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CONTENT

DEAR READERS,
On behalf of Organizers and Scientific Committee we are happy to introduce a new suplement 8/2019 of Issue of Rehabilitation, Orthopaedics, Neurophysiology and Sport Promotion–IRONS. It is devoted to topics presented on 4th STUDENTS INTERNATIONAL CONFERENCE „FRONTIERS IN NEUROLOGY, NEUROPHYSIOLOGY AND NEUROPHARMACOLOGY" which was held on 25th of May in Poznań under the honorary patronage of Rector of Poznań University of Medical Sciences, Professor Andrzej Tykarski with participations of invited lecturers.

Among issues of neurology, neurophysiology, neurorehabilitation, neurosurgery, directly referred to the scope of IRONS, the readers may find abstracts of presentations related to topics regardings neuropharmacology and genetics, ophthalmology and neuroinformatics as well as nutrition problems.

We would like to thank Members of Student Scientific Society of Poznań University of Medical Sciences for their excellent help in organization of international scientific meeting.
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PLENARY SESSION I (IN ORDER OF PRESENTATION)

Early results of modern neurological rehabilitation of patients with ischemic stroke based on neurophysiological methods

Katarzyna Kaczmarek
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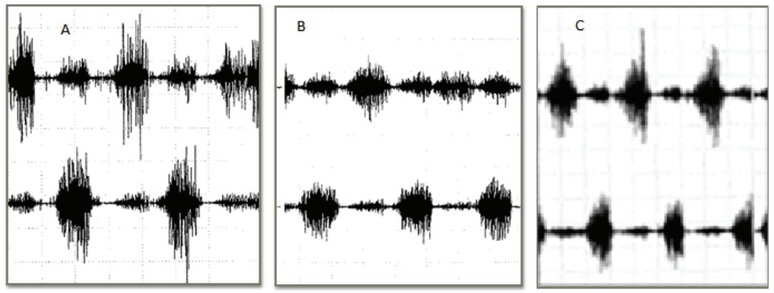
Introduction
Stroke according to the World Health Organization (WHO) is a state of rapid, progressive, focal or generalized neurological deficits, life-threatening, leading to disability. About 70–85% of strokes are ischemic. There are various qualifications of ischemic strokes due to the dynamics of symptoms, the area of ischemia and etiology. Ischemic stroke can cause speech disorders, balance, cognitive, sensory and motor dysfunctions as paresis.

Aim
The aim of the study was to assess the early results of treatment in patients after ischemic stroke using surface electromyography (sEMG) method.

Materials and methods
The early results of the sEMG pattern change of the alternating action of motor units in antagonistic muscles acting on wrist and ankle joints were analyzed (mm. extensores carpi vs. mm. flexores carpi, m. tibialis anterior vs. m. gastrocnemius) in 6 patients aged 60–70 after ischemic stroke subjected to electrostimulation at individual stages of treatment. The standard scale of 5–1 (from 5 – normal alternation to 1 – no alternating action) was used.

The device for electrostimulation was adjusted individually for the rehabilitated patient with parameters of stimulation based on results of EMG and ENG tests, with the possibility of electronic reading the data from the device memory, informing the doctor about the frequency and regularity of its use. Electrostimulation algorithm was as follows: duration of one stimulation session – once a day, for 15–20 minutes depending on the intensity of changes in the nerve impulse conduction in the motor fibers determined in ENG tests and the variable of the frequency in sEMG recordings during the conditions of the maximal contraction (usually at40–70 Hz).

Results and conclusion
The analysis of recordings was performed in the first days (a) from the onset of stroke followed by 9–10 days (b) and after 4–6 weeks (c) from February 2019. The results show an improvement in the function of alternating activities as illustrated in the figures below at the certain stages of observation.



The results of the studies of patients not subjected to electrostimulation will be also reported, showing also the positive results of treatment.

Seddon's classification of the peripheral nerves injuries vs. results of neurophysiological evaluation. How far are they complementary?

Agnieszka Wiertel-Krawczuk, Juliusz Huber
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Introduction

The assessment of the degree of nerve damage using the Seddon's classification allows structural analysis of the severity of pathology during surgery. Clinical neurophysiology studies enable functional evaluation of nerve impulse transmission. The results of electroneurographic (ENG) and electromyographic (EMG) tests allow the selection of an appropriate surgical or conservative treatment strategy.

Results

In most cases of neuropraxia, the nerve impulse conduction velocity parameter is normal, whereas the amplitudes of evoked motor potentials (CMAP) are normal or decreased, the sensory potentials (SNAP) are reduced, pathological spontaneous EMG activity is not recorded. In axonotmesis cases, the conduction velocity is normal or slightly reduced, CMAP and SNAP amplitudes are reduced, EMG reveals symptoms of muscle's denervation. In neurotmesis cases, CMAP and SNAP are not recorded, while the EMG results indicate massive denervation of the muscle. On the basis of clinical neurophysiology recordings, it is possible to determine the axonal and / or demyelinating nature of damage and to differentiate the degree of their severity.

Discussion

The above are literature data, while diagnostic practice reveals many cases of discrepancies from the standard symptoms described during the division of nerve damage according to Seddon's classification.

Conclusion

We propose, that the possible factors influencing the diagnostic discrepancies are (i) different advancement of pathologies, including the mechanisms of disturbances in retrograde and anterograde axonal transports and (ii) self-healing processes which naturally exist in degeneration and regeneration simultaneously overlapping from the time of injury.

