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Shahid Beheshti University of Medical Sciences

Tehran-Iran

Iranian Epilepsy Association

ABSTRACT BOOK

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In the name of God

Contents

Dr. Mahmoud Mohammadi (Congress president) 6
Dr. Roshanak Tirdad (Scientific Secretary of the Congress) 7
Members of Scientific Committee: 8
Members of the executive Committee: 8
Oral Presentaion 10
A Comprehensive Study on Developmental and Epileptic Encephalopathies: From Clinical Manifestations to Genes 10
Autoimmune neurologic disorders and Epilepsy 11
Brain aging in temporal lobe epilepsy and role of epilepsy surgery 12
Correlation of ictal EEG and imaging 13
Deep brain stimulation for Drug Resistant Epilepsy: patient selection 14
Ecstatic Epilepsy And Famous People 16
Epilepsy and the Role of Epidemiology in its Control 17
Epilepsy classification in children 18
Epilepsy with visual pathway origin 19
Epileptic Syndromes in Adults 20
Focal Autonomic Seizure 21
Headache and epilepsy 22
Hormonal and Reproductive disturbances in epileptic patients: Emerging Issues 23
Identifying high risk of cardiac death in patients with epilepsy 24
Indication of Functional MRI (fMRI) in patients with epilepsy 25
MRI Negative Epilepsy 26
Neuroimaging funding in auto immune epilepsy 27
Neuroimaging in dual pathology in epileptic patients 28
New advances in FCD imaging 29
New advances of Neuroimaging in focal epilepsy 30
New update on SE in children 31
New update on status epilepticus in adults 32
Paroxysmal dysesthesia, is it seizure or other neurologic causes 33
Perampannel for treatment of people with a range of epilepsy etiologies in clinical practice 34
PET and SPECT in non-lesional epilepsy 35
Psychogenic Nonepileptic Seizures in Children 36
Role of genetic in approach to epilepsy and Challenges in front 37
Self-management strategies in epilepsy during puberty 38

Surgical Technique of VNS Implantation 39

systemic complications in pediatric epilepsy 40

The role of AI in interpretation of Long Term video EEG, in children with epilepsy: A systematic review 41

Update of anti-seizure medications (ASM) in system disorders 42

Update on Anti Seizure Medication in Children 43

Updates on Sudden Unexpected Death in Epilepsy 44

Vagus Nerve Stimulation: Patient Selection 45

Poster Presentation 46

"Effects of Gut Microbiome Modulation on Seizure Frequency and Cognitive Function in Epilepsy: A Double-Blind, Randomized-Controlled Trial" 47

Efficacy of hydroalcoholic Petroselinum crispum L. leaf extract on pentylenetetrazole-induced seizure in rats 48

"Investigating the effect of epilepsy on criminal behavior: analysis of biological, psychological and social factors" 49

A boy with medication resistant focal epilepsy! 50

A Case Study of a Patient with Peroxisome Biogenesis Disorders, Seizures, and Normal VLCFA Levels 51

Alien hand as a transient post-ictal phenomenon 52

Assessing the Impact of EEG on Diagnostic and Treatment Decisions in Pediatric Patients Referred for EEG 54

Bitemporal atrophy with temporal lobe epilepsy ; case report 55

Comparison of responsive and refractory status epilepticus cases 56

Evaluating the Effect of Injectable Use of Hydroalcoholic Extract of date (Phoenix Dactylifera) on Pentylene Tetrazole Induced Seizure in White Mice 57

Evaluation of the role of oxidative stress and brain cytokines in the effect of recombinant human interleukin-2 on seizures induced by maximal electroshock in mice 58

Exploring the Unique Iranian Case of SeSAME Syndrome: A study of clinical manifestation and genetic analysis 59

Frontal lobe epilepsy with presentation of night terror , case report 60

Ketoprofen alleviates seizure by downreregulating of nuclear factor kappa B gene expression in the male Wistar rats 62

Levetiracetam Overdose: A Case Report and Literature Review 63

PCDH19-clustering epilepsy, pathophysiology and clinical significance 64

Prevalence screening of rs4570625 polymorphism associated with depression in patients with generalized epilepsy 65

Propriospinal (segmental) myoclonus (PSM): bibliometric study 66

Propriospinal (segmental) myoclonus (PSM): bibliometric study. 67

Tenoxicam mitigates nuclear factor kappa B gene expression level in the male Wistar rats' model of the seizures 69

The attenuating effect of tolfenamic acid on nuclear factor kappa B gene expression in the seizures model of the male Wistar rats 70

The effect of flunixin meglumine on nuclear factor kappa B gene expression in the male Wistar rats' model of the seizures 71

The effect of Mefenamic Acid on oxidative stress status in male Wistar rats' model of the seizures 72

The efficacy of physical activities in athletes with epilepsy 73

The risk of recurrent status epilepticus during antibiotic therapy, A Case Report 74

Transient brain MRI abnormalities following methadone induced new onset refractory status epilepticus (NORSE); A Rare Case Report 75

Unveiling a different phenotype of a variant in ATP3A1 gene: A case of Developmental and Epileptic Encephalopathy 99 76

Dr. Mahmoud Mohammadi

Congress president
Professor Pediatric Clinical Neurophysiology and Epilepsy

On behalf of the scientific and administrative committee of the 21st First Congress on Epilepsy, it is my great honor to extend a cordial invitation to you for this pivotal meeting, scheduled for November in Tehran.

This congress will emphasize a multidisciplinary and transdisciplinary approach to epilepsy, addressing its significant impact on public health and the health economy. Our discussions will highlight the latest advancements and innovative strategies in the detection and management of epilepsy, catering to diverse age groups ranging from newborns to late adulthood.

We are confident that your participation will greatly enrich our discussions and contribute to the collective effort in advancing epilepsy care. We eagerly look forward to welcoming you to what promises to be an enlightening and collaborative event.

Warm regards

Dr. Roshanak Tirdad

Scientific Secretary of the Congress

The 21st Epilepsy Congress will be held with the help of the great God and the honorable professors of the Iranian Epilepsy Association, the Neurology Association and the ILAE branch, on the 23 to the 25 of November this year in Imam Khomeini Hall of Shahid Beheshti University of Medical Sciences. Thank God for giving us the opportunity to hold this congress this year as well.

In this congress, an effort is made to discuss the latest scientific, research and research achievements with the presence of domestic and foreign professors and experts.

One of the most significant cases in epilepsy is "New horizon in Epilepsy", which will be addressed in a more detailed and comprehensive manner as the main axis of the congress.

Various other topics such as "new treatment in children and adults, epilepsy imaging, treatment-resistant epilepsy cases, business techniques and artificial intelligence in epilepsy" are other axis of this congress.

We are proud to host dear professors, distinguished researchers and dear students in this congress, and we hope that your presence in this congress will help us.

I am confident that all the scientific and executive members of the congress have tried their best to achieve a worthy result for all the professors and participants of this congress.

In the end, I would like to express appreciation for the sincere cooperation of the honorable president of Shahid Beheshti University of Medical Sciences, ‘Dr. Alireza Zali’. I pray to Almighty God to wish him more and more success.

With respect

Members of Scientific Committee:

- Dr. Reza Azizi Malamiri
- Dr. Reza Shervin Badv
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- Khatereh Vatani

Oral Presentations

A Comprehensive Study on Developmental and Epileptic Encephalopathies: From Clinical Manifestations to Genes

Mehran Beiraghi Toosi, MD [1], Razie Rezaie [2], Bita Barazandeh Shirvan [2], Ehsan Ghayoor Karimiani [3], Majid Mojarrad [4], Sahar Arab Yousefabadi [5], Najmeh Ahangar [6], Farah Ashrafzadeh [1], Javad Akhondian [1]

1 Department of Pediatrics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
2 Neuroscience Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran
3 3 Genetics Research Centre, Molecular and Clinical Sciences Institute, St George's University of London, London SW17 0RE, UK
4 Department of Medical Genetics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
5 Mashhad University of Medical Sciences, Mashhad, Iran
6 Department of Medical Genetics, Next Generation Genetic Polyclinic, Mashhad, Iran

Developmental and epileptic encephalopathies (DEEs) refer to a heterogeneous group of epileptic syndromes. Children with DEEs frequently experience drug-resistant seizures and developmental delays associated with cerebral epileptiform activity. Therefore, finding the etiology in patients with DEE is important for predicting the clinical progression and effective treatment strategies. The present study aims to describe the variation types of DEEs in the east of Iran

Systemic searches of medical records were performed to identify patients with DEEs. Whole exome sequencing and clinical evaluations were done to find the etiology of DEE in patients. We categorized patients based on genetic analysis, clinical features, seizure semiology, EEG abnormalities, anti-seizure medications, and MRI findings.

We found 50 patients with different types of DEEs. The most frequent type of DEE in our study was DEE4 (4 patients) with different variants of the STXBP1 gene. There were many phenotypes and genotypes in patients, but we could not correlate genotype-phenotype variations according to the variety of genes. They had multiple types of seizures as; focal, generalized tonic-clonic, and myoclonic. The brain MRI findings included: ventricular dilatation, agenesis of the corpus callosum, delayed myelination, and cortical atrophy. Some people responded better to some specific treatments such as Valproic acid, Clobazam, and the ketogenic diet. However, a greater number of patients had medication-resistant seizures.

The results from this study show the importance of genetic analysis in diagnosing patients with DEE. Moreover, new insights into the pathophysiology of DEEs may be helpful for treatment in the future.

Key words: DEE, WES, Epilepsy

Autoimmune neurologic disorders and Epilepsy

Ahmad Negahi, MD [1]

[1] professor of Neurology

Systemic autoimmune disorders affect multiple organ systems. Brain involvement commonly causes seizures, which may be the presenting symptom. Mechanisms underlying CNS pathology in systemic autoimmune disorders and specifically factors predisposing these patients are discussed, including vascular disease (e.g., prothrombotic state, anticardiolipin antibody, emboli, vasculitis), antineuronal antibodies, immune complexes, cytokines, metabolic disorders, infection, and therapy.

Systemic autoimmune disorders affect multiple organ systems and frequently involve the central and peripheral nervous systems. Seizures are among the most common neurological manifestation and occasionally can be the presenting symptom

There are many causes of seizures in systemic autoimmune disorders and the first clinical challenge is to determine not only the cause but also the significance of seizures. The risk of epilepsy is particularly high in systemic lupus erythematosus and type 1 diabetes mellitus, with vascular and metabolic factors playing a key role in connecting autoimmune disorders to epilepsy.

Immune system dysfunction affects brain activity through both innate and adaptive immunity, especially in autoimmune encephalitis.

Brain aging in temporal lobe epilepsy and role of epilepsy surgery

Majid Barekatain [1]

[1] Professor of neuropsychiatry in ICSS

Temporal Lobe Epilepsy is associated with an accelerated aging process, where the brain ages faster than in the general population. Mechanisms of accelerated aging include Seizure-induced neurodegeneration, chronic inflammation, oxidative stress, and disruption of neuronal networks. Patients with TLE often show earlier onset of cognitive decline, including memory deficits, attention issues, and language impairments, which mimic patterns seen in neurodegenerative diseases.

In a mini review, I have tried to show explain Why understanding the link between epilepsy and brain aging is crucial for managing long-term outcomes in TLE patients, particularly as they age an dhow interventions like epilepsy surgery aim to address both seizure control and the cognitive impacts of accelerated aging.

Repeated seizures in TLE lead to excitotoxicity by overactivation of glutamate receptors during seizures increases calcium influx into neurons, leading to oxidative stress and eventual neuronal death. Hippocampal sclerosis contributes to memory deficits and accelerates age-related cognitive decline. Chronic TLE leads to progressive cortical and subcortical Atrophy in the temporal and frontal lobes that has faster. Seizure activity induces a persistent inflammatory response in the brain, leading to the release of pro-inflammatory cytokines (e.g., IL-1β, TNF-α). in addition, the brain's immune cells (microglia) also become activated in response to seizures, causing sustained neuroinflammation that damages brain tissue over time. Recurrent seizures disrupt functional and structural brain networks, impairing communication between different brain regions. The disconnection between brain areas involved in cognition, such as the hippocampus, prefrontal cortex, and default mode network, leads to cognitive deficits. Disrupted connectivity persists beyond seizure episodes and contributes to the long-term cognitive decline seen in aging TLE patients. After surgery, synaptic plasticity enables remaining neurons to strengthen or form new synapses, particularly in the areas surrounding the resected tissue. The brain may reorganize functional networks to compensate for the loss of tissue in the resected temporal lobe, engaging nearby regions or other brain areas to take over cognitive functions.

The complex impact of epilepsy surgery on the brain aging process, providing a nuanced understanding of both the potential neuroprotective effects and the risks, particularly in older patients. It emphasizes the need for personalized approaches to optimize outcomes in the aging TLE population.

Correlation of ictal EEG and imaging

Mostafa Asadollahi, MD [1]

[1] Neurologist, Epilepsy fellowship, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Evaluating the correlation between ictal EEG and imaging is often an important part of epilepsy presurgical evaluation. Most favorable condition is complete compatibility of the two parameters which is not always achieved. Lack of correlation between ictal scalp EEG and imaging may occur due to several reasons. Limitations of scalp EEG and imaging are important factors. Some cases are introduced in this respect and the correlation between ictal EEG and imaging is discussed.

Scalp electrodes have significant limitations in exploring basal temporal, frontal, or occipital regions, and to pick up activity originating from the mesial aspects of both hemispheres or from the depth of cerebral sulci. Also, false localization and lateralization sometimes occur in parietal, temporal, occipital and parasagittal epileptogenic foci. The inaccessibility of much of the frontal lobes to surface electrodes and the widespread anatomic connections of the frontal lobes to other areas contribute to the lack of EEG localization in frontal lobe epilepsy. Brain MRI is commonly negative in epilepsy patients. Focal cortical dysplasia is the most common underlying pathology in epilepsies with apparently normal MRI. On the other hand, the existence of dual pathology or multifocal lesions in MRI, make the correlation more difficult. Achievement of a better correlation requires more advance evaluations such as intracranial EEG, MRI post processing techniques and nuclear imaging.

As a conclusion, there are several limitations to reach a logical correlation between imaging and ictal EEG and we require more precise and complementary evaluations in this regard.

