Spinal cord and root disorders; Peripheral nerve disorders

EP2262
Correlation of electromyography and magnetic resonance imaging findings in the diagnosis of radiculopathy
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Introduction: Electromyography (EMG) and magnetic resonance imaging (MRI) are the main diagnostic tools in radiculopathy. The aim of the study was to classify and correlate MRI and EMG findings in diagnosis of suspicious cervical or lumbosacral radiculopathy.

Study design: Retrospective.

Methods: We reviewed 346 patients, with complaints of numbness and pain in the neck and back for at least eight weeks, referred from neurology and neurosurgery outpatient clinics to our neurophysiology lab between 2011 June - 2013 May. Patients with diabetes mellitus, previous disc or spine operation, polyneuropathy and spinal cord diseases as tumor, infection or syrinx were excluded. Patients who were investigated with both neuroimaging and neurophysiological studies, in those who had normal nerve conduction results and had no motor deficits were included. MRI findings were classified in four groups as degenerative abnormalities, bulging disc, protrusion and nerve root compression. EMG findings were classified also in four groups as denervation, re-innervation, chronic neurogenic changes and normal. Root compression disclosed by MRI and abnormal EMG results were considered as positive findings for radiculopathy.

Results: We studied 66 patients. Mean age was 52.15±12.07. Total of 37 (56.1%) were female, 29 (43.9%) were male and 43% was cervical, 57% was lumbosacral radiculopathy. We determined 27.27% MRI positive and 16.69% EMG negative results. Positive predictive value is higher for MRI (94.44% versus 32.08%) and negative predictive value is higher for EMG (92.31% versus 25%).

Conclusions: In the present study EMG is more sensitive than MRI, but MRI is more specific than EMG.

Disclosure: Nothing to disclose

EP2263
Prevalence and imaging characteristics of asymptomatic and symptomatic spondylotic cervical spinal cord compression
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Introduction: Magnetic resonance imaging (MRI) is able to detect spondylotic cervical cord compression that could cause cervical spondylotic myelopathy (CSM) but could also remain asymptomatic (“asymptomatic spondylotic cervical cord compression” - ASCCC). Diffusion tensor imaging (DTI) parameters was shown to differentiate between CSM and ASCCC. The aim was to estimate the prevalence and MR parameters of both ASCCC and CSM in a general population above the age of forty.

Methods: 89 randomly chosen healthy volunteers, recruited irrespective of the presence of signs of CSM, 50 women and 39 men, aged 65 (median), 40-80 (range) years participated in the study. All underwent MRI examination on a 1.5 T device using standard images and diffusion tensor imaging (DTI) at the C5/6 level or at a level of maximum compression and at C2/3 as a reference. Subject with MRI signs of cervical cord compression were subsequently examined clinically.

Results: MRI signs of cervical cord compression were found in 50 individuals (56.2%). Focal impingement was present in 9 cases (10.1%), and wide compression in 41 subjects (46.1%). The T2 hyperintensity was present in 2 subjects. DTI parameters showed no significant difference between subgroups with and without signs of compression. Clinical signs of symptomatic CSM were found in 2 cases (2.2%).

Conclusions: Prevalence of spondylotic cervical cord compression in the 5th-8th decades is higher than previously reported. Most compressions are asymptomatic and are not associated with hyperintensities and significant changes in DTI parameters. The predictive significance of different types of compression remains to be established.

Disclosure: Nothing to disclose
Non-traumatic spinal cord disorders at the Neuro-ICU 2001-2013: aetiology, reasons for admission and mortality

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Introduction: Most recent studies indicate that non-traumatic spinal cord disorders have surpassed the number of traumatic spinal cord injuries. Their causes and outcomes are variable, and there is limited knowledge on acute clinical worsening and requirement for neurocritical care. Here, we aimed to study the relative frequencies of aetiologies, reasons for admission and mortality at the Neuro-ICU.

Methods: A retrospective chart review of patients admitted to the Neuro-ICU during a twelve-year period at a tertiary care centre. Definitions for aetiologies of non-traumatic spinal cord disorders were taken from New and Marshall (Spinal Cord, 2013).