Assessment of virtual therapy in post-stroke rehabilitation

Joanna Dudzińska, Katarzyna Kazimierska
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Due to high incidence and mortality, stroke is a very important medical condition. New therapeutic approaches are sought, including new rehabilitation strategies. An innovative computer-assisted technology known as virtual therapy or virtual reality (VR) has been found to beneficially improve sensorimotor function lost due to stroke. Systematic reviews show effectiveness at the early and chronic stage after stroke. In addition to conventional therapy (CT), VR has been shown to decrease upper limb impairment. When VR is provided as partial substitution of CT, it is supposed to be at least as effective as CT. A few studies demonstrated that VR might be more effective than CT. Its effectiveness has been less studied in the acute phase than in the chronic one. It was also found that VR-based rehabilitation methods showed positive effects in cognitive dysfunction therapy. VR also may have some advantages over CT approaches as it can give people an opportunity to practise everyday activities that are not or cannot be practised within the hospital environment. Furthermore, there are several features of VR programs

that might mean that patients spend more time in therapy: for example, the activity might be more motivating. The potential of VR-based rehabilitation is yet to be fully elucidated in stroke patients. Further studies based on standardized protocols are needed to achieve large sizes of possibly homogeneous samples and the technologies used should enable comparison between centers. This will allow to reliably confirm clinical efficacy of VR in rehabilitation.

Effects of repetitive transcranial magnetic stimulation in patients with incomplete spinal cord injury. State-of-the-art

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Incomplete spinal cord injury (iSCI) is a life-altering trauma characterised by partially compromised spinal cord, which leads to preservation of sensation, or motor function found at the lowest segment of the spinal cord. Functional recovery after iSCI is possible due to a neural plasticity and regeneration. Both processes are highly individual and may be triggered by different factors. Therefore, it is crucial to investigate the effectiveness of new methods that enhance the recovery of the spinal cord and support evidence-based neurological rehabilitation.

Repetitive transcranial magnetic stimulation (rTMS) is a non-invasive method of brain stimulation which has been shown to facilitate neural plasticity and regeneration. In particular, it seems to reduce spasticity and improve motor and possibly also sensory functions in patients with incomplete SCI. It may strengthen neuronal pathways and, as a result, improve functional abilities of a patient. Different stimulation parameters, numbers of sessions, and lack of quantitative standards, in likely, leads to divergent results on efficiency of rTMS in iSCI treatment.

In my presentation, I will review existing evidence supporting the role of rTMS in the iSCI population. In particular, I will focus on the effectiveness of rTMS in the recovery of motor and sensory function. I will have a careful look at stimulation parameters, numbers of sessions, results, and side effects which will help understanding possible sources of discrepancies among the studies.

I will conclude by listing open questions and suggesting future directions which will help improving methodology of the procedure of rTMS sessions for patients with iSCI.

Does repetitive transcranial magnetic stimulation improve recovery of motor function in patients with incomplete spinal cord injury?

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Background

Subjects with incomplete spinal cord injuries (iSCI) present multimodal impairment of motor and sensory functions accompanied by increased spasticity, and a pain. The repetitive transcranial magnetic stimulation (rTMS) is a noninvasive method recommended in the treatment

of psychiatric disorders e.g. depression, obsessive-compulsive disorders. A decade ago rTMS has been used in SCI patients to potentiate amelioration of their neurological status and the results of rehabilitation.

Aim

The purpose of this study was evaluating the influence of rTMS on restoration function of human damaged spinal cord based on the activity of motor units and spinal cord efferent transmission.

Material and methods

Twenty-eight subjects with iSCI at C2-Th12 levels were subjected to twenty sessions of rTMS for five months (three to four sessions every month). During each session, subjects received 800 biphasic pulses (20Hz, 2s trains, 28s ITI, 36–38% MSO) bilaterally over the primary motor cortex areas (MagVenture). sEMG at rest and during maximal contraction and MEPs amplitude from five observation periods were analyzed.

Results

After five rTMS courses we received a significant decrease in sEMG amplitudes recorded at rest and increase of mean sEMG amplitudes recorded during maximal contraction. Additionally, a minor increase of mean MEPs amplitudes were obtained on a certain observation period.

Conclusions

rTMS provided a decrease of spasticity as evaluated in sEMG recordings at rest and evoked simultaneous improvement of muscles contractions as well as the efferent transmission in spinal pathways in the iSCI subjects. Aforementioned observations proved the utility of rTMS as an additive procedure during complex rehabilitation patients with iSCI.

Keywords: incomplete cervical spinal cord injury, repetitive transcranial magnetic stimulation, rehabilitation

The study was supported by the Nicholls Spinal Injury Foundation, UK.

PLENARY SESSION II (IN ORDER OF PRESENTATION)

Deep brain stimulation procedures in patients with symptoms of dysfunction in central nervous system

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Deep brain stimulation (DBS) is a functional neurosurgical approach that focuses on different procedures of selective neuromodulation of targets involved manly in the cortico-subcortico-thalamico-cortical neuronal circuit. Using DBS an essential improvement of the quality of life of patients with movement disorders (Parkinson disease, essential tremor, dystonia) and psychiatric diseases (obsessive compulsive disorder, major depression, Tourette syndrome, etc.) can be achieved, without causing irreversible injury of the deep brain structures. Due to the fact that the many neuronal circuits have senso-motor, cognitive and limbic part, the final clinical effect of neuromodulation is complex. This is why a cooperation between neurosurgeons , neurologists, psychatrists and psychlologists is mandatory in the process of surgery planning, performance and postoperative patient treatment. The aim of this work is to present the general principles of DBS and the history and the directions of its current development. The experience of the Department of Neurosurgery of the Wroclaw Medical University in the application of DBS both in neurological as well as psychiatric cases will also be presented.