Deep brain stimulation for Drug Resistant Epilepsy: patient selection

Faezeh Mousavinia [1]

[1] Department of Neurology, Shohadaye Tajrish Educational Hospital, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Treatment of epilepsy is undergoing paradigm shifts from symptomatic anti-seizure medication therapy to mechanism-based treatments. Resective surgery, an effective treatment for focal onset drug-resistant epilepsy, it is not accessible for all patients especially considering the difficulty of localizing the seizure focus, multiple seizure foci, and seizure focus close to the eloquent cortex. Therefore, alternative options including brain stimulation methods can be a promising techniques for modulating brain activity and suppressing epileptic seizures. The effectiveness of neuromodulation is mainly related to the appropriate candidates, the optimal stimulation target, and the elaborate postoperative program control strategy.

A systematic literature review was performed to clarify the clinical criteria of patient selection for Deep Brain Stimulation (DBS) in DRE.

Deep Brain Stimulation (DBS) can be applied for treating epilepsy if:

• a patient is diagnosed with drug-refractory epilepsy (the patient who has failed to achieve control of their epilepsy symptoms after taking at least two different anti-seizure medications)

• a patient who has had 6 or more seizures per month for at least the last three months with no more than 30 days between seizures.

• the preoperative evaluation indicated that the patient is inoperable or had contraindications for resective surgery, such as widely distributed epileptogenic zones or EZ located in the functional cortex • failed resective surgery

• the patient refused to undergo the resective surgery.

Based on the evidence from several studies, ANT-DBS is considered effective for patients with TLE (including T-plus), FLE, multifocal epilepsy and focal to bilateral tonic-clonic seizures. For patients with motor seizures, especially with the EZ overlapping the sensorimotor cortex, STN-DBS might be helpful. CM-DBS can be an effective treatment for patients with multifocal epilepsy and generalized epilepsies such as Lennox-Gastaut syndrome. stimulation of the pulvinar is a viable option for patients with medication refractory posterior quadrant epilepsy.

Developmental Patterns in Pediatric EEG

Mahmoud Mohammadi, MD [1]

[1] Professor, Pediatric Clinical Neurophysiology and Epilepsy

This presentation will delve into the “developmental patterns in pediatric electroencephalograms (EEGs)”, emphasizing their critical role in assessing neurological development and diagnosing pediatric disorders. EEGs reflect the brain's maturation through distinct patterns that evolve with age, providing valuable insights into a child's neurological health.

Key Developmental EEG Patterns Posterior Dominant Rhythm (PDR): The PDR is a fundamental marker of brain maturation, characterized by its evolution from 4 Hz at 4 months to 10 Hz by age 10. This rhythm serves as a benchmark for normal development, with specific voltage criteria indicating healthy brain function. For instance, the PDR's highest voltage is observed between ages 6 and 9, reaching at least 100 µV. Graphoelements: These include developmental landmarks such as sleep spindles and neonatal EEG patterns. Sleep spindles first appear at around 1.5 to 2 months, initially presenting as biphasic and evolving into longer runs as the child grows. Abnormalities in these patterns can indicate developmental delays or neurological disorders.

Neonatal EEG Patterns: Specific graphoelements observed in neonates, such as monorhythmic delta activity and delta brushes, provide crucial information about an infant's neurological status. These patterns typically evolve as the child matures.

Clinical Implications Understanding these developmental EEG patterns is essential for pediatric neurologists. Abnormal findings at specific ages can signal developmental issues or neurological conditions, enabling timely interventions. By recognizing these markers, clinicians can better assess a child's developmental quotient (DQ) and tailor their approach to monitoring and treatment. In conclusion, this talk aims to enhance understanding of how EEG patterns correlate with developmental stages in children, reinforcing the importance of EEG as a diagnostic tool that offers insights into the evolving brain of a child.

Ecstatic Epilepsy And Famous People

Majid Ghafarpour, MD [1]

[1] Department of Neurology, Tehran University of Medical Sciences, Tehran, Iran

Ecstatic epilepsy is a rare form of focal aware epilepsy, in which auras (called also ecstatic seizures) consist of ecstatic or mystical experiences. The “primum movens” of these experiences originally appeared to be a feeling of bliss, but interview with patients proposed it as a feeling of certainty or clarity, that then gave rise to the serenity and /or bliss.

All patients had a feeling of well-being, expanded self-consciousness, and time dilation with a feeling of “eternal now” or eternity. Some patients described unity with everything exists (i.e., feeling of oneness that described as “nonduality” in Hinduism and Buddhism). William James criteria for mystical experiences include ineffability, transiency, passivity and noetic quality.

We herein address to 1) insular functions including perception of body state, comparing top-down and bottom-up signals to prepare predictions and tracking the magnitude of the prediction errors (i.e., the surprise), 2) the neural network centered around the insula (salience network), from which ESs arise and 3) mention to Dostoevsky who used his own ESs descriptions for characters in his novels (“The Idiot” and “Dream of a Ridiculous Man”), postulation of Fabienne Picard about nondual sensation of Albert Einstein , and noting the leading religious figures including Saint Teresa of Avila, Saint Paul and Hindu master Ramana Maharshi, all of whom were suspected to have had ESs.

Also, the 2022 film of Avator 2 by James Cameron in which a character named Kiri suffers from ES that induces a religious ecstasy.

Epilepsy and the Role of Epidemiology in its Control

Mohammad Taghi Farzadfard, MD [1]

[1] Associate Professor of Neurology, Epileptology Fellowship, Mashhad University of Medical Sciences, Mashhad, Iran

Epilepsy, a neurological disorder characterized by recurrent seizures, affects millions worldwide. Understanding its epidemiology is crucial for developing effective control and prevention strategies.

Epidemiological studies, including prevalence surveys, incidence studies, and case-control analyses, are employed to investigate epilepsy patterns, risk factors, and disease burden. These studies involve collecting data on the occurrence, distribution, and determinants of epilepsy in populations.

Studies have revealed variations in epilepsy prevalence and incidence across different regions due to socioeconomic factors and geographic differences. For example, higher rates of epilepsy have been observed in low-income countries with limited access to healthcare. Common risk factors include family history, head trauma, stroke, brain infections, and certain neurological conditions. Additionally,studies have identified disparities in epilepsy care,with individuals from marginalized communities often facing barriers to diagnosis and treatment.

The findings from epidemiological research inform the development of targeted prevention and treatment strategies for epilepsy. These strategies include public health interventions, such as improving access to healthcare, promoting prenatal care, and implementing head injury prevention programs. Additionally, advancements in diagnosis and management, including the development of new medications and surgical techniques, are crucial for improving the quality of life for people with epilepsy. Addressing the disparities in epilepsy care is essential to ensure equitable access to services and improve outcomes for all individuals affected by the condition.

Epilepsy classification in children

Mehran Beiraghi Toosi, MD [1]

[1] Department of Pediatrics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Epilepsy is a neurological disorder that affects more than 11 million children under the age of fifteen in the world. The International League Against Epilepsy (ILAE) proposed a classification system for seizures and epilepsy with subsequent revisions in 1964. Although learning a new classification system is never easy, these classifications make it possible to include some seizure types that were previously unclassifiable and use more logical terminology. Therefore, creating standardized definitions and a common language for clinical practice is the main goal of epilepsy classification. This study discusses the new epilepsy classification for patients, physicians, and researchers.

We collected information about the new epilepsy classification of ILAE and revealed the different aspects of the new classification. Furthermore, the advantages and disadvantages of previous epilepsy classifications were mentioned.

Seizures are classified into four main categories: Focal, Generalized, Unknown (focal or generalized), and Unclassified. focal seizures begin within networks limited to one hemisphere, while generalized seizures entail quickly engaging bilaterally dispersed networks. Unknown seizures are categorized as focal or generalized, while unclassified seizures are labeled as epileptic if clinicians believe the event, is an epileptic seizure. Furthermore, the chronological sequence of seizure semiology is used to describe seizures, rather than relying solely on the first sign, and negative myoclonus is recognized as a seizure type in the new classification.

This new epilepsy classification will offer a framework to help patients, doctors, and researchers better understand seizure and epilepsy diagnoses.

Epilepsy with visual pathway origin

Masoud Etemadifar [1]

[1] Isfahan university Of Medical Sciences

Visual phenomena are a key feature of occipital seizures not specific of occipital lobe seizures or cortical electrical stimulations and less frequently occur during parietal lobe, anterior ventral and medial temporal and occipito-temporal lobe seizures or stimulations and even less frequently during prfrontal and premotor seizures or stimulations

In this review literature we discus about anatomo clinical,MRI findings and localization value of visual symptoms in epileptic patients.

Oculo-motor phenomena are the second semiological hallmark of occipital seizures and comprise contralateral or ipsilateral eyes deviation, blinking, eleylid myoclonia,oculo-clonic manifestations also coined epileptic nystagmus. Elementary hallucinations described as static or moving unformed flashes of lights, spots, or blobs, white or colored. They may be localized or non-localized in a visual field (quadrant, hemi visual field or in the whole visual field). The term intermediary visual hallucination (ILAE definition) share many of the characteristics of elementary visual hallucinations but are described with a geometric form (stars, circles, triangles, squares, diamond) and have a slightly different sub-lobar localization value. Elementary negative visual phenomena correspond to transient amaurosis in the whole visual field or scotoma confined to a part of it (quadrantanopia, hemianopia, tunnel vision). Visual illusions refer to affecting an object or its visual background and spanning from visual blurring to an alteration of size (micropia/macropia), color (dyschromatopsia), shape (metamorphopsia), distance ormovement (kinetopsia), or number (diplopia, polyopia).

visual symptom has an important role for localization of visual pathway epileptogenic focus and can be a good guide for epilepsy surgery.

Epileptic Syndromes in Adults

Mohammad Reza Najafi, MD [1]

[1] Department of neurology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Epilepsy syndromes are defined by a unique combination of symptoms or the brain lobe where seizures start. In adults, these syndromes involve various disorders with recurrent seizures, differing in causes, symptoms, and outcomes. Understanding each syndrome's features is important for accurate diagnosis and effective management.

This review examines current literature and clinical guidelines on adult epileptic syndromes, using data from peer-reviewed journals, clinical trials, and meta-analyses. Key syndromes include temporal lobe epilepsy (TLE), frontal lobe epilepsy (FLE), juvenile myoclonic epilepsy (JME), idiopathic generalized epilepsy (IGE), progressive myoclonic epilepsies, and Lennox-Gastaut Syndrome.

TLE is the most common focal epilepsy in adults, often linked to hippocampal sclerosis. FLE has diverse seizure types and is often misdiagnosed due to its complex symptoms. Generalized epilepsy syndromes, like IGE, feature generalized tonic-clonic seizures (GTCS), absence seizures, and myoclonic seizures. The review highlights diagnostic criteria, typical EEG findings, and treatment options for each syndrome.

Adult epileptic syndromes present complex clinical challenges requiring a multidisciplinary approach for optimal management. Ongoing research and advancements in diagnostic techniques are essential for improving patient outcomes. This review provides a comprehensive overview of current understanding and management strategies for adult epileptic syndromes.

Focal Autonomic Seizure

Amir Rezaei, MD [1]

[1] Epilepsy Monitoring Unit, Loghman Hakim educational Hospital, Shahid Beheshti University of Medical Sciences, Tehtan, Iran

Focal autonomic seizures are characterized by alterations in systems controlled by the autonomic nervous system at seizure onset. These may occur with or without objective clinical signs of a seizure evident to the observer. Focal autonomic seizures with predominantly subjectively experienced phenomena are one type of epileptic 'aura'. An 'aura' is an subjective experience (which may be sensory, emotional, autonomic or cognitive) felt by the individual having a seizure. The 'aura' reflects the initial seizure discharge in the brain. It may be an isolated phenomenon or progress to a focal motor seizure, to a focal impaired awareness seizure or to a focal to bilateral tonic-clonic seizure.

we discuss vast clinical presentation of focal autonomic seizures (Cardiac, gustatory, genital,...), risk of SUDEP, ictal asystole and how to recognise these symptoms and signs.

When we should suspect autonomic nature of focal seizure and how to approach and treat these conditions. Headache as a sole manifestation of seizure is under recongnsied.

the autonomic seismograph is still under construction. The localising and lateralising value of autonomic manifestations could be improved if the broader clinical context is put in the equation and the timing related to coincidence of other symptoms. We still fail to reliably predict SUDEP: postictal autonomic measures or markers of ANS dysfunction, including interictal HRV acceleration and deceleration capacity, might proof fruitful to improve SUDEP risk prediction. Seizure detection is a promising intervention in those with refractory epilepsy with signs of missed seizures.

Headache and epilepsy

Sadegh Izadi, MD [1]

[1] epileptologist, associate professor of shiraz university of medical sciences

Headache and epilepsy are two common neurological disorders. Individuals with epilepsy have a significantly higher risk of experiencing headaches. Headaches can occur at any time in connection with a seizure – before, during or after a seizure. They are particularly common after tonic-clonic seizures. In the present review, we discuss the connection between headache and epilepsy in various aspects, including: 1.Epidemiology and prevalence of headaches in epileptic patients. 2.Factors contributing to increased headaches in epileptic patients 3. Types of headaches in epileptic patients as the following: Seizures can trigger headaches: Seizures can cause post-ictal headaches, which are headaches that occur after a seizure. • Medications for epilepsy can cause headaches: Some anti-epileptic drugs (AEDs) have headache as a side effect. • Underlying conditions can cause both epilepsy and headaches: For example, brain tumors can lead to both seizures and headaches. •

Headaches can mimic seizures: Some headaches, particularly migraine, can have symptoms that overlap with seizures, such as visual disturbances and neurological symptoms. 4. We also discuss about the following Clinical Implications • Accurate Diagnosis: Differentiating between primary and secondary headaches • Tailored Treatment Strategies: Individualized treatment plans based on headache type, epilepsy management, and individual risk factors. Individuals with epileps y have a significantly higher risk ofexperiencing headaches.

Hormonal and Reproductive disturbances in epileptic patients: Emerging Issues

Asieh Mehramiri, MD [1]

[1] Faculty of Medicine, Ahvaz University of Medical Sciences, Ahvaz, Iran

Sexual disorders are prevalent and vary in men and women with epilepsy. Infertility and reproductive abnormalities are more common in females with epilepsy. Antiepileptic medications and seizures can both have an impact on sexual health in people with epilepsy. Seizures can alter the release of pituitary and hypothalamic hormones, and some antiepileptic drugs (AEDs) can alter sex steroid hormones (gonadal steroids and gonad corticoids). Women with epilepsy may develop Polycystic Ovaries Syndrome (PCOS), anovulatory cycles, and menstrual disorders.

