cases treated in the department was as high as 3,400 cases per year. Personally, I had great opportunity to train myself with more than 600 surgical cases in 2 years.

During my fellowship in Mayo Clinic, I had figured various differences between the neurosurgical practice and training in Japan and USA. What I thought most significant was a role of neurosurgeons. In Japan, a neurosurgeons tend to take full responsibility of the care of one patient including diagnoses, surgical treatments, postoperative adjuvant therapies, and follow-ups in out patient clinics. In USA, I had impression that the roles were divided and taken care of a group of doctors from several departments. This difference has made it possible for neurosurgical trainees in USA to spend more time in operation rooms and experience high amount of surgical cases during their residency programs, when compared to those in Japanese training system. I would like to discuss pros and cons of the residency programs in USA and Japan.

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Penetrated ocular injury through the optic canal: case report

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We report a case of penetrated ocular injury via the optic canal.

A three-year-old girl ran into the window while playing. She fell down on the floor through the window and hit her face on the scattered glass. She came to our hospital, however, there was only a small excoriation on the left lower eyelid at a glance. Since the patient vomited, a CT scan was performed. It revealed a piece of glass penetrated through the eyeball, then break and went toward the intracranial region through the optic canal.

We removed the glass with the ophthalmologists. First, we approached to the tip of the glass by left fronto-temporal craniotomy. We pushed out the glass, and the ophthalmologist removed the eyeball, then pulled out the glass. However, some pieces of the glass remained. Then we cut off the optic nerve, drilled out a part of the optic canal, finally pulled out the remnant wedge-shaped glass. Postoperative course was uneventful, and the patient discharged with ocular prosthetic.

We will discuss the management of intracranial foreign body by presenting our operative procedure.

Binostril endoscopic transsphenoidal surgery for pituitary tumors

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Objective: To evaluate of efficacy of binostril bimanual endoscopic transsphenoidal surgery for pituitary tumors.

Material and Method: Seventeen patients underwent binostril bimanual endoscopic transsphenoidal surgery which is done by four-hands. We used a high-definition endoscope with irrigation device (Endoscrub). The middle turbinate was completely preserved in all patients except for cases treated with extended transsphenoidal approach.

Results: In all cases, extent of tumor removal was acceptable and no complication occurred. The advantages of this technique compared with endoscope assisted microsurgery are better manipulation of instrument due to absence of a nasal speculum and flexible movement and focusing of endoscope. Using a high-definition endoscope, visualization is excellent and quality of image is not inferior to a microscope. The invasiveness of these two operations is equal and the postoperative care of the nasal cavity by a ENT surgeon improves comfortableness of patients.

Conclusion: Binostril bimanual endoscopic transsphenoidal surgery is an excellent method for the treatment of pituitary tumors.

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The development of new imaging modality visualizing microstructural tissue compression

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The effectiveness of bevacizumab and irinotecan treatment for children with progressive diffuse pontine gliomas

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Objective

To assess the effectiveness of bevacizumab (BV) and irinotecan (CPT-11) treatment for children with pontine gliomas showing progression after temozolomide (TMZ) and radiation treatment.

Methods

Pediatric pontine glioma patients who clinically progress after concomitant TMZ and radiation treatment followed by maintenance TMZ were recruited. After permission of the internal review board and obtaining informed consent, patients received 8mg/kg infusions of BV and 100mg/m² infusions of CPT-11 biweekly, in addition to the monthly oral TMZ treatment. Clinical symptoms as well as radiological and laboratory data were assessed.

Results

2 patients (9-year-old girl and 5-year-old girl) were enrolled. Both patients tolerated the treatment well, and showed improvement of clinical symptoms and a marked decrease of abnormal signal intensity and enhancement on MR images. Time to progression of symptoms was 2 months and 4 months; overall survival from initiation of BV/CPT-11 was 3.5 months and 6 months, respectively. Hypertension and epilepsy was noted in 1 patient. Her MR scans showed characteristics similar to posterior reversible encephalopathy syndrome.

Conclusion

Clinical and radiological improvement was observed by BV/CPT-11 treatment for pediatric pontine glioma patient who progressed after TMZ therapy. Adverse effects can be severe, and careful monitoring is vital.