The algorithm of rehabilitative treatment in patients after spinal cord injuries

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The presented rehabilitation starts 7 days after admittance to the centre and is it subsequently continued from 6 to 12 weeks. The first evaluation starts with the recognition of the most active muscle groups presenting ability for stretches against gravitation. If the patient muscles don't overcome gravity then the further examination is performed with unloading. After the verticalization procedure, the capability for walking with the assistance of physiotherapist at the parallel bars is examined. The next step of kinesiotherapy engages these muscle groups which are not adjusted for moving. This includes the number of repetitions, number of repetition in one trail, the number of trials, the magnitude of loading with weights. All loaded exercises are performed in isolated positions for a particular group of muscles. Depending on the spasticity or hypotonia the verticulator is utilized. The using of the verticulization bed without control of the minor neurological symptoms as tingling or decrease of muscle strength or function of the autonomic nervous system is strictly forbidden. Depending on the presence of tetraplegy or paraplegy, the kinesiotherapy should be performed three or five days per week due to the necessary time for the recovery of muscles. In cases of tetraplegic subjects, the exercises are performed with loadings which prevent fast exhaustion of muscles. The effort depends on the trophic conditions especially in tetraplegic patients. First electrotherapy or repetitive transcranial magnetic stimulation are recommended after the first month of regular peripheral rehabilitation. Along with rehabilitation regularly are performed a neurological and electrophysiological evaluation of the current status of the patient and compare to a period before admittance to our centre.

Genetic guidance in personal neurological treatment

Joanna Bartkowiak-Wieczorek, Edyta Mądry
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This presentation will explore the possibilities of genetic profiling in drug metabolism to make informed drug selections by examining the polymorphic enzymes P450 2D6 in the treatment of selected neurological disorders.

Personalized pharmacotherapy has the potential to provide targeted care to patients. However, one of the major challenges towards this goal is understanding and effectively using the genetic heterogeneity of the various enzymes involved in drug metabolism. One of the most polymorphic enzymes is P450 2D6 (CYP2D6), which metabolizes many drugs used to treat neurological disorders. Its genetic polymorphism can arise from: a) duplication or multiplication of the CYP2D6 genetic sequence–leading to its increased activity, b) complete gene deletion-causing the loss of the metabolizing function, or c) nucleotide changes, which can lead to the formation of misfolded, inactive proteins. As a result of genetic variations in this enzyme, four types of CYP2D6 metabolizers have been classified: poor (PM), intermediate (IM), extensive (EM) and ultrarapid (UM).

The polymorphic expression of CYP2D6 has been identified as a crucial factor impacting the efficacy of neurological drugs and their side effects. For example, patients with Major

Depressive Disorder who are prescribed venlafaxine respond differently, in part, due to the expression and activity of P450 2D6. Specifically, this enzyme is involved in demethylation of venlafaxine to O-desmethylvenlafaxine. Neurotoxicity and cardiovascular toxicity are reported in association with venlafaxine treatment in patients with CYP2D6 PM genotype, while in UM allele carriers had inadequate therapeutic response. Understanding the enzymatic variation among patients could potentially lead to personalized dosage regimens and greater therapeutic success with this drug. However, genetic testing for the purposes of drug or dosage selection is limited due to the lack of commercial availability of genetic testing.

Advances of pharmacogenetics in Alzheimer's disease

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Introduction

Alzheimer's disease (AD) is the most significant dementia disease affecting older adults in developed societies. The cognitive symptoms of AD are currently managed with four substances: donepezil, rivastigmine, and galantamine – improving cholinergic transmission, as well as memantine, reducing glutamate excitotoxicity to neurons. The pharmacogenetic studies in AD investigate the effects of variants in several genes associated with acetylcholine and lipid metabolism, as well as hepatic decomposition of drugs. The most promising results have been demonstrated for *BCHE*-K (reduced butyrylcholinesterase activity variant), and *CYP2D6* UM (ultrarapid hepatic metabolism). Subsequently, dementia risk variant, *APOE* E4 as well as the other variants in the same genetic cluster, such as *TOMM*40 and *APOC*1 may influence the efficacy of antidementia drugs.

Aim

The aim of our project was the analysis of *APOE* E2/E3/E4 genetic status, rs1052452 and rs2075650 *TOMM*40 variants and rs4420638 *APOC*1 polymorphism in relation to used treatment and AD clinical features.

Materials and methods

In the present study, 230 individuals were recruited: 88 AD patients, 80 controls without (UC), 62 controls with (RC) positive family history of AD, as comparative group. The *APOE* variant was assessed by mismatch primer Real Time-PCR, the *TOMM*40 genotype was determined by HRM and capillary electrophoresis, while *APOC*1 by HRM.