Lower rate of reproduction are likely due to psychological and physiological issues, epilepsy and AEDs. Antiepileptic drugs (AEDs) have adverse effects on peripheral endocrine glands, influence hormones' biosynthesis and protein binding, diminish the bioactivity of serum sex hormones, and lead to secondary endocrine disorders related to changes concerning body weight and insulin sensitivity.

Liver enzyme inducing AEDs may also cause menstrual and sexual disorders in women and sexual dysfunction in men. Newer AEDs are much safer, but studies still suggest reduced sexuality and erectile dysfunction.

All types of sexual disorders also are common in women and men with epilepsy and can be caused by psychological, physical, or social factors. Specialists must address the gender-based biology of epilepsy and the impact of AEDs on sexual well-being to offer the best treatment possible for patients. The care of patients with epilepsy is a multifaceted discipline that recognizes the life-long impact of sex and gender influences on epilepsy care.

Identifying high risk of cardiac death in patients with epilepsy

fatemeh yourdkhani, MD [1]

[1] medical doctor.epilepsy fellowship

People with epilepsy (PWE) have a 2-3-fold increased risk of dying prematurely as compared to the general population, which is, in a significant proportion (15%), due to sudden cardiac death (SCD) or acute myocardial infarctions.

we reviewed articles in past 10 years which was about the relation between SUDEP and epilepsy

People with epilepsy (PWE) have a 2-3-fold increased risk of dying prematurely as compared to the general population,

Sudden unexpected death in epilepsy (SUDEP) is one of the most common lethal causes in patients with epilepsy. Sudden unexpected death in epilepsy has complex underlying mechanisms and can result from the following three origins: cardiac mechanism dysfunction, respiratory suppression with apnea, and electrocerebral transduction shutdown. Of these mechanisms, cardiogenic death has received most attention. Cardiovascular comorbidities such as myocardial infarction (MI), cardiac arrhythmia, and cardiac arrest (CA) in patients with epilepsy may increase the risk of sudden death. A substantial body of research has documented that seizures may not only cause arrhythmias but also structural and functional cardiac changes attributable to autonomic dysfunction .Electrocardiographic abnormalities during the ictal or postictal phase may contribute to SUDEP .Some previous cohort studies reported higher incidences of heart disease in patients with epilepsy than in healthy populations ,Although the genetic risk factors for epilepsy and cardiovascular comorbidities may be similar, it is still unclear how seizures trigger cardiac pathology. Some community-based studies suggested that seizure severity was related to sudden CA, but this remains controversial

Key words: cardiac arrhythmias; epilepsy

Indication of Functional MRI (fMRI) in patients with epilepsy

Fatemeh Zamani, MD [1]

[1] Associate professor of radiology, children's medical center, TUMS, Tehran, Iran

Demonstrating high agreement between structural abnormalities identified on magnetic resonance imaging (MRI) and physiologic abnormalities identified on electroencephalography (EEG) could benefit the assessment of epileptic focus in childhood seizures. The present study aimed to assess the agreement between abnormal findings on brain MRI and long-term monitoring (LTM) by EEG as the standard protocol in children with abnormal focal epileptic discharges in LTM.

This cross-sectional study was performed on 95 consecutive children who suffered from seizures with evidence of focal epileptic discharges in LTM which was referred to the Children's Medical Center in 2017. All patients were also concurrently evaluated by MRI. All MRIs were evaluated two times, before and after knowing the EEG results.

Fifty-nine out of 95 patients with abnormal LTM had concurrently abnormal MRI findings. The diagnostic agreement between the MRI and LTM in discovering abnormal findings was found to be high (86.4%) with a kappa correlation coefficient equal to 0.79.

About two-thirds of patients with abnormal LTM findings had concurrently abnormal MRI features with high agreement between the two modalities. Thus, MRI and EEG can be valuable in predicting epileptic focus in drug-resistant patients who need surgery.

Key words: seizure, magnetic resonance

MRI Negative Epilepsy

Bahram Yarali, MD [1]

[1] Pediatric Neurologist, Epileptologist, Erfan Niayesh Hospital EMU and Epilepsy Department

MRI-negative epilepsy refers to circumstances where dedicated epilepsy protocols MRI do not reveal any visible structural lesion that could explain the epilepsy. This condition led to significant challenges in diagnosis and treatment, especially for drug- resistant epilepsy. Epileptic patient with MRI-negative epilepsy often undergoes vast majority evaluations to localize the epileptogenic zone, which is crucial for epilepsy surgery.

The absence of identifiable lesions on MRI significantly reduces achieving favorable surgical outcomes. Studies indicate that the success rates for surgery in MRI-negative patients can be as low as 30-50%. However, when comprehensive non-invasive imaging techniques are utilized effectively, the chances of successful outcomes can improve.

So, MRI-negative epilepsy gives out a variety of query about the context of diagnosis, treatment, and surgical intervention.

Neuroimaging funding in auto immune epilepsy

Mohammad Zare,MD [1]

[1] Isfahan medical science university, Neurology department, Kashani hospital, Epilepsy center, Isfahan neuroscience research center

Autoimmune encephalitis (AE) is characterized by an immune-mediated damage of the central nervous system including limbic and extra limbic. It includes a variety of subtypes that differ in clinical presentation, radiologic appearance, and serologic findings. Neuroimaging plays an important role in the work up. Additionally, it can mimic other conditions as herpes simplex encephalitis, brain tumors as glioma, gliomatosis cerebri, CJD, Behcet,s disease, Listeria monocytogenes and hypoxic brain damage. Brain CT is frequently the first imaging can be use in ER but is not sensitive for the identification of brain abnormalities in AE.

Brain MRI abnormalities in AE characterize the anatomical pattern of involvement (i.e. limbic or extra-limbic). MRI should be acquired with and without gadolinium-based contrast agents and the acquisition protocol ideally should include high resolution 3D-T1, T2-FLAIR, TSE T2, DWI, SWI and post-contrast T1. 3D T1-weighted images provide more anatomical detail to identify enhancing areas, and also are helpful to monitor atrophic changes over time.

3D turbo spin-echo (TSE) is superior to 3D inversion-recovery gradient-recalled echo (IR-GRE) in the identification of small foci of contrast enhancement (higher lesion conspicuity), as proven on brain metastasis studies. Coronal view of T2-weighted and/or T2-weighted FLAIR images help to evaluate the volumes and symmetry of medial temporal lobes structures.

Other imaging are brain FDG-PET when brain MRI is negative, Chest and Pelvic CT with contrast in suspected paraneoplastic AE, Whole body FDG-PET for detection of occult neoplasms, testicular ultrasound, mammography and breast MRI when mammography is negative.

Neuroimaging in dual pathology in epileptic patients

Neda Pak, MD [1]

[1] Associate professor of radiology, Tehran university of medical science

Dual pathology in epilepsy is defined as the association of two epileptogenic lesions, usually hippocampal sclerosis (HS) and extrahippocampal (temporal or extratemporal) lesion. Each lesion can be a cause of epilepsy.

Most frequent lesion accompanied by hippocampal sclerosis is focal cortical dysplasia (FCD). several reports have described the presence of dysplastic lesions as being associated with early seizure onset, high seizure frequency, and poor postsurgical outcomes.

Recent molecular neuropathology studies that focused on developmental aspects of hippocampal suggested that HS may be a disorder resulting from developmental errors. MRI and PET scan play an important role in detection of second pathology.

New advances in FCD imaging

Sara Ranji, MD [1]

[1] Iranian Center of Neurological Research, Neuroscience Institute, Tehran University of Medical Scienc

Focal cortical dysplasia (FCD) are the most commonly resected epileptogenic lesions in children and the third most common lesions in adults. They are histopathologically categorized in ILAE type I to III.

Only FCD type II have distinctive MRI and molecular genetics alterations so far. Subtle FCD including FCD type II located in the depth of a sulcus are often overlooked requiring the use of dedicated sequences (MP2RAGE, FLAWS, EDGE) and/or voxel (VBM)- or surface-based (SBM) postprocessing.

The magnetization-prepared rapid gradient-echo (MPRAGE) sequence allow not only for optimal evaluation of brain anatomy and morphology but are also used for voxel-based analysis including volumetry and postprocessing. The fluid and white-matter suppression (FLAWS) sequence is similar to the FLAIR sequence; however, not only the CSF but also the white matter signal is suppressed. The 3D Edge-Enhancing Gradient Echo sequence is a MPRAGE sequence with an inversion time of 442 ms. At this inversion time, gray and white matter have equal signals but opposite phases and voxels with a mixture of gray and white matter (e.g., at the gray-white boundary) will have cancelation of longitudinal magnetization producing a thin area of signal void at the normal boundary. Postprocessing has dramatically improved detection rate of FCD. MRI features such as the cortical thickness, gyral/sulcal pattern, or blurring of the gray/white matter junction can be computed semiautomatically using voxel-based (VBM) or surface-based morphometry (SBM).

subtle FCD including FCD type II are often overlooked requiring use of dedicated sequences and ictal SPECT and PET scan.

New advances of Neuroimaging in focal epilepsy

Hoda Naghshineh, MD [1]

[1] Tehran university of medical science

Recent technical and methodological advances in neuro-imaging evaluation of patients with focal epilepsy includes improvement of existing technics and combinations of technologies, multimodal imaging, as well as prediction computer models using artificial intelligence,AI.

We discussed new imaging techniques such as MEG and multimodal images including EEG-fMRI and SISCOM. We also elaborated how machine-learning algorithms and AI have been revolutionising presurgical evaluation in epileptic patients, especially with FCD

Studies showed that these new diagnostic techniques can significantly aid to identify epiletogenic zone and contribute to streoelectroencephalography planning and presurgical planning. It is deemed to improve post epilepsy surgery outcome as well

These advancements are expected to contribute to more precise surgical planning with minimum neurological deficits in epileptic patients

Key words: Focal epilepsy, Neuroimaging,

New update on SE in children

Mohammad Barzegar MD [1] , Bahareh Madahi MD [1]

[1] Mardani Azari Children Hospital, University of Medical Sciences

Status epilepticus (SE) is a common life-threatening neurological emergency in children. The reported frequency for SE is 18–23 per 100 000 children. Despite treatment advances over the last two decades, however SE continues to be associated with substantial morbidity and mortality. Underlying SE etiology appears to play a very crucial role in the outcome. Importantly, rapid and proper SE treatment affects outcomes, and longer delays and improper treatment are associated with poorer outcomes.

Management requires simultaneous resuscitation and medical stabilization, diagnosing the underlying cause, and definitive rapid treatment of both clinical and electrographic seizures. In should be remind that the physical and neurochemical characteristics of the developed brain (adult patient) differ from those of the developing brain(children) and difference in underlying etiology in children, so approach in management of SE in children is a little different from adults. Most importantly the age of the patient plays a role underling etiology.

Several studies suggest that infections and fever underlie most pediatric SE cases. Therefore, the strategies for the management of SE include:1. Early treatment of ongoing seizure to prevent long term consequences and brain damage; 2: Treatment approach tailored to the pathophysiologic changes of SE; 3: Identify and treat the cause of SE.

New update on status epilepticus in adults

Nasim Tabrizi, MD [1]

[1] Mazandaran University of Medical Sciences, Sari, Iran

Convulsive status epilepticus is defined as a seizure lasting more than five minutes, either continuously or as repetitive seizures without regaining consciousness. It is regarded as an emergency situation that requires prompt intervention to reduce the risk of morbidity and mortality. The prompt commencement of antiseizure medications and a willingness to confront treatment resistance is essential. The objective of this study is to provide an updated review of the available treatment options for status epilepticus.

The initial therapeutic approach entails the administration of rescue benzodiazepine, administered intravenously in the form of lorazepam or diazepam, or via intramuscular or intranasal administration of midazolam, with rectal diazepam also being employed. Second-line therapies include parenteral levetiracetam, fosphenytoin/phenytoin, valproate or lacosamide. The choice of appropriate medication is guided by a number of factors, including the presence of underlying comorbidities and the etiology of the condition. Third-line therapies encompass the administration of intravenous anesthetic agents, including midazolam, propofol, ketamine, thiopental and pentobarbital. At present, there is a paucity of evidence to inform the choice of appropriate therapy and the optimal duration of aggressive treatment in patients with super-refractory status epilepticus.

Further strategies might include immunomodulatory treatments, non-pharmacological approaches such as the ketogenic diet, neuromodulation therapies and surgical intervention. Additional recommendations such as avoiding frequent switching, administration of fewer antiseizure medications with low interaction potential, predictable kinetic properties and no negative systemic effects should also be considered.

Paroxysmal dysesthesia, is it seizure or other neurologic causes

Ahmad Chitsaz, MD [1]

[1] Professor of Neurology, Isfahan University of Medical Sciences, fellowship of Movement Disorders

Dysesthesia causes itches, tingling, burning or restrictive sensations without an immediate trigger, neurologic cause of dysesthesia are: Peripheral neuropathy, brain and spinal tumors, spinal canal stenosis, multiple sclerosis, carpal tunnel syndrome, migraine, cranial neurologic, Central pain syndrome, transient ischemic attack, and seizures paroxysmal spasms are painful tonic spasms like that occur in multiple sclerosis can be differentiated with seizures.

Dysesthesia can as aura in epilepsy localized to the non-dominant frontal operculum misdiagnosed as non- epileptic seizures. The diagnosis of atypical paroxysmal events represent challenge for clinicians to differentiating epileptic events.

The ictal manifestations of pharyngeal dysesthesia misdiagnosed with pharyngeal discomfort. Isolated ictal pharyngeal dysesthesia can confirmed by continuous video EEG monitoring, Non-epileptic events that may mimic epileptic seizures are not associated with rhythmic discharges of cortical neurons.

Isolated dysesthesia can an ictal manifestation secondary to an epileptogenic foci and must to be in differentiating paroxysmal epileptic from nonepileptic.