Results: We identified 73 patients (51% female), mean age was 62.2 y (22-90).

The most frequent aetiologies were infection (28.7%), inflammatory/autoimmune disorders (17.8%), motor neuron disease (16.4%), vascular disorders (16.4%), followed by neoplastic (8.2%), vertebral column degenerative (6.8%) and genetic disorders (5.5%).

The most common reasons for Neuro-ICU admission were paresis (41.1%), respiratory distress (27.4%) and decreased level of consciousness (12.3%), followed by sepsis/multiple organ failure (11.0%), pain (5.5%) and seizures (2.7%).

The overall mortality rate was 23%, no gender differences were found. The top three underlying etiologies were motor neuron disease (29.4%), vascular disorders (23.5%) and infections (17.6%).

Conclusions: Neuro-ICU admission for non-traumatic spinal cord disorders is characterized by a broad range of aetiologies and reasons for deterioration. Many patients are in critical conditions, as reflected by the high fatality rate. Further studies are needed to broaden the knowledge of neurocritical care and predictors of unfavourable outcome.

Disclosure: Nothing to disclose

Medical conditions and outcomes after traumatic spinal cord injury in Estonia

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Objective: To evaluate health conditions and outcomes in the chronic phase of traumatic spinal cord injury (TSCI) in Estonia.

Design: Prospective, population-based study.

Patients and methods: 103 patients with TSCI filled a follow-up questionnaire and the subjects were also individually interviewed and clinically evaluated. The patients assessed their own quality of life using the International Spinal Cord Injury Quality of Life Basic Data Set.

Results: There were 90 men and 13 women (mean age 36.6±12.8 years). The mean time since TSCI was 1,800±1,414 days (min 370, max 5,475 days). The majority of individuals reported themselves satisfied with their psychological condition (7.1±2.5), but were less contented with their physical health (5.8±2.2) or life in general (6.4±2.0) (p<0.001). The most frequently reported problems were spasticity (51%), pain (42%) and bladder problems (42%). Pain was more frequent among patients with lower (thoracic or lumbar) and incomplete TSCI (p=0.03), whereas spasticity was dominated as a problem among patients with cervical trauma (p<0.001). 52% of patients reported neuropathic or musculoskeletal pain after TSCI compared to 14% before the trauma (p<0.001). The intensity of pain (Visual Analogue Scale) was negatively correlated with the self-rating of physical health (p=0.005).

Conclusion: Patients with TSCI report that their psychological health is good. Pain and spasticity are the most often mentioned problems that need to be dealt with in order to improve their life in general.

Disclosure: Nothing to disclose
EP2266

Modulation of cortical activity in patients with chronic spinal cord injury treated by intrathecal baclofen: a pilot fMRI study

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Introduction: Spasticity is a disabling symptom of upper motor neuron syndrome in spinal cord injury (SCI) which can be solved in severe cases by intrathecal baclofen (ITB). The aim of this study was to assess brain activation after continuous ITB delivery during simple motor tasks evaluated by functional magnetic resonance imaging (fMRI).

Methods: Two subjects (27- and 35-years-old males) with chronic posttraumatic cervical spinal cord injury at C4-5 level were studied by 1.5T fMRI with three tasks employed: i) finger-tapping and mental movement simulating, ii) finger tapping and iii) foot flexion.

Tasks were performed before and 12 weeks after ITB pump implantation. Analysis was processed in SPM8 using the FWE corrected threshold (p<0.05). Spasticity was assessed by modified Ashworth scale (MAS).

Results: ITB treatment profoundly decreased limb spasticity in both subjects. Before-ITB pump implantation fMRI showed weak activations in all tasks. Post-ITB tasks extensively raised activation in the motor system network, namely the primary sensorimotor cortex and supplementary motor area.

Conclusions: Continuous ITB administration relieving spasticity in SCI patients was associated with increased activation of sensorimotor cortex. We suggest that ITB may cause distant functional reorganization of motor network at cortical level.