Results

Our study showed that the rare variants: *APOE* E4, *TOMM*40'523-L, '650-G and *APOC*1'638-G were overrepresented in AD patients as compared to controls ($p < 0.0001$) and facilitated the age at onset of AD ($p < 0.05$). For the first time, it was demonstrated that the presence of *TOMM*40'650-G and *APOC*1'638-G variants significantly increased the risk of AD even in individuals without the *APOE* E4 variant ($p = 0.0001$ and $p < 0.05$ respectively). Moreover, we observed a tendency that AD patients with unfavorable genetic variants more often required polytherapy, and generally showed worse response to the treatment.

Conclusion

In conclusion, the genetic studies in dementia diseases in the future could help to identify the group of AD patients prone to earlier development of the symptoms, and thus requiring more advanced, combination therapy since the first dementia onset.

STUDENTS SESSION III (THEMATICALLY)

Urodynamic evaluation after spinal cord injury

Anna Barnaś
Poznań University of Medical Sciences

Introduction

The disorders in the middle and lower urinary tract are a significant obstacle in turning back to everyday activity for patients after spinal cord injury (SCI). Profound study of neurogenic bladder will contribute to more appropriate choice of therapy and will prevent complication of this medical condition. Essential research in this subject were published in the previous decade. This indicates the need for an update and broaden the knowledge.

Aim

The aim of this study is to investigate if there is a relationship between the level of SCI and parameters of urodynamic investigation and the bacterial strain.

Material and methods

Retrospective study, which analysed objective data, results of urodynamic investigation of patients, who were admitted to the Neurological Rehabilitation Ward of the Rehabilitation Clinic in the Orthopedic-Rehabilitation Hospital in Poznan in years 2010–2018. The statistical analysis of 100 medical records of 54 patients with SCI (cervical, thoracic, lumbar) has been made. Inclusion criteria are: incomplete SCI, complete medical records, the results of the urodynamic tests (conducted by the same urologist) by admission, urine culture test by admission.

Results

Depending on the level of SCI, the severity of the urological dysfunction increases. Patients with the cervical SCI experience worse detrusor compliance than patients with lumbar SCI ($p = 0.001$). The sensation in the urethra and bladder fullness are significantly more often preserved after the lumbar SCI than in cervical SCI.

Conclusion

The level of SCI strongly determines urological dysfunctions. Urodynamic evaluation should be considered essential in neurogenic bladder management.

New molecular markers for the early diagnosing, monitoring therapies and in preventive personalized medicine in polish patients diagnosed with Parkinson 's disease

Olaf Chmura, Jan Koper, Barbara Zapała
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Background

Parkinson's disease (PD) is the second most common age-dependent neurodegenerative disorder. There is no single molecular test that is suitable to reliably diagnose PD with adequate specificity and sensitivity.

Aim

The aim of this project is to uncover the sources and understand the factors that contribute

to develop of PD and the extraordinary pharmacokinetic and pharmacodynamic variability within and between polish patients with PD. We analyze miRNA expression profile, and genetic variants in FGF20 that might be associated with with PD. Additionally we examined drug metabolism activity profiles, interindividual variability and regulation of expression and the functional and clinical impact of genetic variation in drug metabolizing in PD patients.

Materials and methods

We involved 100 patients diagnosed with PD. The profiling for miRNA expression for all samples was performed using the TaqMan Array Human MicroRNA Panel v3.0 (Applied Biosystems, CA, USA). The genotyping of FGF20 and other genes linked with drug metabolism was performed by using Sanger sequencing method and 3130xl Genetic Analyzer (Applied Biosystems).

Results

We have identified several polymorphisms in 3'UTR region of FGF20 gene. We have selected 44 different miRNA strands which may play important role in PD development. We perform analysis in order to assess connections between detected gene polymorphisms and identified miRNA. We also plan to assess the connections between them and specific phenotypes of patients diagnosed with PD.

Conclusion

We hope to find possible diagnostic tool as well as suggestions for the early diagnostics/intervention markers for diagnosing, monitoring therapies and in preventive personalized medicine.

External tactile and internal proprioceptive focus of attention hampers joint position sense in the elbow joint

Wojciech Jelonek, Dawid Łochyński
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It is uncertain whether during a non-visual typical two limb position matching, automatic (ATA) or voluntary (TEFA) external tactile attention focusing, which requires tactile remapping and referring to a stored central body model, will improve matching acuity over the natural, no tactile attention (NTA), which refers to postural schema, or internal focus of attention (TIFA), which refers to the proprioceptive location of own body parts. In 28 subjects we have evaluated position errors generated during non-visual, active, elbow extension repositioning of an indicator forearm to the position of the reference forearm for two (20˚ and 40˚) movement amplitudes. No differences in the absolute and constant errors were found between the NTA and ATA and between TEFA and TIFA for both amplitudes. At greater but not lower amplitude of movement TIFA (10.6˚) resulted in decreased position matching accuracy (absolute error) in comparison to NTA (7.9˚) and ATA (7.1˚), while TEFA (10.0˚) only in comparison to ATA. During TIFA and TEFA the indicator forearm position laid in a more flexed direction (constant error) by 2.0˚–2.3˚ for lower and by 7.5˚–7.9˚ for larger movement amplitudes than the actual position of the forearm as compared to NTA (lower +0.6˚, larger 4.1˚) and ATA (lower 1.3˚, larger 4.1˚) conditions. In conclusion, the observed inaccuracy and underestimation of forearm position suggest, that humans probably do not use neither the external tactile localization or internal proprioceptive body segment mental location as cues but rather relay on postural schema during a typical limb position matching.