Premenstrual psychophysiological symptoms and autonomic nervous system activityTamaki Matsumoto¹⁾, Hiroyuki Asakura²⁾, Tatsuya Hayashi³⁾

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Regular menstrual cycles reflect normalcy of the standard female reproductive health system. A majority of women from all cultures and socioeconomic levels, however, experience a wide variety of cyclic and recurrent physical, emotional, and behavioral symptoms occurring during the late luteal phase of the menstrual cycle and abating shortly following the beginning of menstruation. The symptoms can alter well-being and even affect family, friends, and working relationships. After more than half a century of examining the subject, research has not yet demystified this enigmatic condition, commonly known as premenstrual syndrome (PMS) or in the case of more severe PMS, premenstrual dysphoric disorder. Despite inconclusive etiopathogenesis, altered function or even slight disorder of the autonomic nervous system, which plays a vital role in reflecting mind-body interaction and in maintaining homeostasis in the human internal environment, could induce physical and mental changes leading to complaints and ultimately undermining a woman's overall health. We have measured heart-rate variability and salivary chromogranin A as reliable, non-invasive electrophysiological and biochemical indexes of sympatho-vagal activity in women from 20 to 40 years of age with different degrees of PMS during the menstrual cycle. This presentation will discuss the extent to which and the manner in which the menstrual cyclicality of autonomic nervous system activity is associated with PMS. It will also cover the following topics affecting susceptibility to PMS: vulnerability to stress, personality traits, social-environmental stimuli, and cultural backgrounds as possible agents, as well as the potential interrelationship between autonomic nervous system activity and the complex web of bio-psycho-social factors relating to PMS.

Antioxidant properties of 4-hydroxy-2,2,6,6-tetramethylpiperidine-N-oxyl(TPL) and 2-arachidonoyl glycerol(2-AG)

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Traumatic brain injury (TBI) is one of the leading causes of death in trauma patients in Operating Enduring Freedom and Iraqi Freedom (OEF/OIF). It is important to know the mechanism(s) of injury and possible treatment(s) of TBI.

Reactive oxygen species (ROS) have been involved in pathophysiology of various disease processes (ie, TBI and ischemia). Tempo: 4-hydroxy-2,2,6,6,-tetramethylpiperidine-N-oxyl (TPL), a known antioxidant, was shown to reduce brain injury, blood brain barrier (BBB) permeability and edema. The endocannabinoid, 2-arachidonoyl glycerol (2-AG), a novel, potent vasodilatory and cytoprotective agent, has also been implicated to act as an antioxidant.

This study examined 2-AG modulation of tissue injury, edema and BBB permeability changes induced by TBI. We also compared the effects of 2-AG and TPL on ROS- induced (by exogenous H₂O₂) changes in Ca²⁺- uptake and cytoskeleton of human brain microvascular endothelial cells (HBMECs).

In vivo, 2-AG treatment reduced brain tissue injury, brain edema and changes in BBB permeability. Studies in vitro showed that 2-AG or TPL treatment decreased H₂O₂-stimulated Ca²⁺ mobilization and cytoskeleton (Vimentin) rearrangement on HBMECs.

These results strongly suggest that 2-AG has antioxidant properties similar to that observed with TPL. In addition , these findings are in agreement with the reported involvement of ROS in the pathomechanism of TBI induced tissue injury, brain edema and alterations in BBB permeability.

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Aesthetic Cranioplasty

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An abnormal appearance of the forehead “contributes” greatly to a popular misconception that the patient may have cognitive impairment, even if they are normal. Treatment for the forehead lesion is important to protect these patients from the unfair prejudice. Ever since we have introduced Catcher’s mask cranioplasty in 2008, we have been focusing on the aesthetic contribution to the patients who had received neurosurgical intervention with postoperative infectious trouble. In this presentation, we demonstrate the modern application of vascularized-calvarial graft for the better aesthetic result in the forehead reconstruction.

Method of changing a catheter of PEG and usefulness of a battery type endoscope

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【Purpose】

Percutaneous Endoscopic Gastrostomy (PEG) is useful for not only enteral nutrition but early rehabilitation of oral intake. We have done PEG and rehabilitation consistently, and also change a catheter after discharge from our hospital. There are 4 methods of changing a PEG catheter. I report each technique and investigate the usefulness of a battery type endoscope.

【Method】

The first method of changing a PEG catheter is that colored water with indigo carmine is inserted before removing a catheter and recognizing indigo blue after inserting a new catheter. The second method is to recognize contrast medium in the stomach after changing a catheter by fluorography or simple X-ray. The third method is to change a catheter by using an oral endoscope. The fourth method is to change a catheter by using a battery type endoscope as a guiding introducer. We compared merit, demerit and time for each method.