Key words: paroxysmal dysesthesia, seizure

Perampannel for treatment of people with a range of epilepsy etiologies in clinical practice

Mohammad Amin Farzi i, MD [1]

[1] Tabriz University of Medical Sciences- Epileptologist

AMPA (α-amino- 3- hydroxyl- 5- methyl- 4- isoxazole- propionate) receptors (most abundant ionotropic glutamate receptors) transduce the glutamate signal into the depolarization of postsynaptic neuron (EPSP) and have Pivotal role in seizure generation and spread. Perampanel (PER) is a first-in-class, selective, noncompetitive antagonist of ionotropic glutamate receptor (AMPA) and acts as a potentially broad-spectrum ASM.

In the United States, Perampanel is currently FDA approved for treatment of partial-onset seizures in patient 4 years and older. It is also approved as adjunctive (i.e., add-on) treatment for primary generalized tonic–clonic seizures in patient 12 years and older. Recently it had been showed that PER is also effective in treatment of seizures in people with idiopathic generalized epilepsy including myoclonic and absence seizures without propensity for aggravating absence seizures. It has long half-life of 70 to 110 hours, which permits once daily dosing. It has few drug interactions most significant of them are enzyme inducers and levonorgestrel containing hormonal contraceptives. Most frequent side effects are dizziness and somnolence.

Perampanel labeling includes a box warning for possible psychiatric symptoms: aggression, unusual changes in mood, or behavior, and other behavioral symptoms such as homicidal ideation and threats.

PET and SPECT in non-lesional epilepsy

Meysam Aghaei Meybodi, MD [1]

[1] Shahid Sadoughi Yazd medical university

background: MRI-negative epilepsy presents a diagnostic challenge, as conventional imaging often fails to identify the underlying seizure focus. Functional imaging techniques such as positron emission tomography (PET) and single photon emission computed tomography (SPECT) have emerged as valuable tools in this context.

Methods: This review examines the application of PET and SPECT in patients with MRI-negative epilepsy, focusing on their ability to localize seizure foci and assess metabolic and perfusion abnormalities. The study analyzes various radiotracers, including [^18F]FDG for PET and [^99mTc] HMPAO for SPECT, and their respective roles in evaluating cerebral glucose metabolism and blood flow.

Findings: PET has demonstrated high sensitivity in detecting regional hypometabolism, particularly in temporal lobe epilepsy (TLE), with 65% to 90% of patients showing decreased glucose consumption ipsilateral to the seizure focus. Conversely, SPECT primarily reflects cerebral perfusion and is less reliable for localizing the epileptogenic zone. The integration of these imaging modalities enhances diagnostic accuracy and may predict surgical outcomes, with specific patterns of hypometabolism correlating with better prognoses.

Conclusion: PET and SPECT are essential adjuncts in the evaluation of MRI-negative epilepsy, providing critical insights into the metabolic and perfusion characteristics of the brain. Their combined use can significantly improve localization of seizure foci and inform treatment strategies, particularly in surgical candidates.

Key words: Epilepsy, PET, SPECT

Psychogenic Nonepileptic Seizures in Children

Mohsen Javadzadeh, MD [1]

[1] Pediatric Neurologist Pediatric Clinical Neurophysiologist

The first dilemma concerning non-epileptic seizures is the still non-resolved variety in nomenclature. Some of the terms used for this condition consist of: “Psychogenic Nonepileptic Seizures” (PNES), “Psychogenic Nonepileptic Attacks” (PNEA) “Psychogenic Nonepileptic Events” (PNEE), and more recently, “Functional Seizures”. We will discuss the cons and pros for each of these terminologies. Anyway, PNES is considered a neuropsychiatric condition clinically very similar to epileptic seizures in view of presentations with transient alterations in awareness and also motor features in semiology. Please pay attention that in the last sentence, we deliberately insisted on “epileptic” seizures, and we avoided the term “true” seizures; because using the word “true” for epileptic seizures, implies that nonepileptic seizures are something” false”, while this not the case, at all. Nothing is false in PNES, and PNES should be differentiated from malingering.

PNES, should be looked at as “a cry for help” in an individual who has experienced psychic trauma, or has been physically or even sexually abused, has experienced unpleasant environment. It is a form of conversion disorder. PNES is largely misunderstood, and consequently, maltreated. These events are underdiagnosed and missed for long periods of time.

The mechanism underlying this very remarkable clinical entity is a phenomenon mostly called as: “dissociation”- a dichotomy between mind and body. We will deal with this phenomenon in more details. The most common false diagnosis attributed and labelled to the PNES patients is epilepsy; and it is not uncommon for these patients to be treated with many antiseizure medicines for years, before the correct diagnosis is revealed. Recently, there has been considerable progress in making earlier diagnosis; long-term video-EEG monitoring has played a great role in improving our situation in this regard.

Another barrier to correct management of these patients is that even after the right diagnosis is made, and while patients are in agony by their experiences of disabling attacks which actually are beyond their control or comprehension, the health care providers consider PNES trivial, because they are not epileptic seizures and are only a presentation of psychological distress. The negative attitudes towards these patients even among the highly specialized health care providers, and the reluctance to provide the due support and respect to these patients is really embarrassing. Perhaps there are few topics in medicine that we are in need of a revolutionary change in the attitude of medical staff towards a medical condition as much as here, in PNES. We will discuss in more detail the clinical clues which may be a guide to differentiate PNES from epileptic seizure, and we will talk a few words about the therapeutic steps which should be taken, and the long-term prognosis.

Role of genetic in approach to epilepsy and Challenges in front

Gholamreza Zamani, MD [1]

[1] Children's Medical Center,Tehran University of Medical Sciences

Epilepsy is a neurological disorder characterized by recurrent, unprovoked seizures, and it affects millions of people worldwide. The role of genetics in approach to epilepsy has become increasingly significant due to advancement of our knowledge however the following challenges are still on the way. 1. Although some forms of epilepsy are monogenic such as Dravet or tuberous sclerosis, most epilepsies are Polygenic particularly common types like idiopathic generalized epilepsy and often involve a complex interplay between genetic predispositions and environmental factors. Furthermore, Epileptic Encephalopathies are frequently linked to de novo mutations 2 Despite advances in genetic tests, including whole-exome and whole-genome sequencing that allow identification of specific genetic mutations in patients with epilepsy that can provide valuable information about the risk of epilepsy in offspring, the genetic landscape of epilepsy is highly complex, with many genes involved, contributing small effect. Moreover, genetic test raises ethical issues, particularly regarding the implications of test results for patients. 3.Although the genetic findings can inform and help us in the choice of AED, avoiding harmful treatments and paving the way for innovative treatments, we still need to wait for ongoing research for better understanding of full complexity of genetic contributions to epilepsy.

Article review discussing the advancement in understanding genetic of epilepsy and complexity of the field Mentioned above as benefits and challenges need to be considered.

The integration of genetics into epilepsy represents a major advancement, however ongoing research can refine these strategies and improve outcomes.

Key words: Epilepsy, Genetic, Challenges

Self-management strategies in epilepsy during puberty

Ali Akbar Momen, MD, Pediatrician & Pediatric Neurologist, Full Professor of Pediatric Department of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, IRAN [1]

[1] Ali Akbar Momen, MD, Pediatrician & Pediatric Neurologist, Full Professor of Pediatric Department of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, IRAN

Epilepsy the most common chronic brain disease, affects people of all ages. More than 50 million people worldwide have epilepsy; nearly 80% of them live in low- and middle-income countries. Epilepsy is a neurological disease characterized by recurrent seizures, and has no age (more common in young children and older people), racial, geographic or socio-economic boundaries. An estimated 70% of people with epilepsy could be seizure free if properly diagnosed and treated. People with epilepsy and their families frequently suffer from stigma and discrimination. In many parts of the world the true nature of epilepsy has also long been distorted by myths, fear and mistaken notions about the disorder. Epilepsy, the 4th most common neurological condition affects more than 65 million people worldwide, at least 3.4 million people in the U.S. including 470,000 children, nearly 10 million epilepsy patients in China, two-thirds of whom are adolescents under 18 and about 50 % of seizures will be carried through to adulthood. People with Epilepsy in IRAN is not clearly determined. Epilepsy places a significant burden on people living with epilepsy, families, caregivers and the health system. People living with epilepsy have above-average rates of mental health issues, unemployment, a higher health system utilization rate and they are 71% more likely to have a mental health disorder in their lifetime. The unemployment for people with epilepsy is more than four times the national average. 30% of people living with epilepsy do not have seizure control with medication. While seizure control is important, not all psychosocial issues are necessarily solved through seizure control alone. All teens are concerned with issues of transition. This may be formal transition from a pediatric setting to an adult setting, or a transition to an adult model of care from a pediatric model within the same setting. The American Academy of Pediatrics has adopted guidelines recommending that all teens and their families begin this discussion early, around age 12 to 14, to be accomplished by age 22. It can be difficult to allow teens to have the chance to engage in activities on their own, worrying about seizures. Often parents perform many advocacy functions (at school, with peers). These don't go away, but they need to change to be age appropriate for teens. Rules and privileges must be discussed before being implemented. What we will address: Taking Meds, Sleep, Exercise, Use of alcohol and other drugs, Peers, Keeping in touch (monitoring, curfew, etc.). What we won't address: Driving: it will be addressed in future webinar. Sexuality/pregnancy: It will be addressed in future webinar. Depression and mental health: It will be addressed in future webinar. Taking medication regularly and as prescribed. Healthy eating and exercise, Sleep hygiene, Concerns about body image and self- esteem and Changing seizure patterns. Exercise is not likely to increase seizures if properly monitored. Evidence suggests that Exercise help decrease anxiety and depression which may occur in teens with epilepsy. Some Exercise is to be avoided such as Horseback riding and diving, Mountaineering and parachuting, Marathon running and If seizures are not well controlled, high impact contact sports: football and ice hockey. Swimming requires on-site supervision.

Key words: Epilepsy, Teen, Strategies

Surgical Technique of VNS Implantation

Ali Razmkon [1]

[1] Research Center of Neuromodulation and Pain (NeuroMaPC), Shiraz, Iran

Epilepsy is a common neurological disorder, and approximately one third of these patients are considered refractory to medical therapy. Resective surgeries have been known to be effective and commonly used as treatment for many types of refractory seizures, with the expense of complications of open brain surgery, and irreversible side effects of the resection of some parts of the brain. Electrical stimulation of both the peripheral and central nervous system has been shown to decrease seizures frequency significantly. Neuromodulation refers to a specific subgroup of minimally invasive procedures aiming to provide therapeutic electrical stimulation to a predesigned field of the nervous system, so the whole system may work more efficiently to reduce pain, seizures and movement disorders, and to improve quality of life. Neurostimulation includes vagal nerve stimulation (VNS), and deep brain stimulation (DBS) of various targets including thalamus, hippocampus, subthalamic nucleus, and trigeminal nerve. Responsive neuromodulation, which involves the application of stimulation only in response to epileptic activity is also an evolving technique. Other promising technologies also exist, including focal drug delivery, transcranial magnetic stimulation, gene therapy and cellular transplantation.

In this presentation, various technical aspects of implantation of vagal nerve stimulator will be discussed in details.

systemic complications in pediatric epilepsy

Hossein Eslamiyeh, MD [1]

[1] Assistant professor of pediatric neurology, shahid sadoughi university of medical science, Yazd, Iran

Epilepsy is one of the most common pediatric neurology problems. Seizure types in children can be very different than adults, so its complications can be very challenging. Pediatric neurologists have long recognized that Children living with epilepsy are at increased risk of other systemic disorders including neuro psychitric disorders, bone health and hematologic problems.

We evaluated articles which are related to the subject in two main databases of pubmed and google scholar. Our key words in search were pediatric epilepsy,attention deficit hyperactivity disorder, learning disability ,rickets and osteomalacia. About 1230 articles were found.

Among epilepsy neuropsychiatric comorbidities which are mentioned in the articles, ADHD and learning disability were the most common complications. The prevalence of ADHD in epileptic patients was reported to as high as 60 percent in some studies, however it was reported to one third in others. The treatment of such comorbidities has important role in scholastic performance and educational improvement.On the other hand, usage of some groups of medications such as stimulants was a matter of debate for a long period of time.Bone health is another important issue, many of older antiseizure medications interrupts vitamin D metabolism. long term treatment with such medications will result to rickets and osteomalacia.

Most of the studies emphasize that complications are common in children with epilepsy.so,timely diagnosis and treatment of these subjects has important role in mental and physical health of patients and could bring the function of these patients to normal level of society

Key words: Pediatric epilepsy, ADHD

The role of AI in interpretation of Long Term video EEG, in children with epilepsy: A systematic review

Soheil Ahmadzadeh Irandoost [1] , Mahmoud Mohammadi [2] , Reza Shervin Badv [2], Zahra Rezaei [2], Sedighe Nikbakht [2], Fakhreddin Shariatmadari [3], Amirhosein Kargar[4], Mohammad Erfan Lotfi [4], Arman MomeniAmjadi [4], Bahador Makkiabadi [1]

[1] Department of Medical Physics and Biomedical Engineering, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[2] Child Neurology Division and Children's Epilepsy Monitoring Unit, Children's Medical Centre, Tehran University of Medical Sciences, Tehran, Iran
[3] Department of Pediatrics, Arak University of Medical Sciences, Arak, Iran
[4] Medical student, Faculty of Medicine, Tehran University of Medicine Sciences, Tehran, Iran

background: Epilepsy is one of the most common neurological disorders with a prevalence of about 70 million cases worldwide. Based on previous studies most epileptic patients are children and their ages are below 18 years. Now long-term video EEG monitoring (LTVEM) is a valuable tool for the diagnosis of different aspects of epilepsy such as seizure type, epilepsy type, and epilepsy syndrome in a real-time state. However, the LTVEM interpretation is very time-consuming and the accuracy of interpretation is dependent on the amount of experience of a neurophysiologist in terms of years. This study is a systematic review that aims to explore the role of artificial intelligence (AI) in the interpretation of LTVEM in epileptic children.

Methods: For this purpose, we followed PRISMA guidelines and searched the papers with two engines Embased, and PubMed, from 2020-2024. In this study, we used the following keywords: epilepsy, EEG, AI, Deep learning, and machine learning. For this research, we set several inclusion criteria such as human subjects, English text, and children's age group.