Clinical neurophysiological findings to confirm symptoms of the thoracic outlet syndrome

Agata Kaczmarek, Paweł Jessa, Anna Kalek, Katarzyna Leszczyńska
Students Scientific Neurophysiological Society, DEpartment of Pathophysiology of Locomotor Organs

The supplementary clinical diagnosis for the Thoracic Outlet Syndrome (TOS) detection is an electroneurographic examination (ENG), which determines the nerve impulse transmission in the motor fibers of median nerve rather than in the ulnar nerve (recording of M and F waves of evoked potentials) and the sensory fibers of the ulnar nerve (recording of SCV potential) at the elbow level more than the median on one or both sides. During recordings of motor potentials induced by stimulation of nerves with an electrical stimulus on their anatomical passage in ENG examination in patients with suspected TOS, abnormalities in the transmission of motor impulses should be observed over the entire length of nerves tested but with preference from the Erba point level. The The novum of presented project is an attempt to apply diagnostics of motor evoked potentials called MEP (induced oververtebrally at the level of C5–C8 neuromers with a single stimulus of the magnetic field) which are recorded from the muscles innervated by the above-mentioned nerve branches. In patients with suspected TOS, changes in the transmission of impulses should be expected from the cervical level.

In patients with suspected TOS, diagnostic tests of clinical ENG neurophysiology are standard, the usefulness of the MEP study has not been verified in the specialist medical literature presented in the PubMed database.

The second presented issue in project is the verification of transient changes in the muscle motor units of the distal, upper extremities, one- or both-sided in non-invasive surface electromyography (sEMG) in patients with suspected TOS after the use of the Addson's ischemic test lasting 2 minutes (with lifting the hands over the head in half-elbow). After the test performed during sEMG recordings under condition of maximal contraction, one should expect the decrease in amplitude parameter without changing the frequency parameter of the muscle motor units recruitment by more than 50%, in comparison to the test result performed before the ischemia.

Although the above-mentioned sEMG test during the Addson' s trial is a recognized diagnostic standard, its sensitivity and specificity have not been described so far in patients with clinically documented TOS, which is the second goal of the project.

Hippocampal lesions protect from contextual visual illusions: Evidence for a representational-hierarchical model

Anastasia Kalantarova, Gary R. Turner, Asaf Gilboa
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The hippocampus, along with other medial temporal lobe (MTL) substructures, plays a central role in long-term declarative memory. Patients with MTL damage present with impaired memory functions, while other cognitive remaining intact. However, recent evidence suggest that MTL cortices are part of a representational-hierarchical continuum in ventral visual pathways. According to this view, the hippocampus is hypothesized to play a major role in representation of increasingly complex spatial relationships between parts of the visual scene even when memory is not required.

Due to insufficient evidence towards the role of hippocampus in visual perception, we tested patient BL (male, 56-year-old) who has bilateral lesion to hippocampus on an Ebbinghaus illusion task that depends on processing of visual relationships. In the Ebbinghaus illusion

two circles of similar size appear different because they are surrounded by either larger or smaller circles. Since the illusion depends on processing of the relationships between objects and contexts, we predicted BL would be more accurate than matched controls because of his impaired processing of contextual information.

Overall, BL was more accurate in perceiving the relative size difference (79% average accuracy) compared to 18 control participants (44% average accuracy) across all trials. Also, BL required a smaller size difference for accurate detection compared to controls.

We suggest that BL's bilateral hippocampal lesions lead to impaired processing of contextual information and therefore decreased susceptibility to this visual illusion. These findings are consistent with the proposed representational-hierarchical model, in showing impaired contextual processing influence domains beyond memory.

The palpebral fissure narrowing leading to the neuroblastoma diagnosis

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Background

Horner's syndrome manifests itself by anisocoria, one-sided ptosis, anhidrosis, and enophthalmos. It is caused by an interruption of the oculosympathetic tract. Among pediatric patients, the most common etiology is trauma. The aim of this paper is to present a case report of an infant with Horner's syndrome who experienced a fall and had a surgery; however, finally was diagnosed with the neuroblastoma.

Case report

A 3-month-old patient presented with left-sided ptosis. The palpebral fissure narrowing occurred abruptly in the 4th week after birth. After phenylephrine administration the left eyelid lifted. Lack of the pupils' reaction after the 0.1% adrenaline administration, suggested the diagnosis of the preganglionic Horner's syndrome. Moreover, the left pupil miosis was observed. In the age of 1 month, the operation of the pyloric stenosis was performed. The occurrence of drooping eyelid was connected with the surgery or incident of a fall reported by the mother of the patient. The head ultrasound and thoracic RTG did not show any pathologies. Two weeks after ophthalmology consultation magnetic resonance imaging was performed and revealed a 1.6 cm mass adjacent to the left subclavian artery. The biopsy of the tumor confirmed the diagnosis of the neuroblastoma. The chemotherapy with vincristine and the surgical removal of the tumor were performed. The child has been under permanent oncologic care from 3 years, now.

Conclusion

This case report shows that Horner's syndrome requires vigilance and should lead to cervical and brain MRI examination in children because of the possible neuroblastoma incidence.

Speech and language disorders after stroke–aphasia and dysarthria

Julia Mickiewicz

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Introduction

Both the ischemic and hemorrhagic stroke are a serious medical and social problem. It has become a civilization disease. Brain damages, caused by stroke, often lead to various kinesthetic

deficits, as well as to cognitive and language disorders. Certain areas of the brain influence one's ability to communicate and understand a language. When a stroke occurs in one of those areas, it may result in aphasia or dysarthria (if it comes to disturbances in muscular control over the speech mechanism).