Disclosure: Nothing to disclose

[FMRI activation during finger-tapping task]
Figure shows comparison of fMRI activations in one subject prior (red) and after ITB treatment (green).

Conclusions: Continuous ITB administration relieving spasticity in SCI patients was associated with increased activation of sensorimotor cortex. We suggest that ITB may cause distant functional reorganization of motor network at cortical level.

Supported by grant IGA MZ: NT12282-5
Disclosure: Nothing to disclose

EP2267

Anti-TNF alpha-induced neuropathies

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Introduction: Our aim was to determine the type and frequency of peripheral neuropathy in patients with inflammatory disorders (ID) taking anti-TNF alpha agents.

Methods: We retrospectively ascertained neuropathy in a cohort of patients having in common ID, use of anti-TNF beta agents, and peripheral neuropathy (PN) between 2000 and 2012.

Results: We identified 10 patients among 19,500 EMG exams over 13 years corresponding to inclusion criteria; and systematically reviewed the clinical features, laboratory studies, electrophysiological findings, and histopathological changes. Among the patients, 6 were males, 4 had bowel ID and 6 arthritis. Five had a focal or multifocal peripheral neuropathy: one had erythromelalgia at the digits of her left hand; two had a non-compressive, inflammatory, radiculopathy; two had neuropathy with persistent conduction block (one localized proximally on the femoral nerve, the other at the peroneal head). Five patients developed a generalized, non length-dependent, neuropathy: two had a sensory variant of GBS; one a Lewis-Sumner syndrome; one a CIDP-like neuropathy; another a motor type of Guillain-Barré syndrome. All patients improved following discontinuation of anti-TNF alpha agents and introduction of immunomodulatory or immunosuppressant agents, except for the CIDP like neuropathy that eventually revealed a CMT neuropathy.

Conclusions: Our rare anti-TNF alpha-induced neuropathies were surprisingly heterogeneous in their clinical manifestations (onset, pattern, type) and were seen during initial or maintenance therapy periods. No true peripheral nerve toxicity (i.e., dependent on cumulative dose) was identified. Early recognition of these neuropathies has management (targeted immunotherapy) and prognostic (mostly favorable) implications.

Disclosure: Nothing to disclose
EP2268

Various manifestations of the peripheral nervous system after bariatric surgery

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Introduction: Sleeve gastrectomy is a safe and effective fast growing weight loss surgery option. Nevertheless complications are not rare.

Methods: To present five patients who developed sensorimotor symptoms after sleeve gastrectomy.

Results: Five patients were referred to the Neurological Department of Papageorgiou General Hospital, because of weakness, sensory symptoms and gait disorders a few (2-5) months after sleeve gastrectomy for morbid obesity. The first patient was diagnosed with axonal sensorimotor polyneuropathy due to thiamine and folic acid (FA) deficiency. The second patient presented with drop foot and numbness on the right leg. Neurophysiological assessment revealed ipsilateral peroneal neuropathy. The third patient developed gait disorder and bilateral drop foot due to axonal sensorimotor polyneuropathy with prominent bilateral peroneal neuropathy and FA deficiency. The fourth patient presented with marked difficulty in rising and walking due to proximal leg weakness. FA deficiency was revealed. The fifth patient developed disabling flaccid paraparesis ten days after a febrile diarrhoeic syndrome. Prominent clinical and neurophysiological deterioration occurred during the first days after hospitalisation despite full vitamin supplementation. Identical oligoclonal bands were present in serum and cerebrospinal fluid. High titer of Widal anti-S. parat.B-H antibodies and FA deficiency were found. Neurophysiological assessment was consistent with acute inflammatory axonal polyneuropathy and treatment with plasmapheresis was successful.

Conclusions: Sleeve gastrectomy can cause serious sensorimotor complications due to mononeuropathy or polyneuropathy, attributed to malabsorption of the B-complex vitamins. Although neurological manifestations are almost always complications of the bariatric surgery, they may also be attributed to comorbid conditions.