Findings: We screened the title and abstract of 1432 studies and selected 32 that met the inclusion criteria. Based on neurophysiologist tasks and information that can be captured from long-term EEG data, we classify studies into ictal detection (n=24), Interictal epileptiform discharge (IED) detection (n=3), seizure type detection (n=2), epilepsy detection (n=2), localization (n=1), and High-frequency detection (n=1). Most of the AI systems were deep learning-based (approximately %57). Twenty-two studies used public EEG data collected at the Children's Hospital Boston and others used exclusive EEG data.

Conclusion: According to these results, most of the studies (%75) incorporate AI for ictal detection, and other important areas such as seizure type (less than %1), IED (1%), and localization (less than%1) are not adequately addressed. These neglected items have a critical impact on LTVEM interpretation, especially for finding the symptomatogenic zone, ictal onset zone, and irritative zone in children who are candidates for epilepsy surgery. For future studies, we suggest that source localization, IED, semiology classification, and also epilepsy syndrom with AI should be considered for better assisting neurophysiologists in interpreting LTVEM of epileptic children.

Key words: EEG, AI, Children

Update of anti-seizure medications (ASM) in system disorders

Mahyar Noorbakhsh, MD [1]

[1] Autoimmune Diseases Research Center, Kashan University of Medical Sciences, Kashan, Iran

background: Seizures can be a common neurological manifestation of systemic disorders and can assist in early recognition and diagnosis of these conditions. Antiepileptic treatment in systemic diseases involves managing seizures in individuals with conditions that affect multiple organ systems. This specialized approach considers the interactions between systemic diseases and epilepsy to optimize treatment outcomes and minimize potential drug interactions.

Methods: This review is based on a comprehensive search of the scientific literature on epilepsy treatment in patients with variable systemic comorbidities such as somatic, psychiatric, and neurological disorders.

Findings: In recent years some new pharmacological or non-pharmacological approaches have been developed to optimize seizure treatment and outcomes in systemic diseases.

Conclusion: This brief review provides an update on the management of seizures in this context. It discusses the current understanding of the relationship between systemic conditions and seizures, highlights recent advancements in treatment strategies, and explores the challenges in optimizing anti-seizure therapy for patients with this comorbidity. This review emphasizes the importance of a multidisciplinary approach to effectively manage seizures in the context of systemic diseases.

Key words: ASM, systemic diseases

Update on Anti Seizure Medication in Children

Zahra Rezaei, MD [1]

[1] 1. Pediatric Neurology Department, Children's Medical Center, Pediatric Center of Excellent, Tehran University of Medical Sciences, Tehran, Iran.

Recent advancements in anti-seizure medications (ASMs) for children have introduced promising options for managing epilepsy, particularly in cases resistant to traditional therapies. Notably, carbamate has emerged as a significant treatment for focal seizures in adolescents, demonstrating over 60% of patients achieving at least a 50% reduction in seizure frequency. This medication is particularly beneficial for those with a history of adverse reactions to other ASMs, as none of the patients in recent studies developed rashes while on carbamate.

Additionally, perampanel and brivaracetam have gained approval for pediatric use, providing effective alternatives with favorable safety profiles. Perampanel acts as a non-competitive antagonist at AMPA glutamate receptors and has shown efficacy in reducing seizures when added to existing regimens. Brivaracetam, targeting synaptic vesicle protein 2A, is also effective for children over four years old.

These new ASMs not only enhance treatment options but also address specific needs within the pediatric population, emphasizing the importance of individualized treatment plans.

Ongoing research is crucial to further validate these medications' long-term safety and efficacy, ultimately improving outcomes for children with epilepsy.

Key words: Anti, Seizure Medication, epilepsy

Updates on Sudden Unexpected Death in Epilepsy

Soheila Rezakhani, MD [1]

[1] Neuroscience Research Center, Neuropharmacology Institute, Kerman University of Medical Sciences, Kerman, Iran

Epilepsy is a complex neurological condition with numerous etiologies and treatment options. In a subset of these patients, sudden unexpected death can occur, and to date, there are numerous explanations as to the pathophysiological mechanisms and how to mitigate these catastrophic outcomes. Sudden unexpected death in epilepsy (SUDEP) accounts for 2–18% of all epilepsy-related deaths and this is equivalent to one death in 1000 person-years of diagnosed epilepsy.

This narrative review focuses on updated information related to SUDEP epidemiology; pathophysiology; risk factors; treatment options; and finally, a discussion of important clinical studies. We searched the following databases: PubMed, Medline, SciHub, Cochrane Database of Systematic Reviews, and Google Scholar.

It is more common in young adults aged 20–45. Seizures in the past year; the absence of terminal remission in the last five years; increased seizure frequency, particularly GTCS; and nocturnal seizures are the most potent modifiable risk factors for SUDEP. Patients not receiving any antiepileptic drug therapy are at higher risk of SUDEP. Patient education on medication compliance; care plans for seizure clusters (rescue medicines); epilepsy self-management programs; and lifestyle changes to avoid seizure-triggering factors, including avoiding excessive alcohol use and sleep deprivation, should be provided by health care providers.

SUDEP is a catastrophic event, both for patients and families and public health burden worldwide. Continued research into the etiology of this entity will hopefully lead to additional effective interventions to minimize occurrences.

Key words: Epilepsy, sudden death

Vagus Nerve Stimulation: Patient Selection

Farhad Mahvelati Shams Abadi, MD [1]

[1] Child Neurologist, Pediatric Neurology Research Center, Mofid Children Hospital, Tehran

Epilepsy affects over 70 million people worldwide. The frontline therapy for epilepsy is antiepileptic drugs (AEDs). Despite the introduction of new AEDs within the past two decades, many epileptic patients continue to experience seizures. There are a few therapeutic modalities available for drug resistant epilepsy, including surgical intervention, dietary modifications like the ketogenic diet or neuromodulation techniques like vagus nerve stimulation (VNS). Despite more than two decades of VNS therapy in clinical practice, the identification of reliable predictors for treatment response continues to be challenge. It is important to identify the profile of patients who would have the best response to guide early indications and better patient selection.

We evaluated the published results of VNS for medically refractory seizures. We performed a review of available literatures published between 2000 and 2020.

Some clinically relevant differences have been reported with specific factors such as epilepsy etiology or type, patient ages well as the delay of VNS therapy onset. Patients with shorter duration of epilepsy were identified to have a higher likelihood to respond to VNS therapy. VNS efficacy on seizure frequency has been demonstrated in both children and adults, in lesional and non lesional cases, in focal and generalized epilepsies. Predictors of positive response included absence of bilateral interictal epileptiform activity and cortical malformations.

In this speech, we identify the indications, patient profiles, response patters and associated clinical characteristics with best treatment success.

Posters Presentation

"Effects of Gut Microbiome Modulation on Seizure Frequency and Cognitive Function in Epilepsy: A Double-Blind, Randomized-Controlled Trial"

Seyed saeid hosseini houshyar [1]

[1] **Shiraz University of Medical Sciences**

background: Emerging evidence suggests a bidirectional relationship between the gut microbiome and neurological disorders, including epilepsy. This study aims to investigate effects of targeted gut microbiome modulation on seizure frequency and cognitive function in patients with drug-resistant epilepsy.

Methods: Methods: In this 12-month, double-blind, randomized controlled trial, 150 adults (aged 18–65) with drug-resistant epilepsy were randomly allocated to receive either aspecialized probiotic formulation (n = 75) or placebo (n = 75). The probiotic formulation was developed based on prior metagenomic studies identifying critical microbial species linked to enhanced neurological outcomes. The primary outcomes included changes in seizure frequency and cognitive function. Secondary outcomes included changes in gut microbiome composition and quality-of-life measures.

Findings: Participants receiving the probiotic formulation showed a significant reduction in seizure frequency compared to placebo group (mean difference: -2.3 seizures/month; 95% CI: -3.1 to -1.5; p 0.001). Cognitive function improved significantly in the intervention group (p 0.01). Gut microbiome analysis revealed increased diversity and abundance of beneficial bacteria in the probiotic group. Quality of life scores improved more in the probiotic group compared to placebo (mean difference in QOLIE-31 score: 8.2 points; 95% CI: 5.7 to 10.7; p 0.001).

Conclusion: In patients with drug-resistant epilepsy, frequency of seizures was significantly reduced, and cognitive function was enhanced through targeted modulation of gut microbiome using a specialized probiotic formulation. These results indicate the potential for a novel therapeutic approach to epilepsy management and highlight the significance of the relationship between the gut and the brain in neurological disorders.

Key words: epilepsy, gut

Efficacy of hydroalcoholic Petroselinum crispum L. leaf extract on pentylenetetrazole-induced seizure in rats

Nahid Jivad [1], Zahra Frouzandeh Shahraki [1], Anahita Khosravi [1]

[1] Shahrekord University of Medical Sciences

background: Epilepsy is a disorder of the central nervous system that manifests with sudden, transient, recurrent and unpredictable seizures of sensory-motor, autonomic origin. Drugs used to treat the disorder may cause numerous side effects and treatment response may be unsatisfactory. The purpose of the present study was to investigate the in vitro effects of hydroalcoholic Petroselinum crispum L. leaf extract on pentylenetetrazole (PTZ)-induced seizure in rats.

Methods: In this experimental study, 60 male rats were randomly divided into 6 groups of 10 each. Control group received normal saline. Model group received PTZ at 90 mg/kg intraperitoneally. Intervention groups received P. crispum extract at concentrations of 100, 150 and 200 mg/kg 30 minutes before PTZ administration. Positive control group received 40 mg/kg phenobarbital 30 minutes before PTZ injection. Then, seizure threshold was recorded. In addition, serum and brain antioxidant capacity and malondialdehyde (MDA) levels were measured.

Findings: Treatment of mice given PTZ with different concentrations of P. crispum extract caused a significant increase in seizure threshold (P 0.05). In mice receiving PTZ, a significant increase in serum and brain MDA levels was observed (P 0.05) but no significant change in antioxidant capacity was noticed. Treatment of mice given PTZ with different concentrations of the extract led to a significant increase in brain and serum antioxidant capacity and a significant decrease in brain and serum MDA levels (P 0.05).

Conclusion: P. crispum shows protective efficacy against PTZ-induced seizures, which may be due to its antioxidant effects

Key words: Petroselinum crispum L

"Investigating the effect of epilepsy on criminal behavior: analysis of biological, psychological and social factors"

Faeze Eskandari [1]

[1] PhD student in Psychology, University of Tehran - Kish branch

background: This review article examines the complex relationship between epilepsy and crime and analyzes the effects of epilepsy, as a chronic neurological disorder, on people's behavior and cognitive performance. Considering the importance of this issue for society and the criminal justice system, accurate knowledge of this relationship can help prevent discrimination and social inequalities. In this article, a comprehensive definition of epilepsy and its types is presented along with the explanation of the concept of committing a crime. The main purpose of this research is to examine the relationship between epilepsy and criminal behavior, review previous research, and provide suggestions for future research. It also discusses various factors that may affect this relationship, including psychological, social and biological factors.

Methods: he method of this article is a systematic review that uses a comprehensive search in reliable databases such as PubMed and Scopus. The selected articles include epidemiological, experimental and case studies and are evaluated based on tools such as PRISMA so that only high quality studies are included in the final analysis.

Findings: Findings show that the type and severity of seizures may affect involuntary behaviors, but most people with epilepsy do not engage in criminal behavior, and factors such as comorbidities, economic problems, and social discrimination can complicate the relationship between epilepsy and crime.

Conclusion: Finally, this research recommends that the effect of anticonvulsant drugs and environmental factors in the prevention of criminal behavior be further investigated.

Key words: Epilepsy, criminal psychology,

A boy with medication resistant focal epilepsy!

Reza Azizimalamiri, MD [1]

[1] Ahvaz Jundishapur University of Medical Sciences

background: Medication-resistant epilepsy (MRE) in children is a challenging condition. This report presents a case of MRI-negative focal MRE in a boy.

Methods: A seven-year-old boy with focal MRE was referred for evaluation. A systematic approach led to successful seizure management.

Findings: The patient's history and neurological examinations were unremarkable. Seizure semiology indicated focal unaware motor seizures, likely originating from frontal mesial structures based on video EEG long-term monitoring. MRI epilepsy protocol and voxel-based morphometry were inconclusive. Whole exome sequencing identified a pathogenic PLPO variant, guiding a change in therapy. Administering high doses of B6 and pyridoxal phosphate (PLP) resulted in complete seizure cessation.

Conclusion: This case underscores the importance of genetic testing in children with MRI-negative MRE. A proper genetic workup can save time, reduce costs, and improve patient outcomes. Remarkably, this patient responded dramatically to high-dose B6 without additional PLP.

Key words: Epilepsy, resistant, B6

A Case Study of a Patient with Peroxisome Biogenesis Disorders, Seizures, and Normal VLCFA Levels

Narges Hashemi [1] , Najmeh Ahangari [2], Bita Barazandeh Shirvan [3], Razie Rezaie [3], Ehsan Ghayoor Karimiani [4], Javad Akhondian [1], Parvaneh Layegh [5], Mehran Beiraghi Toosi [1]

[1] Department of Pediatrics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
[2] Department of Medical Genetics, Next Generation Genetic Polyclinic, Mashhad 009851, Iran
[3] Neuroscience Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran
[4] Genetics Research Centre, Molecular and Clinical Sciences Institute, St George's University of London, London SW17 0RE, UK
[5] Department of Radiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

background: Zellweger spectrum disorders (ZSDs) are a group of peroxisome biogenesis disorders (PBDs) with different variants in the PEX genes. The main biochemical marker for screening peroxisomal disorders is very long-chain fatty acids (VLCFAs). The study reveals a rare Iranian case with PBD and normal plasma VLCFA levels.

Methods: We report a 10-year-old girl with neurodevelopmental delay, seizures, and hearing impairment. A brain magnetic resonance imaging scan was done to determine the reason for the seizures and neurodevelopmental delay. Biochemical analysis was done to detect ZSD. The diagnosis was made using whole-exome sequencing (WES).

Findings: Here, we find a homozygous variant of uncertain significance (VUS) in PEX6 NM_000287.4: c.1992GC (p. Glu664Asp). MRI images showed a mild widening in sulci especially in frontal lobes and sylvian fissures with pachygyria in the perisylvian regions. Additionally, plasma VLCFA levels were normal.

Conclusion: According to the case report, plasma VLCFA levels can be normal in patients with peroxisome biogenesis disorders. Furthermore, based on clinical manifestations, we could re-classify c.1992GC variant in the PEX6 gene from VUS to likely pathogenic.