Materials and methods

This was an observational case series with retrospective chart review of patients after both the ischemic and hemorrhagic stroke at the Department of Neurology with Stroke Treatment Unit at a MSWiA hospital in Poznań. The statistics are based on the age, gender, address, localization in the brain during the stroke, risk factors such as types of blood glucose level, obesity, smoking cigarettes, drinking alcohol, neurological diseases, cardiac disease, atherosclerosis, hyperfibrynogenemia.

Results

The outcome of speech disorders of 234 stroke patients was assembled over a period of 6 months. Among 234 patients, 81 had aphasia, 80 had dysarthria, 19 had other speech and language disorders, and 61 had shown no symptoms of any speech impairment.

Conclusions

Stroke is a serious issue these days. Different types and symptoms of aphasia and other speech and language disorders were noted in this study. Stroke prevention and stroke methods of treatment (for example the stem cells treatment, thrombolysis and thrombectomy) are also referred to in the paper/article. Apart from the medical angle, the paper comprises the aphasic and dysarthric symptoms, and the therapy process.

Rare case of plasmocytoma

Dorota Hop, Maciej Błaszczyk, Maciej Radek

Medical University of Łódź, Poland

Tumors most commonly found in the area of the Turkish saddle are pituitary adenomas. Myeloma tumors in this anatomic region are rare. It is believed that it may originate from the surrounding bone structures or mucous membranes covering at some places the slope, the sphenoid bone or the rocky part of the temporal bone. The radiological image deceptively resembles a pituitary tumor, and laboratory tests indicate its non-functional nature. We present a case of a woman with a tumor in Turkish saddle area who imitated pituitary adenoma in the clinical and radiological picture.

The patient was admitted to the clinic for surgical treatment of the tumor in the area of the Turkish saddle. The patient was diagnosed initially in the neurological department due to binocular haze vision disorders. In the additional studies, significant visual field disturbances were found–right eye significant overall amblyopia, left eye temporal amblyopia. During the hospitalization, head MR was performed with contrast, which showed a change in the above and hormonal tests showing an elevated level of PRL were performed.

In case of patients with a diagnosis of a Turkish saddle tumor, who during the initial diagnosis confirms the behavior of the anterior pituitary function, and in the clinical picture the cranial nerve deficits appear, one may suspect a myeloma lesion.

STUDENTS SESSION IV (THEMATICALLY)

Treatment options for patients with drug-resistant depression (TRD) – a review

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Depression is a common mental disorder; it is estimated that there are over 350 million people in the world, and up to 1.5 million in Poland. It is one of the most common causes of disability (after ischemic heart disease). Depression is considered drug resistant if at least 2 adequate trials of antidepressant therapy from various pharmacological groups have not brought about significant improvement.The aim of the study is to compare the state of knowledge, effectiveness and safety of electroconvulsive therapy (ECT), vagus nerve stimulation (VNS) and deep brain stimulation (DBS) in treatment of drug-resistant depression.Usage of ECT in patients with severe depressive episode reduces the risk of suicide attempts. The group of patients in whom this therapy is particularly recommended are women with mental disorders in pregnancy, because they are safer than pharmacotherapy. VNS has been approved for the supportive long-term treatment of chronic or recurrent depression in adult patients with major depressive episode who have failed to respond to four or more appropriate antidepressants. Initial studies suggest the safety and efficacy of several DBS targets for the treatment of TRD. Most data concerns the cingulate sulcus (SCC). However, the most interesting are the data on the medial forebrain bundle (MFB), which suggest faster antidepressant efficacy than for other purposes.

Application of brain-computer interface in limb prostheses

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The idea of prosthesis controlled by the patient is not new. But for a long time, the unresolved problem was the ability to connect the patient's nervous system and the prosthesis's electronic systems. The brain-computer interface solve this problem. It is a link between the human nervous system and the external devices. It can control limb prostheses by detecting the electrical potentials of neurons and their mathematical analysis. This type of prostheses has opened new opportunities for patients. Protheses controlled by the brain-computer interface expose new possibilities of improving life quality for the persons who the lost their limbs or are paralyzed. Unfortunately, some restrictions on these devices were noticed quickly. One of the main problem is to improve the control of the prosthesis by the patient. To achieve this, scientists devised a somatosensory feedback system as a replacement for the perception of force or tactile sensation. Sensors on the prosthesis are delivering this feedback by intracortical microstimalation directly to the somatosensory cortex. Nowadays, techniques which are using this type of machine are developing very fast. There are also many researches provided in this field, which results are giving an optimistic look for the future.

Recognition and management of eating disorders in general and specialist practice

David Masolak, David Matuszewski, Tim Chmielewski
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Introduction

Eating disorders are relatively common, affecting approximately 1% of the general population. Like many other psychological conditions, eating disorders are somewhat stigmatized

in our society. Because of this, patients may be reluctant to discuss these disorders with their physician. Nonetheless, their clinical presentation could be noticed by an adequately trained clinician based on several fundamental and easily recognizable signs. Therefore, it is important for all physicians, despite their specialty, to have a basic knowledge of the diagnostic criteria surrounding eating disorders. For diseases like anorexia and bulimia, early detection is often key to effective treatment. That way, a multidisciplinary and holistic approach can be taken for the diagnosis and management of affected individuals.