Disclosure: Nothing to disclose

EP2269

Spinal cord infarction with fibrocartilagenous embolism in Japan: a single-centre prospective study

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Introduction: Spinal cord infarction (SCI) is a rare vascular disorder that accounts for 1% of all strokes. Neither the etiology nor any definitive treatment for SCI has yet been established. Recent studies have shown vertebral diseases, such as fibrocartilagenous embolism (FCE), to be related to the pathogenesis of some cases of SCIs. However, SCIs with FCE have not yet been reported in Japan. Aim of this study is to clarify the prevalence and characteristics of FCE in Japan.

Methods: We prospectively recruited the patients with acute SCI from September 2010 to December 2013. Ischemia of the spinal cord was confirmed by diffusion weighted MRI, and myelitis cases of any etiology were excluded. The distribution of the ischemic lesions was classified using Novy’s method (2006). Mateen’s criteria (2011) were used to diagnose FCE without biopsy or necropsy. Functional severity was assessed using the American Spinal Injury Association Impairment Scale (AIS).

Results: In 2,047 patients with stroke admitted during the period, we identified ten cases with SCI. At baseline, five were AIS A or B, seven were wheel-chair-bound, and eight had dysuria. Three were diagnosed to have SCI with FCE. Ischemic lesions with FCE demonstrated either anterior or posterior spinal artery pattern. The disability levels were similar between FCE and non-FCE.

Conclusions: FCE was involved in more than 10% of SCI patients in Japan. Our next question is to identify optimal methods for treating both FCE and non-FCE to improve the outcome of SCI cases.

Disclosure: Nothing to disclose
EP2270

Non-tuberculous spondylodiscitis: etiology, diagnosis, risk factors and management

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Introduction: Spondylodiscitis is an infection of the intervertebral disc and the adjacent vertebral bodies. Spinal infections are uncommon. The diagnosis is often delayed due to the rarity of the disease.

Methods: We analysed retrospectively the clinical characteristics of patients with non-tuberculous spondylodiscitis who were admitted and treated in our clinic. The period of the study is three years.

Results: The clinical features of 21 patients were analysed. Mycobacterium tuberculosis was excluded as an etiological agent in all of them by specific tests. Fifteen (15) of patients with non-tuberculous spondylodiscitis were men (71.4%), all of our patients had back pain, 13 of them (61.9%) had fever on the onset of the disease. The inflammatory markers were increased in 18 patients (85.7%), anemia was demonstrated in 13 patients (61.9%), 11 patients were with diabetes mellitus (52.3%), 4 patients were with concomitant oncological disease (19%). Etiological factor was identified in 14 patients (66.7%). SAPHO(synovitis, acne, pustulosis, hyperostosis, osteitis) syndrome was diagnosed in one patient. Three patients were surgically treated. Intravenous application of antibiotics was administrated to the other 18 patients. The diagnosis was performed by MRT in all patients.

Conclusions: The main risk factors identified in our study is the concomitant diabetes mellitus. Staphylococcus aureus is the most frequent pathogen in non-tuberculous cases. The combination antibiotic therapy is highly effective.

Disclosure: Nothing to disclose

EP2271

Falls in independent ambulatory individuals with spinal cord injury who walked with and without a walking device

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Introduction: Patients with spinal cord injury (SCI) encounter sensorimotor impairments that reduce mobility that subsequently increases risk of falls. Some studies reported that using a walking device can reduce risk of fall whereas some study contrarily indicated that using a walking device increases a risk of fall. Thus, this study prospectively assessed incidence of falls over 6 months in ambulatory individuals with SCI who walked with and without a walking device.

Methods: 89 ambulatory subjects with SCI were interviewed and assessed for their baseline data and prospectively interviewed to gather fall data every week for 6 months using a fall questionnaire.

Results: Approximately, 39%-40% of device users and non-device users with SCI experienced falls during 6 months. Most of the falls occurred while walking within the house and its immediate surroundings. Subjects reported the lower limb muscle weakness, environmental hazards, slippery floor, and obstacle on the floor were major causes of falls. After falls, two subjects required medical attention due to patellar and sternum fractures.