Key words: VLCFA,PEX6,seizure

Alien hand as a transient post-ictal phenomenon

shadi zamanian, MD [1]

[1] Member of the Board of Directors of Khorasan Neurology Association

background: Background and aims: Alien limb (AL) refers to involuntary limb activity in which patients report loss of control over the affected limb. Isolated AL is encountered in patients with well-defined lesions, such as stroke or tumour, while in neurodegenerative diseases, AL coexists with other motor and cognitive deficits.

Methods: Clinical evaluation, video recordings and EEG recordings of three patients with post-ictal AL.

Results: 81-yo female was admitted due to epileptic status. caused by an old ischemic lesion in the right temporo-occipital cortex. Postictally, AL was observed in the left arm and leg along with left-sided neglect and Balint syndrome: optic ataxia, oculomotor apraxia and simultagnosia. The symptoms completely subsided after 4 days. 68-yo male was admitted after a series of seizures. caused by an old vascular lesion in the left occipito-parietal cortex. Post-ictal confusion, right arm Todd's paresis and postictal aphasia were followed by right arm AL that continued for 2 davs. In all cases, prolonged EEG recordings ruled out seizure activity during episodes of AL.

Conclusion: Transient post-ictal AL may be observed in patients with posterior cortical lesions. Pathophysiologically, it may arise from postictally suppressed parietal areas, causing disinhibition of the motor areas (transitory disconnection) along with a lack of sense of agency.

Anti-inflammatory and antioxidative effects of elderberry diet in the rat model of seizure: a behavioral and histological investigation on the hippocampus

Anti-inflammatory and antioxidative effects of elderberry diet in the rat model of seizure: a behavioral and histological investigation on the hippocampus

Mahdi Tizro 1, Abbas aliaghaei 1

1 Department of Biology and Anatomical Sciences, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

background: The present study was designed to evaluate whether elderberry (EB) effectively reduces inflammation and oxidative stress in hippocampal cells to modify seizure damage

Methods: Seizure was induced in rats by the injection of pentylenetetrazol (PTZ). In the Seizure + EB group, EB powder was added to the rats' routine diet for eight consecutive weeks. The study included several behavioral tests, immunohistopathology, Voronoi tessellation (to estimate the spatial distribution of cells in the hippocampus), and Sholl analysis

Findings: The results in the Seizure + EB group showed an improvement in the behavioral aspects of the study, a reduction in astrogliosis, astrocyte process length, number of branches, and intersections distal to the soma in the hippocampus of rats compared to controls. Further analysis showed that EB diet increased nuclear factor-like 2 expression and decreased caspase-3 expression in the hippocampus in the Seizure + EB group

Conclusion: In addition, EB protected hippocampal pyramidal neurons from PTZ toxicity and improved the spatial distribution of hippocampal neurons in the pyramidal layer and dentate gyrus. The results of the present study suggest that EB can be considered a potent modifier of astrocyte reactivation and inflammatory responses

Key words: elder berry, pentylenetetrazol, hippocampus inflammation

Assessing the Impact of EEG on Diagnostic and Treatment Decisions in Pediatric Patients Referred for EEG

Mahmoud Mohammadi [1], Solmaz Aziz-Ahari [1], Zahra Rezaei [2]

[1] Department of Neurology, Pediatrics Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran.
[2] Department of Neurology, Pediatrics Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

background: Electroencephalography (EEG) is routinely employed to diagnose seizure disorders in neurological centers. However, uncertainties persist regarding its effectiveness in leading to accurate seizure diagnosis and influencing treatment decisions. This study aims to evaluate whether the indications for EEG are appropriately specified and observed and EEG results can prompt correct diagnostic and treatment changes.

Methods: Our study population was 104 patients referred to our pediatric neurology clinics during a period of one year. In this before and after study, pediatric neurologists provided their initial clinical diagnosis of seizures, proposed treatment approaches, and their confidence in these decisions before performing EEG. Subsequently, patients underwent EEG evaluations, after which the neurologists reassessed their diagnostic and treatment decisions. An experienced neurophysiologist also interpreted the EEG results and evaluated the need for changes in the treatment approach.

Findings: EEG results led to changes in seizure diagnoses in 5% of patients, with 4.8% having their seizure diagnosis completely overturned. Regarding treatment adjustments, post-EEG evaluations resulted in initiating medication in 13.5% of patients and discontinuing medication in 6.7% of cases. Overall, there was an increase in the confidence scores of doctors concerning both diagnosis and treatment after EEG. Notable discrepancies in indications, diagnosis, and treatment decisions were observed between specialist doctors and the clinical neurophysiologist.

Conclusion: EEG is a valuable tool for enhancing the accuracy of seizure diagnoses and optimizing treatment approaches. The study highlights the need for improved educational curricula on the use of EEG in seizure management, given the diagnostic disagreements observed between doctors and neurophysiologists.

Key words: electroencephalography, seizure, diagnosis

Bitemporal atrophy with temporal lobe epilepsy ; case report

Zare M.MD [1]

[1] Neurologist; Isfahan medical science, neurology department, Kashani Hospital, Epilepsy center

background: The patient was 29 years old RT handed man with seizure. The first seizure happened at sleep with GTC presentation. The habitual seizures was staring, automatism, without aura that often tend to generalized tonic colonic type and sometimes agitation sleepiness at post ictal phase, 1-2 every week. He was born with normal vaginal delivery, no history of febrile convulsion, trauma and CNS infection and family history. He was treated with levetiracetam 2000mg /d, Depakin 1000 mg/d,Tegreton 800 mg/d and Lacosamide 200mg /d. neurologic examination is normal. Brain MRI shows bilateral temporal atrophy He underwent Long-term monitoring EEG for better evaluation. EEG in intertidal phase shows RT temporal spike and phase reversal at T4-T6. After tapering AEDs three onset of seizure happened with presentation of focal with impaired awareness and automation. Based on clinical feature of epileptic attacks and ictal EEG findings, the source of seizure was RT temporal lobe in spite of bilateral temporal atrophy on MRI. PET Scan showed bilateral temporal lobe hypometabolism more prominent at RT side. Therefore, he was candidate for selective RT side amygdalohippocampectomy with depth electrode in temporal lobes after neuropsychology tests.

Methods: It is case admitted comprehensive epilepsy center of Isfahan Kashani Hospital.

Findings: Epileptic discharge and epileptic focus may be unilateral in bitemporal atrophy

Conclusion: In every patient with temporal lobe epilepsy with bilateral temporal epilepsy, the source of seizure may be unilateral. Before epilepsy surgery, LTM and PET scan neuropsychiatry tests and depth electrode during surgery is recommended.

Key words: Bitemporal atrophy

Comparison of responsive and refractory status epilepticus cases

Sheida Shaafi, MD [1], Seddighe Daneshmand [1], Saeid Charsouei, MD [1]

[1] **Tabriz University of Medical Sciences**

background: Introduction: Status epilepticus is an emergency situation that can be life threatening. Refractory status epilepticus also refers to a condition in which seizure activity continues despite the use of benzodiazepines and another class of anticonvulsant drugs. In recent years, the incidence of this situation has increased.Epilepsy has high mortality and requires immediate treatment to control it. This study intends to help to better understand these two conditions and finally treat them in time by comparing the demographic conditions and the hospital outcomes of resistant and non-resistant persistent epilepsy.

Methods: This study was done retrospectively. The file information of the patients referred to Razi and Imam Reza hospitals who were referred from the beginning of 2017 to 2022 were extracted. Finally, 300 patients were divided into two groups of resistant and non-resistant status epilepticus in terms of demographic data (age and gender of the patient) and clinical data including duration of status epilepticus, treatments used to control seizures, underlying causes in cases with refractory status epilepticus, EEG and brain MRIof patients, complications and mortality rate of patients were investigated.

Results: There was no significant difference between the demographic data of the patients. There was no statistically significant difference in MRI findings between the two groups. 18.3% of patients had refractory status epilepsy. Among these patients, there was 36.4% mortality. Mortality in the status epilepsy group resistant to treatment was significantly higher than the non-resistant group (P-value: 0.001). Hospital complications and duration of hospitalization also occurred more in patients with refractory status

Evaluating the Effect of Injectable Use of Hydroalcoholic Extract of date (Phoenix Dactylifera) on Pentylene Tetrazole Induced Seizure in White Mice

Nahid Jivad [1], Zahra Frouzandeh Shahraki [1], Anahita Khosravi [1]

[1] Shahrekord University of Medical Sciences

background: Dates have significant neurological and antioxidant properties. The present study was conducted to evaluate the therapeutic effects of hydroalcoholic extract of dates on pentylenetetrazole-induced seizures in Balb / c mice

Methods: In this experimental study, pentylenetetrazole (90 mg/kg) was used to induce a seizure. Mice were divided into eight groups. The case groups received the extract at concentrations of 30, 100, and 300 mg/kg, 45 minutes before injection, the control groups were divided into PTZ, PTZ and distilled water, PTZ and phenobarbital, and non-intervention groups. After PTZ injection, the onset, termination, and severity of seizure, as well as mortality of mice in different groups, were recorded and compared by the observer. The levels of sodium, potassium, calcium, phosphorus, and blood sugar in different groups were also assessed.

Findings: : The result show that there was a significant difference between groups 1 and 3 (p 0.001), groups 3 and 4 (p 0.01), and groups 3 and 6 (p 0.05) in terms of seizure onset. The duration of seizures between groups 3 and 4 as well as groups 3 and 5 was also reported to be significant (p 0.05) and (p 0.001). In serum factors, the difference between sodium levels of groups 7 and 8 (p 0.05) and potassium levels of groups 2 and 5 (p 0.01) and 5 and 6 (p 0.01) was also significant

Conclusion: The results of this study showed that the hydroalcoholic extract of dates reduced the severity and duration of seizures in the study groups

Key words: Seizure, Pentylene tetrazole,

Evaluation of the role of oxidative stress and brain cytokines in the effect of recombinant human interleukin-2 on seizures induced by maximal electroshock in mice

Mehrdad Hend Abadi [1], Morteza Fathi [1]

[1] **Shahed University**

background: Beneficial effects of interleukin-2 on a variety of neurological functions have been reported. Therefore, the effect of recombinant human interleukin-2 (rhIL-2) protein on two parameters of convulsion in maximal electroshock (MES) models, some molecular mediators in mice hippocampus and blood and co-treatment with paroxetine hydrochloride, a serotonin reuptake inhibitor, was investigated.

Methods: One hour after intraperitoneal (i.p.) injection of 5 and 10 (µg/kg) of rhIL-2 to male NMRI mice, latency to onset and duration of hind-legs extension (HLE) were measured following MES exposure. In the combination therapy groups, mice received paroxetine (10 mg/kg) subcutaneously one hour before rhIL-2. Total antioxidant (TAC) and carbonyl proteins (CPs) levels, glutamate dehydrogenase (GDH), myeloperoxidase (MPO) activity in the hippocampus, and also interferon gamma (IFN-γ), thyroxine and CD8 and CD34 markers in the blood by flow cytometry were measured.

Findings: Both seizure elements were reduced after injection of 10 (µg/kg) rhIL-2, whereas rhIL-2 at 5 (µg/kg) was only able to reduce the duration of HLE. In addition, pretreatment with rhIL-2 (5 µg/kg) attenuated effect of seizure on hippocampal TAC and CPs levels and inhibited GDH activity. Administration of both doses of rhIL-2 had no significant effect on blood thyroxine and CD markers; while it increased blood IFN-γ levels in convulsive mice. Paroxetine potentiated the effects of rhIL-2 on measured biomarkers in the brain.

Conclusion: Administration of rhIL-2 has beneficial effects on some neuroinflammatory factors and GDH in the brain and blood of mice after exposure to MES-induced seizures, and these effects are enhanced by paroxetine pretreatment.

Key words: interleukin-2, seizure

Exploring the Unique Iranian Case of SeSAME Syndrome: A study of clinical manifestation and genetic analysis

Razie Rezaie [1], Bita Barazandeh Shirvan [2], Farah Ashrafzadeh [3], Narges Hashemi [3], Mehran Beiraghi Toosi [4]

[1] Blood Transfusion Organization. Mashhad. Iran. Neuroscience Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran
[2] Neuroscience Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran
[3] Department of Pediatrics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
[4] Neuroscience Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran.Department of Pediatrics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

background: SeSAME/EAST syndrome is a rare autosomal recessive disease caused by mutations in the KCNJ10 gene. It was described in 2009 for the first time and until 2019, twenty-eight patients with 16 different mutations in the KCNJ10 gene were reported in medical literature. Seizures are the initial symptoms that start in infancy, followed by ataxia, sensorineural deafness, and renal tubulopathy with electrolyte imbalances. Here, we describe the rare case of Sesame syndrome with tonic colonic seizures, hypotonia, hypokalemia, and neurodevelopmental delay

Methods: Our patient was an 8-year-old girl from consanguineous parents visited with a chief complaint of seizures which started in sleep in 4 months of birth. The patient suffers from tonic seizures with a short post-ictal phase. In Gross Motor, she could only crawl. The patient was hypotonic with brisk Deep Tendon Reflexes (DTR). She had hypokalemia and tubulopathy. Speech abilities were delayed but her social skills were not bad. She had abnormal Auditory Brainstem Response (ABR). Whole Exome Sequencing (WES) was performed for the patient and confirmed with Sanger sequencing

Findings: We identified a homozygous variant in KCNJ10 NM-02241.5: c.194GC (p. R65P) that correlated with SeSAME syndrome. This variant was reported as the most frequent in Pakistani patients. Her clinical findings were confirmed with genomic analysis. The EEG and brain MRI were normal.

Conclusion: This study suggests that when there are patients with seizures, neurodevelopmental delay, hypotonia, tubulopathy and hypokalemia, practitioners could consider SeSAME syndrome.