Aim

The purpose of doing this study is to investigate the average U.S. physicians knowledge of eating disorders, diagnostic criteria, and current screening methods.

Materials and methods

We have conducted self-answered questionnaires with physicians across multiple specialties in the United States and Poland. The questionnaire asks medical student level, basic questions about the clinical presentation of various eating disorders. It also assesses the physicians' knowledge of the current screening methods for eating disorders, and includes a simple survey to collect demographic information about the participant and their overall opinions about the screening, diagnosis and treatment of eating disorders.

Conclusions

We expect a majority of physicians to be fairly familiar with most aspects of eating disorders recognition and diagnosis, but there may be some lack of knowledge when it comes to the current, recommended screening methods.

Dietary approach to autism spectrum disorder – role of ketogenic diet

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In the "Ketogenic diet (KD) as possible therapy of autism spectrum disorder — review and implication" we present the current state of knowledge about KD use in ASD.

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that affects communication and behavior. The therapeutic options available for treating ASD are limited to non-targeted treatments. Therefore, searching for an additional opportunity management still remains an issue.

Ketogenic diet (KD), as a dietary intervention has been widely described as being effective treatment for refractory epilepsy. Currently, KD has been proposed to exert positive effects in ASD affected individuals.

Studies on animals provide an optimistic findings showing improvement in autistic features following KD use. Interestingly, caloric restriction is not necessary to achieve therapeutic benefits. Scarce human studies describe effectiveness of KD in the forms of Radcliffe ketogenic diet, modified Atkins (MAD) and ketogenic gluten-free diet with supplemental medium-chain triglycerides, at least in the certain types of autism. Modified form of KD seems to be a good alternative to classic one, because is less restrictive and provides better quality of nutrition.

Although the effects of KD are promising and potential adverse reactions are rather low, robust safety data, as well as, detailed mechanistic understanding of KD in ASD affected patients still require further investigation.

The involvement of salidroside in modulation of dopaminergic genes transcription in the hippocampus of rats with induced alcohol tolerance

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Introduction and aim

The aim of the study was to evaluate the mRNA level changes for several dopaminergic receptors in the hippocampus of rats with induced alcohol tolerance under the influence of salidroside (Sal) – the main bioactive compound from Rhodiola rosea L. extract, both influencing on the development of alcohol tolerance estimated on the basis of changes in the hypothermic and sedative effects of ethanol.

Material and methods

From the hippocampus of male Wistar rats, divided in the the previous experiment into two control groups (receiving H_2O or ethanol (30%; 3g/kg m.c./1x day/7 days; i.p.)) and four Sal administered groups [(9 days: 4.5 or 45 mg/kg, p.o.) with H_2O or ethanol, i.p.)], a total RNA was isolated. Changes in mRNAs levels for Drd 1, 2, 4 and 5 genes were measured in a two-step relative quantification strategy using quantitative real-time PCR technique (Pfaffl method). GAPDH gene was proposed as housekeeping gene.

Results

In the case mRNA of Drd2 gene the effect of Sal action occurred for both doses regardless of the solvent used, while it significantly increased level of Drd1, 4 and 5 transcripts, especially at the lower dose (for a higher dose this effect was not statistically significant).

Conclusion

In conclusion, it seems that there was no gene-specific effect of Sal action. It is not clear whether its molecular activity took place by direct action via D1–D5 receptors causing observed transcriptional profile or led to this process indirectly. More complex studies in this field are needed.

Acknowledgments

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Risk of Alzheimer's disease: genetic study of ApoE in Southern Poland

Agata Macionga, Wioletta Szywacz, Małgorzata Poręba
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Introduction

Located on chromosome 19q13.32 gene of apolipoprotein E (ApoE) affects our lives by encoding plasma ApoE isoforms. This gene shows polymorphism with alleles being codominant. The most often found are alleles E2, E3, E4, with E3 being the most common.ApoE3 is not associated with any pathogenesis processes and considered as correct, whereas individuals carrying ApoE4 may have 11-times increased risk of developing Alzheimer's Disease AD, contrary ApoE2 is acting neuroprotectively.

Materials and methods

The aim of our study was evaluating genotypes of our research group of 749 patients, 416 women (55.54%) and 333 men (44.46%). We examined correlation between two SNP's of rs429358 and rs7412, which together determine the expression of specific isoform of ApoE. We performed RT-PCR with use of fluorescent-labelled TaqMan probes in order to amplificate and mark selected DNA fragments.1498 indications, allowed us examination of the polymorphism of ApoE in rs429358 and rs7412 and indication of variants of ApoE in our study group. Correlation between gender and variant of ApoE has been checked.

Results

Among our study group of patients living in the southern Poland the most common genotype was E2/E2 – 28.7% of examined people, E3/E3 – 28.3%, genotype E3/E4 – 10.6%. More women (69 people – 16.59%) than man (30 people – 13.81%) have unfavorable isoforms.

Conclusion

In the research group, 36 people shows genotype E4/E4 and have 11-fold increased risk of AD and 79 with E3/E4 with 4-times increased risk according to literature information, among them women are more likely to develop AD.

Pupils' reactions and their pathologies

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The pupils' pathologies comprise miosis, mydriasis, and anisocoria. In the examination, it is essential to detect if the pathology occurs in both eyes or only in one, and which of the reflex tracts is damaged. The pupils' impairments can be provoked by ophthalmologic problems, trauma, neurodegenerative diseases, surgery complications, tumors, and many more causes. The aim of this work is to present, how complex the examination of the pupils is.