【Results】

We performed changing a catheter for 156 patients. There was no major complication regarding the patient's body. Merit of the first method is that we could change by bed side with almost no invasion. But we could not get an image of a catheter in the stomach. The average time for a change was 10 min. By the second method, we could make an exact image, but a patient had little invasion of moving to an X-ray room, accepting contrast medium, and having X-ray exposure. The average time was about 30 min. The third method is most reliable for confirmation of a catheter, but most invasive. The fourth method is less invasive than the third method. We could change a catheter by bed side and use an endoscope as a guiding introducer, and get an image of inside the stomach. The cost of a battery type endoscope is cheaper than an oral type endoscope. The average time was 10 min.

【Conclusion】

For confirmation of a catheter, we should choose X-ray method or oral endoscopic changing. But most patients of bed ridden are difficult to move to an examination room. Especially a patient in a nursing home or their own home, indigo method or a battery type endoscope is useful. We need an imaging diagnosis for getting a medical fee, so a battery type is expected to be spread both in the hospital care and the home nursing care.

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Transient Splenium Lesion in Postpartum Woman

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Transient lesion in the splenium of the corpus callosum is rarely encountered phenomenon but has gradually appeared in the literature. The lesion was mainly reported in patient with epilepsy with/without antiepileptic drug treatment or as post-viral infection finding. The authors detected a lesion in a postpartum woman, which has not been reported before to our best knowledge.

A 32-year-old postpartum woman had a few days history of headache. Magnetic resonance (MR) image revealed a limited lesion at splenium of corpus callosum. Even though the MR images looked similar to a transient lesion in the splenium of the corpus callosum in the patients such as epilepsy with/without antiepileptic drug treatment or postviral infection, the patient had no such medical history. In addition to that, the inter- and postpartum period of the patient was uneventful. The lesion almost disappeared naturally in a month on MR images and the headache improved without any treatment.

Although the phenomenon may have some relation to the pregnancy or the delivery, the etiology was unknown.

The authors present this characteristic clinical course and the images with some review of the literature. The authors think that neurosurgeons should be familiar to this characteristic MR image, otherwise the patient would have further useless investigation.

When neurologists ask us to take brain tissue

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Object. Diagnosis of neurological disorders is made in this decade not only by neurological examination but various interventions between molecular analysis and radiological imaging. The significance of microscopic pathology accordingly has been changed these days. In this study, five cases of neurological disorder, which neurologists referred to us recently for brain biopsy, were reviewed.

Clinical Materials. Cerebrospinal fluid has been studied in all of five cases and steroid therapy was used in Case 1-3. Definitive diagnosis could not be made by neurologists and open biopsy was performed with possible diagnosis of neoplasma. Case 1: 49 year-old man with intractable seizure for four years showed non-enhanced progressive lesion in right frontal lobe. Case 2: 62 year-old man with a long-lasting hypesthesia for two year showed intramedullary lesion from T4 to T10 in spinal cord. Steroid pulse therapy temporary improved symptom but radiological study showed growth of the lesion. Case 3: 72 year-old man with mild headache was found to have marked papilloedema. MR image showed high signal lesion in the right occipital cortex. Case 4: 57 year-old woman with progressive deterioration of her right visual function was found to have a round mass surrounding the right optic nerve. Case 5: 70 year-old man with a rapid progression of cognitive function associated with gait disturbance showed slightly high density and non-enhanced lesion in the right frontal cortex.

Results. Enough volume of tissue sample was obtained in each case. Pathological findings and final diagnosis were as follows: perivascular inflammation, cortical artery arteritis (Case 1), inflammatory process, chronic myelitis of unknown etiology (Case2), mild gliosis, suspected chronic stage of unknown infection (Case 3), lympho- proliferative lesion, IgG4-related granulation (Case 4), necrosis surrounded by reactive gliosis, subacute stage of brain infarction (Case 5).

Discussion. In Case 1, 2 and 3, the obtained samples were probably affected by previous treatment by neurologists. Case 4 was diagnosed three years later when neck lymph node was also pathologically examined. In Case 5, the first hospital visit was delayed and sudden onset of the symptom was neglected. The main aim of neurologists on brain biopsy is thought to rule out the possibility of tumor. For the diagnosis of neurological disorders, biopsy should be done in active phase of disease and in most affected lesion of disease, that is hardly achievable. Biopsy procedure itself is not high risk but considered surgical planning should be made for the most profitable biopsy.