Key words: SeSAME, Seizure, Iranian

Frontal lobe epilepsy with presentation of night terror , case report

Mohammad Zare, MD[1]

[1] **Neurologist ; Isfahan medical science , neurology department , Kashani Hospital , Epilepsy center**

background: The patient was a 22 years RT handed man with chief complain of paroxysmal events as agitation ,limbs stiffness, palpitation with duration of 30-40 seconds at sleep and less often at awaking , since 17 years , without aura and postictal confusion. This event repeated every 5-6 days. Past history of febrile convulsion was positive. Family history of seizure was negative. Neurologic examination was normal. He was treated with Tegretol 800mg/day. Brain MRI was normal. He was underwent Long-term monitoring. EEG in intertidal phase showed 3 Hz spike at sleep, occasionally transient slowing in right frontal region predominantly in sleep state in addition to Sharp wave at FP2-F4,F4-C4,C4-P4. After tapering AEDs thirteen onset of seizure happened with similar presentation including bizarre, hyper motor movement , pelvic thrusting, and sometimes obscure talking, vocalizations at sleep and awaking state with duration of 30-50. The EEG during seizures showed slow wave at RT frontal lobe accompanied with muscle artifact Based on these finding the diagnose was focal seizure with impaired awareness and its source was RT frontal lobe The patient was discharged with Tegretol 800 mg/d and SPECT, VBM recommendation.

Methods: It is one of cases admitted in epilepsy comprehensive of Isfahan Kashani Hospital

Findings: Frontal lobe epilepsy simulate some kinds parasomnia as night terror and nightmare.

Conclusion: Frontal lobe epilepsy that is classified focal with impaired awareness, happened more at sleep and can simulates parasomnias as night terror, nightmare. Long term monitoring can help for exactly diagnosis

Key words: Frontal lobe epilepsy,

Investigating the Relationship of Age and Gender with the Prevalence of Seizure Types in Children with COVID-19: An Analytical Cross-Sectional Study in Firouzabadi Hospital

Maryam Kachuei, MD [1], Zahra Adel [2]

[1] Department of pediatric nourology,Firoozabadi Clinical Reasearch Development Unit (FACRDU), Iran university of medical sciences, Tehran, Tehran province, Iran
[2] 2 Medical student, Iran university of medical sciences, Tehran, Tehran province, Iran

background: One of the clinical presentations of COVID-19 infection in children is seizure. Furthermore, based on other studies during the epidemy of the Omicron variant in Iran and other parts of the world, the incidence of seizure in children increased. Moreover, the distribution of different seizure types remains to be discovered due to the newness of the Omicron variant epidemic and the lack of studies in this field. Understanding the connections between demographic factors and different seizure types is crucial, as managing this disorder varies based on the type of seizure and the individual characteristics of each patient. This study aims to investigate the relationship between age and gender with the type of seizures in children under 18 years of age with the Omicron type of COVID-19.

Methods: In this this analytical cross-sectional study included 45 children diagnosed with COVID-19 and having seizures. The required information, including demographic characteristics and clinical findings of seizures, was recorded in them.

Findings: Results No statistically significant relationship was observed between demographic characteristics and the type of seizures.

Conclusion: Conclusion Although this study contains significant clinical results, more studies are needed to clarify this issue due to its limitations.

Key words: COVID-19 seizure pediatrics

Ketoprofen alleviates seizure by downreregulating of nuclear factor kappa B gene expression in the male Wistar rats

Atefeh Eshgevaryan [1] , Kiyana Rahimi [1], Mahyar Abdi [1], Saba Fallahi [1], Mobina Salehi [1], Narjes Askari [1], Saghi Hakimi Naeini [1], Vahid Azizi [1], Abdolkarim Hosseini [1]

[1] Department of Animal Sciences and Marine Biology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran

background: Seizure is characterized by abnormal behavior or a set of movements that indicate abnormal brain cell function. Activation of the transcription factor NF-kB is one of the factors influencing the occurrence of neuroinflammation. Ketoprofen (KP), a non-steroidal anti-inflammatory drug (NSAID), acts to reduce the expression of inflammation-related genes and inhibit NF-kB. In this study, the effect of KP on seizures induced by pentylenetetrazol (PTZ) in laboratory rats was investigated.

Methods: The rats were subjected to seizures with 60 mg/kg of PTZ and were randomly divided into four groups, each consisting of 5 rats (200-250 g): healthy control, untreated control (PTZ) which received saline 30 min before PTZ, and two treatment groups that received 1 and 10 mg/kg doses of KP intraperitoneally. The effect of KP on the expression of inflammatory NF-kB gene was then evaluated by Real-time PCR using brain cell samples.

Findings: The results demonstrated that the two groups receiving KP experienced a significant reduction in NF-kB gene expression compared to the PTZ group (P0.05).

Conclusion: These findings suggest that KP affect seizure by downregulation of inflammatory NF-kB gene and warrants further investigation in the context of reducing inflammation-induced seizures.

Key words: Ketoprofen, NF-κB, Seizure

Levetiracetam Overdose: A Case Report and Literature Review

Kaveh Bahrami [1], Mohammad Shariati [2], Fateme Khodadadi [1]

[1] Department of neurology, Mashhad university of medical sciences, Mashhad, Iran
[2] Stem Cell and Regenerative Medicine Department, Academic Centre for education, Culture and Research (ACECR) –Khorasan Razavi , Mashhad, Iran

background: Levetiracetam is an anticonvulsant. Although its precise mechanism of action is unknown, levetiracetam does not appear to directly interact with the GABA system. We report an overdose with levetiracetam, including clinical effects.

Methods: We investigate a case report of levetiracetam overdose, detailing the clinical conditions and treatments administered. Finally, we review other case reports and highlight key findings based on the collective data.

Findings: Our case involved ingestion of 32 tablets of 1000 mg levetiracetam within half an hour. The patient presented approximately 2 hours later with weakness, balance disturbance, and blurred vision, while alert and oriented. Vital signs were blood pressure 105/65mmHg, a pulse of 63, and oxygen saturation 96%. Based on available data and reported case studies, the patient received treatment including charcoal and intravenous fluids initially, followed by emergency dialysis and two sessions of hemodialysis. Despite developing lethargy and confusion between hours 8 and 16 post-ingestion, the patient's vital signs stabilized after a week and, upon psychiatric consultation, was transferred to psychiatric hospital.

Conclusion: There is no specific antidote for levetiracetam overdose. If necessary, attempts should be made to remove unabsorbed drug through vomiting or gastric lavage. General precautions to maintain the patient's airway are also taken. General supportive care includes monitoring vital signs and observing the patient's clinical status. Due to limited clinical data on levetiracetam overdose, most reported cases indicate mild and transient symptoms. However, serious cases have been documented. Ongoing surveillance is necessary to better understand the associated adverse effects of levetiracetam overdose.

Key words: overdose, levetiracetam,

PCDH19-clustering epilepsy, pathophysiology and clinical significance

Safoura Kowkabi, MD[1], Mahmood Mohammadi [2], Reza Shervin Badv[2], Reza Kaboodkhani [1], Majid Yavarian [1]

[1] Shiraz University of Medical SciencesShiraz, Fars IRAN, ISLAMIC REPUBLIC OF
[2] Children's Medical Centre, Tehran University of Medical Sciences, Tehran, Iran

background: PCDH19-CE is an X-linked epilepsy disorder associated with ID and behavioral disturbances. Males are generally involved more severely than females in X-linked variations. In contrast, PCDH19 variation leads to epilepsy in heterozygous girls, not in hemizygous boys and the inheritance pattern is unusual. The hypothesis of cellular interference was described as a key pathogenic mechanism. According to that, males do not develop the disease because of the uniform expression of PCDH19 unless they have somatic variation and mosaicism.

Methods: A literature review of researches after 2000 on PCDH19-CE pathophysiology was conducted.

Findings: Concerning the age-depending pattern of seizures, the age-related pathogenic mechanisms are assumed: 1) whose sufficiency increases with age or 2) to them, body need decreases with age. Seizure happens when steroid hormones drop after mini-puberty in the first year of life which coincides with the time to change of GABA function from excitatory to inhibitory. If GABA does not work properly during this transition phase (due to the effect of PCDH19 variations) it may not show a through inhibitory function. Decreased allopregnanolone levels in PCDH19 variations during this period of drop in in-utero sex steroids may act as a predisposing factor to hyperexcitability. All these changes, besides immature BBB at this age and fever triggered seizures argue for the lack of proper innate anticonvulsive mechanisms during this susceptible period.

Conclusion: PCDH19 is an important gene with diverse extracellular and intracellular functions and interactions that its effects are more prominent during a distinct period of life.

Key words: Protocadherin 19, seizure

Prevalence screening of rs4570625 polymorphism associated with depression in patients with generalized epilepsy

Marzieh Mohammadi [1], Ali Mohammad Ahadi [1], Hoda Ayat [1]

[1] Department of Genetics, Faculty of Science, Shahrekord University, ShahreKord, Iran

background: Epilepsy and depression are two of the most common neurological challenges in human societies. Several studies have confirmed the sharing of cellular, molecular and biochemical pathways related to these two disorders. In some cases, one of these two disorders may be considered as the cause of another. One of the most important pathways related to depression is the production of 5-hydroxytryptamine or serotonin, in which the role of the enzyme encoded by the TPH2 gene is key. The role of rs4570625 polymorphism, which causes the conversion of nucleotide G to A or T in the upstream regulatory region of this gene, has been proven in relation to depression.

Methods: In this research, acknowledging the many studies that have confirmed a deep relationship between depression and some cases of seizures, we investigated this polymorphism among patients with GTCS generalized epilepsy. The blood samples of the patients were collected after obtaining the consent and obtaining the code of ethics, and after DNA extraction, primer design for rs4570625 polymorphism and Tetra-ARMS method were analyzed.

Findings: The results showed the prevalence of about 23% of the above polymorphism among patients with epilepsy ($P \leq 0.05$, CI=95%, OR=2.21).

Conclusion: Undoubtedly, we cannot consider the presence of this polymorphism as the cause of seizures, but our results clearly emphasize the common border between depression and epilepsy. Paying attention to such studies and results may encourage the therapist and medical sector of the society to the need to design more accurate drug and treatment programs.

Key words: "Epilepsy"; "Depression"; "rs4570625"

Propriospinal (segmental) myoclonus (PSM): bibliometric study

Hossein Ali Ebrahimi Meimand,MD - Mahdiyeh Khazaneha [1]

[1] **Neurology Research Center, Kerman University of Medical Sciences, Kerman, Iran**

background: Myoclonus is a rapid, sudden, short-lived (50–100 m/sec) muscle contraction. Its frequency is not exactly clear, but neurologists deal with people who suffer from it every day, managing patients is very difficult. Although its segmental type is reported to be rare, it is more complicated and more difficult to treat.

Methods: in the biliographic review that was done, very few articles were found that were written about it

Findings: Among the 18,707 articles published about myoclonus, 179 articles were about PSM until 2015, of which 104 were Functional movement disorders.

Conclusion: Propriospinal myoclonus (PMS) is a rare and repetitive disorder that causes brief and irregular jerks of the trunk, hips, and knees. For the first time, Brown et al described it in 199. A recent review divided PSM into primary (unknown etiology) and secondary. Many factors and causes have been mentioned about secondary causes. The origin of PSM is thought to be the muscle spindles that send the signal up, which stimulates the sensory - motor areas of the brain, and spike waves can be seen in the EEG, and it also sends waves down, causing brief jerks that can be seen in the ElectroMyoGraphy (EMG).

Key words: myoclonus, segmental, propriospinal,

Propriospinal (segmental) myoclonus (PSM): bibliometric study.

Hossein Ali Ebrahimi Meimand, MD [1], Mahdiyeh Khazaneha [2]

[1] Neurology Research Center, Kerman University of Medical sciences, Kerman, Iran
[2] Neurology Research Center, Kerman University of Medical sciences, Kerman, Irann

background: Myoclonus is defined as rapid, brief, jerky, or shock-like movements involving muscle or group of muscles. Among all hyperkinetic movement disorders. Myoclonus is currently classified according to anatomical distribution, relation to activity, and precipitating factors detected on examination, neurophysiology, and etiology. 1 - Cortical myoclonus: usually tends to be either focal or multifocal, and it is particularly aggravated by action and tactile stimuli. 2 - Cortical subcortical myoclonus: typically seen in generalized epilepsy syndromes, 3 - Brainstem reticular reflex myoclonus: it's of subcortical nonsegmental origin and is mostly generalized. 4 – Segmental: unilateral arrhythmic jerking in the arm and/or trunk is typical of spinal segmental myoclonus. 5 - Peripheral myoclonus: it's typically focal, and the classical example is hemifacial spasm, usually resulting from irritation of the facial nerve in the cerebellopontine angle region due to neuro vascular conflict. The physiological categories of myoclonus include the following: a. Cortical b. Cortical subcortical c. Subcortical nonsegmental (includes brainstem reticular reflex myoclonus, hyperekplexia, and propriospinal myoclonus) d. Segmental (includes palatal myoclonus and spinal segmental myoclonus) e. Peripheral Propriospinal myoclonus (PMS): is a rare and repetitive disorder that causes brief and irregular jerks of the trunk, hips, and knees (020). For the first time, Brown et al described it in 1991 (21). A recent review divided PSM into primary (unknown etiology) and secondary. Many factors and causes have been mentioned about secondary causes (22).

Methods: in the biliographic review that was done, very few articles were found that were written about it

Findings: For the first time, Brown et al described it in 1991. The studies conducted in this disease are few. Until 2020, out of 10,705 articles published about myoclonus, only 98 cases are seen about propriospinal myoclonus. The highest age of prevalence of this boredom is the fifth decade of life, it occurs more commonly in middle-aged men. there are three types of propriospinal myoclonus: idiopathic (80%), symptomatic, and functional.

Conclusion: Propriospinal myoclonus is a relatively rare disease. It should be said that there are no accurate statistics of this disease. This disease is considered as a movement disorder and is also important as a sleep disorder. Due to the above reasons and the scattering of studies, it is not possible to make an accurate estimate of this disease. For the first time in 1881, Friedreich proposed the term "myoclonus" in his original report. (3) The earliest published articles on myoclonus date back to 1963 in Epilepsia journal. (4) The studies conducted in this disease are few. Until 2020, out of 10,705 articles published about myoclonus, only 98 cases are seen about propriospinal myoclonus. The highest age of prevalence of this boredom is the fifth decade of life, it is seen slightly (not statistically significant) more in men than in women. Propriospinal myoclonus may be seen during sleep and wakefulness, but the most frequent occurrence is at the beginning of sleep (phases 1 and 2). It is especially noteworthy that they appear more often with

the posterior rhythm of the brain (alpha waves). The continuation of these movements can lead to sleep disturbance and, as a result, daytime sleepiness. There are two sources for this type of myoclonus: one is hyperekplexia in the spinal cord and the other is muscle spindles. These stimulations can go up and down in the nervous system and cause jerking movements and go up to the brain and show up EEG spike waves. Accurate diagnosis of the history of the patient and the companions who live with. EMG and EEG monitoring is used. The treatment of these patients is difficult and troublesome. Medicines effective in reducing these movements are limited, sometimes it is necessary to take a large amount, the side effects of which may not be tolerated by the patient. The most effective drugs are clonazepam, carbamazepine and tetrabenazine. Also, in segmental cases, you can benefit from botulinum toxin injection.