The miosis of the one eye can be connected with other symptoms and gives the manifestation of the Horner syndrome. It is the result of the sympathetic tract impairment. The pupil narrowing should be connected with parasympathetic tract damage.In the admission to the Accident and Emergency departments the pupils' examination completes the full checkup of a patient, and not only helps to diagnose the pathology but also can extend the view on the patient's prognosis. The mydriasis after trauma is significant in terms of the intracranial pressure. What is more, the pupils' shapes are essential in the diagnosis after toxic poisoning. In conclusion, in the examination of the pupils, different causes should be taken into consideration. The complexity of this problem may require additional deeper examination and the collaboration of many specialists.

Chalk stick fracture as a typical image of ankylosing spondylitis (AS) in 36-year-old male patient

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Introduction

Ankylosing spondylitis (AS) is a seronegative inflammatory arthritis affecting primarly the spine and sacroiliac joints of the patients below the age of 40, with male predominance. This progressing disease leads to deformity and stifness increasing the risk of fractures. Chalk

stick fracture is a typical fracture image as a result of AS, but can be also seen in other rare diseases, where fuse of the spine is observed. Those fractures are usually transvertebral with fracture of ossified ligaments and damage of surrounding tissues, what makes them highly unstable. They are commonly of extension type, in the lower part of cervical spine, in up to 96% after low-energy trauma. Complications are often and increase rate of mortality to 15–30%. The diagnostic method of choice is MR, although CT can also show the fracture in detail. Classic radiography is not the best method, unless the radiologists are provided with relevant clinical image.

Case report

The 36-year-old patient after an injury was admitted to the clinical hospital in Poznań. Patient previously diagnosed with AS, alcohol use disorder, nicotinism. CT of the head showed an acute subdural hematoma. Routine imaging of cervical spine revealed a spine fracture and features of ankylosis. Craniotomy was performed urgently in order to evacuate the hematoma. Few days later patient was diagnosed with streptococcal pneumonia. In the following days, however, symptoms of C5/C6 instability intensified, therefore indications for its stabilization appeared.Though, due to the high risk of infection it was postponed for almost two weeks. After a partial corporectomy of C5 with a decompression of the spinal canal structures, insertion of PEEK mesh cage, anterior titanum plating and screw fixation, the patient's condition improved.

Conclusion

Chalk stick fracture may occur after trival trauma and lead to many complications, most common of which are pneumonia and respiratory failure, as well as very severe neurological complications.

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This guide examines case studies, a form of qualitative descriptive research that is used to look at individuals, a small group of participants, or a group as a whole. Researchers collect data about participants using participant and direct observations, interviews, protocols, tests, examinations of records, and collections of writing samples. Starting with a definition of the case study, the guide moves to a brief history of this research method. Using several well documented case studies, the guide then looks at applications and methods including data collection and analysis. A discussion of ways to handle validity, reliability, and generalizability follows, with special attention to case studies as they are applied to composition studies. Finally, this guide examines the strengths and weaknesses of case studies. The manuscript must follow the same format requirements as full length manuscripts. Case Studies should be up to 2700 words (excluding title page, abstract and references) and can include up to 3 tables and/or figures. The number of references should not exceed 25.

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Acknowledgements

Under acknowledgements please specify contributors to the article other than the authors accredited. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.). Also acknowledge all sources of support (grants from government agencies, private foundations, etc.). The names of funding organizations should be written in full.

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Artykuł ten analizuje studium przypadku, forma jakościowych badań opisowych, który jest używany, aby przeanalizować pojedyncze przypadki, małe grupy uczestników, lub grupy, jako całości. Naukowcy zbierają dane dotyczące uczestników badania i bezpośrednich obserwacji, wywiadów, protokołów testów oraz egzaminów. Manuskrypt musi spełniać te same wymogi formatu jak pełnej długości rękopis. Studium przypadku powinno zawierać do 2700 słów (z wyłączeniem strony tytułowej, streszczenia oraz piśmiennictwa) i może zawierać do 3 tabel i / lub rycin. Liczba piśmiennictwa nie powinna przekraczać 25.

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Books:
Rang, H.P., Dale, M.M., Ritter, J.M., Moore, P.K.*Pharmacology.* 5th Ed. Edinburgh: Churchill Livingstone; 2003.
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Tables should be typed on sheets separate from the text (each table on a separate sheet). They should be numbered consecutively with Arabic numerals. Tables should always be cited in text (e.g. Table 2) in consecutive numerical order. Each table should include a compulsory, concise explanatory title and an explanatory legend. Footnotes to tables should be typed below the table body and referred to by superscript lowercase letters. No vertical rules should be used. Tables should not duplicate results presented elsewhere in the manuscript (e.g. in figures).

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Artykuł z czasopisma:
Elhassan, B., Bishop, A., Shin A., Spinner, R. (2010) *'Shoulder tendon transfer options for adult patients with brachial plexus injury.'* J Hand Surg Am., 35 (7), str. 1211–1219.
Książki:
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Phillips, S.J., Whisnant, J.P. *Hypertension and stroke.* In: Laragh JH, Brenner BM, Editors. Hypertension: pathophysiology, diagnosis, and management. 2nd Ed. New York: Raven Press; 1995, str. 465–478.

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