Conclusions: The findings indicated that the incidence of falls in ambulatory individuals with SCI was approximately the same. However, the falls were likely occurred in the house and its immediate surroundings. Thus the improvement for functional ability in their own environments is crucial to minimize risk of falls.

Disclosure: The Improvement of Physical Performance and Quality of Life (IPQ) Research Group, Khon Kaen University, Thailand
EP2272
Walking devices in patients with spinal cord injury
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Introduction: There is a trend toward a decreased length of rehabilitation for patients with spinal cord injury (SCI). It is likely that the patients cannot achieve an optimal level of ability at the time of discharge, and this may increase the need of a walking device for daily activities.

Study design: A cross-sectional study.

Objectives: To explore types of walking device used in independent ambulatory patients with SCI.

Setting: A tertiary rehabilitation center and community hospitals, Thailand.

Methods: The data of 195 independent ambulatory patients with SCI were interviewed for customary walking device used.

Results: More than half of the subjects (64%) walked with a walking device in which most of them used a standard walker (45%), followed by a single-tip cane (11%) and bilateral crutches (8%), respectively.

Conclusion: More than half of ambulatory subjects with SCI needed a walking device, particularly a standard walker, for daily walking. However, the findings were derived from subjective information of the subjects. A further study that explores for functional ability relating to the requirement of a walking device may help to confirm the findings.

Disclosure: Nothing to disclose

EP2273
Functional assessments for predicting multiple falls in independent ambulatory patients with spinal cord injury
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Introduction: Fall is an important problem in patients with spinal cord injury (SCI). However, there is no evidence on the use of functional tests to predict risk of falls in these individuals. Thus this study compared ability of the Berg balance scale (BBS), Time up and go test (TUGT), 10-meter walk test (10MWT), Functional reach test (FRT), step test, and Five time sit to stand test (FTSST) to predict risk of multiple falls in patients with SCI.

Methods: Eighty-three independent ambulatory patients with SCI were evaluated for their functional abilities and monitored fall data prospectively for 6 months.

Results: After 6 months follow up, 23 subjects experienced multiple falls (range 2-11 times). Findings of the study indicated that the FRT was the best tool to predict multiple falls in patients with SCI (cutoff score =20 centimeters, 73% sensitivity, 55% specificity and area under the receiver characteristic curve =0.64).

Conclusions: The FRT was the best tool to predict risk of multiple falls in patients with SCI. However, the FRT had low specificity (55%), and subjects who could reach less than 20 centimeters still faced with a high risk of falls. Thus the FRT may be suitable as a screening tool to predict multiple falls and a comprehensive assessment to predict falls is still needed.

Disclosure: The Improvement of Physical Performance and Quality of Life (IPQ) Research Group, Khon Kaen University, Khon Kaen, Thailand
Neurological and neurosurgical treatment of adult patients with Chiari malformation

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Introduction: The best surgical tactics in Chiari malformation are not established yet. We follow up the group of patients which firstly were treated conservatively and after some period were operated on.

Methods: The results of supervision and surgical treatment of 93 patients with various kinds of Chiari malformation, which were operated in 2000-2013 in Institute of Neurosurgery were analyzed. Among 93 patients Chiari malformation 0 is marked at 5 patients, Chiari malformation I at 57, Chiari malformation I,5 - at 16, Chiari malformation II - at 13 patients, Chiari malformation III has not been marked, Chiari malformation IV is marked at 2 patients. For that period we consistently applied three different variants of surgical tactics depending on type of Chiari malformation.

Results: Control MRI was performed from 12 days until 9 years after operation. The average terms of supervision was 3,7 years, the longest period was 9 years. The follow up data was received at all 93 patients. After operation the neurological semiology has been in details appreciated, we used Chicago Chiari Outcome Scale (CCOS) for results evaluation. Improvement was achieved in 62 patients, unchanged were 25 patients and worsened 5 patients.

Conclusions: The choice of treatment in decompensate Chiary malformation patients is surgical treatment. For achievement of the best result, surgical treatment should be directed on: suboccipital decompression, restoration of cerebrospinal fluid outflow in craniocervical junction, increase volume of a posterior fossa.

Disclosure: Nothing to disclose