Key words: myoclonus, segmental, propriospinal,

Tenoxicam mitigates nuclear factor kappa B gene expression level in the male Wistar rats' model of the seizures

Nasrin Abdollahzadeh[1], Zahra Guilandokht [1], Zahra Nazari [1], Bita Amiri Hazaveh [1], Solmaz Jamshidi Dolat Abad [1], Saghi Hakimi Naeini [1], Abdolkarim Hosseini [1], Vahid Azizi [1]

[1] Department of Animal Sciences and Marine Biology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran.

background: Seizures are known to induce significant neuronal damage and provoke an inflammatory response within the brain. The nuclear factor-kappa B (NF-κB) pathway is a crucial mediator of inflammation, and its activation has been implicated in seizure-related neuroinflammation. This study investigates the efficacy of Tenoxicam (TNX), a widely used nonsteroidal anti-inflammatory drug (NSAID), in modulating NF-κB activity and reducing inflammation in the brain of rats subjected to pentylenetetrazole (PTZ)-induced seizures.

Methods: The total of 24 male Wistar rats were randomly assigned to four groups: a control group, a PTZ group and the TNX treatment groups. Seizures were induced via intraperitoneal injection of PTZ in groups. The TNX group received an intraperitoneal injection of TNX (dosage: 0.6 and 1.2 mg/kg) 30 min prior to PTZ administration. Brain tissues were collected post-seizure induction for analysis. NF-κB expression were quantified using Real-Time PCR.

Findings: The PTZ group, which did not receive TNX, demonstrated a pronounced inflammatory response, characterized by significantly elevated NF-κB expression compared to the control group (P0.001). In contrast, animals administered TNX exhibited a marked attenuation of NF-κB expression, indicating a considerable reduction in neuroinflammatory activity relative to the PTZ group (P0.001).

Conclusion: This study demonstrates that TNX significantly reduces NF-κB expression and neuroinflammation in rats subjected to PTZ-induced seizures, supporting its potential as a neuroprotective agent. By attenuating the inflammatory response, TNX may help mitigate seizure-induced neuronal damage.

Key words: NSAID; Tenoxicam; Seizures

The attenuating effect of tolfenamic acid on nuclear factor kappa B gene expression in the seizures model of the male Wistar rats

Kiyana Rahimi [1], Mahyar Abdi [1], Narjes Askari [1], Mobina Salehi [1], Saba Fallahi [1], Atefeh Eshgevaryan [1], Saghi Hakimi Naeini [1], Abdolkarim Hosseini [1], Vahid Azizi [1]

[1] Department of Animal Sciences and Marine Biology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran

background: Abnormal electrical activity in the brain leads to seizures, which manifest as unusual behaviors. One of the primary causes of seizures is neuroinflammation, largely driven by the activation of a protein called nuclear factor kappa B (NF-κB). This research examines how tolfenamic acid (TA) affects seizures in Wistar rats when the seizures are triggered by pentylenetetrazol (PTZ).

Methods: The rats were subjected to PTZ-induced seizures at dose of 60 mg/kg and were randomly divided into four groups, each consisting of 5 rats (weighing 200-250 g). The groups included: a healthy control, an untreated PTZ control group (which received saline 30 minutes before PTZ), and two treatment groups that received TA at doses of 10 and 50 mg/kg. Brain cell samples were collected to evaluate the effect of TA on the expression of NF-κB gene using Real-time PCR.

Findings: The results showed that The PTZ group, which did not receive TA, displayed a pronounced inflammatory response, characterized by significantly augmented NF-κB expression compared to the control group (P0.01). Conversely, animals administered TA exhibited a marked attenuation of NF-κB expression relative to the PTZ group (P0.05).

Conclusion: These findings suggest that TA could be considered a potential therapeutic option for controlling inflammation-related seizures through attenuation of the NF-κB gene.

Key words: Tolfenamic Acid, NF-κB,

The effect of flunixin meglumine on nuclear factor kappa B gene expression in the male Wistar rats' model of the seizures

Sina Amiribesheli [1], Sepideh Saeidinia [1], Armaghan Rahimzade [1], Leili Memarzadeh [1], Anahita Abravan [1], Seyedeh Romina Lavasani [1], Abdolkarim Hosseini [1], Vahid Azizi [1]

[1] Department of Animal Sciences and Marine Biology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran

background: Epilepsy is a prevalent neurological disorder, and the relationship between seizures and the expression of the nuclear factor kappa B (NF-κB) gene is of considerable importance in neurobiology. NF-κB is a critical transcription factor involved in regulating inflammatory pathways, and during seizures, its gene expression is often elevated, increasing the production of pro-inflammatory cytokines and chemokines that can lead to neuronal damage. This study aims to evaluate the effect of flunixin meglumine (FM) on NF-κB gene expression in a PTZ-induced seizure model in male Wistar rats.

Methods: A total of 24 male Wistar rats (200-250 g, 8 weeks old) were randomly allocated into four groups (n=6). The treatment groups were administered intraperitoneal (IP) injections of FM at doses of 1.1 and 2.2 mg/kg, while the control and PTZ groups received physiological saline. Thirty minutes post-treatment, the animals received an IP injection of PTZ at a dose of 60 mg/kg to induce seizures. Afterward, the rats were anesthetized, and brain tissue was harvested and immediately frozen at -80°C for subsequent analysis. NF-κB gene expression levels were quantified using real-time PCR.

Findings: The results demonstrated a significant upregulation of NF-κB gene expression in the PTZ group compared to the control group (p0.001). Notably, the groups treated with FM exhibited a significant reduction in NF-κB expression relative to the PTZ group (p0.001).

Conclusion: FM reduced NF-κB gene expression. The downregulation of NF-κB gene expression observed in FM-treated animals highlights the therapeutic potential of this drug in mitigating seizure-induced inflammation and neuronal damage.

Key words: Nonsteroidal anti-inflammatory drug

The effect of Mefenamic Acid on oxidative stress status in male Wistar rats' model of the seizures

Fateme Meraji [1] , Hasan Rajabi Maham [1], Abdolkarim Hosseini [1], Vahid Azizi [1]

[1] Department of Animal Sciences and Marine Biology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran.

background: Epilepsy is a neurological disorder that manifests with recurrent seizures. Oxidative stress plays a key role in the onset and progression of epilepsy due to excessive free radical release. The aim of this research is to investigate the effect of antioxidant drugs, including Mefenamic Acid (a non-steroidal anti-inflammatory drug - NSAID), in alleviation of seizures.

Methods: 24 male Wistar rats, weighing 200–250 grams, were divided into four groups of six. The groups included a control group (received 0.3 ml of normal saline), a control seizure group (received 60 mg/kg body weight PTZ), and two MFA-treated groups (received 60 mg/kg body weight PTZ + 10&20 mg/kg body weight Mefenamic Acid) via intraperitoneal injection at room temperature. After anesthesia, blood samples were taken, and serum was prepared to measure oxidative stress markers (TAC, TOS). The GraphPad Prism software was used for data analysis.

Findings: In the study, serum TAC levels significantly decreased in the seizure control group compared to the control group (p 0.0001). Conversely, MFA-treated groups showed a significant increase in TAC levels compared to the seizure control group (p 0.01). Additionally, serum TOS levels were significantly higher in the seizure control group compared to both MFA-treated groups and the control group (p 0.05).

Conclusion: PTZ increased oxidative stress and reduced antioxidant capacity. Mefenamic acid, at various doses, reduced these effects and helped restore normal conditions. These results suggest a positive effect of mefenamic acid against PTZ-induced oxidative stress.

Key words: Seizures; Mefenamic-Acid; Oxidative-stress

The efficacy of physical activities in athletes with epilepsy

Vida Golpaygani [1], Farideh Mesgari [2], Fatemeh Aghaei [3]

[1] **Maste degree in sport science**
[2] **Nurse in LTM**
[3] **Master Nurse**

background: Epilepsy, affecting 1% of the global population, is a neuropsychiatric disease often co-occurring with psychiatric disorders. It is characterized by recurrent "epileptic seizures" caused by abnormal electrical activity in the brain, which poses risks during exercise and damages athletic identity. The effects of physical activities programs on the symptomatology and health condition of athletes with epilepsy is relevant.

Methods: This review examines and addresses the challenges and opportunities for individuals with epilepsy in athletic endeavors.

Findings: Historically, misconceptions regarding seizure triggers, societal stigma, and overprotective attitudes have limited physical activity among individuals with epilepsy. resulting in obesity and reduced wellbeing. However, exercise does not typically induce seizures. Recent research suggests that exercise benefits seizure control, quality of life, and comorbidities among individuals with epilepsy. Sports participation risks were categorized into three groups using tailored guidelines provided by the International League Against Epilepsy (ILAE), Water-based sports require controlled environments, monitoring. and distinctive attire due to the risk of drowning, In contact sports, precautions are required to address seizures prior to physical contact. Guidelines for children with epilepsy in school events emphasize inclusion, as restrictions may lead to social and developmental challenges. Few prominent athletes who openly disclosed their epilepsy diagnoses.

Conclusion: Physical activity offers benefits to individuals with epilepsy. necessitating a re-evaluation of exercise restrictions. Guidelines and seizure type considerations are essential. Athletes' openness about epilepsy enhances awareness and support, contributing to the overall well-being of this population, Disruption of epilepsy on competitive mindset might extend to Athletic Identity (AI).

Key words: ILAE, Q.O.L, Guideline, Mindset

The risk of recurrent status epilepticus during antibiotic therapy, A Case Report

Mohammad Reza Najafi,MD [1]

[1] Professor of neurology, Neurology department, Isfahan university of medical sciences

background: Seizure is a side effect of some drugs and up to 9% of status epilepticus cases are caused by a drug or poison. While the specific drugs associated with drug-induced seizures may vary by geography and change over time, common reported causes include antidepressants, stimulants and antihistamines. We report A rare case of status epilepticus after treatment of ceftriaxone.

Methods: Ceftriaxone was discontinued and Azithromycin was substituted. Management of status epilepticus was started. He received antiseizure medications for two months and did not continued. He had a history of hypertension and hyperlipidemia. Brain MRI showed cortical atrophy and diffuse small vessels diseases.

Findings: Ceftriaxone was discontinued and Azithromycin was substituted. Management of status epilepticus was started. He received antiseizure medications for two months and did not continued. He had a history of hypertension and hyperlipidemia. Brain MRI showed cortical atrophy and diffuse small vessels diseases.

Conclusion: Discussion Some antibiotics, such as carbapenems, macrolides and antitubercular medications enter into pharmacokinetic interactions with antiepileptic agents, causing a decrease or increase in the plasma concentration of the latter and in consequence lead to possible epileptic seizures or drug-associated neurotoxicity. Conclusion We report a rare case of recurrence of status epilepticus three months after re-treatment with ceftriaxone. The use of some antibiotics may cause the onset or exacerbation of seizures in susceptible patients.

Key words: 'Ceftriaxone' 'Status Epilepticus'

Transient brain MRI abnormalities following methadone induced new onset refractory status epilepticus (NORSE); A Rare Case Report

Mohammad Reza Najafi, MD [1], Mohammad Amin Najafi, MD [2], Zahra Masoumi [3]

[1] **Professor of neurology, Neurology department, Isfahan university of medical sciences**
[2] **Assistant professor of neurology, Neurology department, Isfahan university of medical sciences**
[3] **Medical student, Neurology department, Isfahan university of medical sciences**

background: Methadone can lower the seizure threshold rarely, particularly in those with a history of seizures. Seizure-related MRI signal changes are widely variable and can be observed in the area of epileptic focus or at distant sites. We report A rare case of methadone induced status epilepticus with transient brain MRI abnormalities.

Methods: Case presentation A 40-year-old male without medical history is presented with tonic-clonic status epilepticus. He abused methadone before the admission.

Findings: Physical examination and routine laboratory tests were normal. Serum methadone concentration was 850 ng/mL. Brain MRI showed focal cortical swelling and multifocal cortical – subcortical T2-FLAIR hyperintense lesions. (Figs.1; a-c). The patients' seizures were controlled. CSF was within normal limited. Autoimmune and paraneoplastic panels checked and were negative. The patient became conscious, extubated and discharged. After 1 month Brain MRI repeated and the abnormalities resolved completely (figure 1; d-f).

Conclusion: Here in we present a case of NORSE following methadone toxicity. Brain MRI showed cortical and subcortical swelling that resolved after 1 month. Keeping in mind the potential effect of methadone toxicity in lowering seizure threshold and the Brain MRI transient change in patients presented with NORSE is helpful in management of these patients.

Key words: NORSE MRI Methadone

Unveiling a different phenotype of a variant in ATP3A1 gene: A case of Developmental and Epileptic Encephalopathy 99

Bita Barazandeh Shirvan [1], Razie Rezaie [1], Javad Akhondian [2], Najmeh Ahangari [3], Ehsan Ghayoor Karimiani [4], Shima Imannezhad [2], Mehran Beiraghi Toosi [2]

[1] Neuroscience Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran
[2] Department of Pediatrics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
[3] Department of Medical Genetics, Next Generation Genetic Polyclinic, Mashhad, Iran
[4] Genetics Research Centre, Molecular and Clinical Sciences Institute, St George's University of London, London SW17 0RE, UK

background: Developmental and Epileptic Encephalopathy 99 (DEE99) is an autosomal dominant disorder of epileptic encephalopathy caused by mutations in the ATP1A3 gene. Patients with DEE99 have a neurodevelopmental delay and early childhood seizures. Here, we report a boy with a pathogenic variant in the ATP1A3 gene that was correlated clinically with DEE99. Although, this variant was linked to alternating hemiplegia of childhood (AHC) in a prior study.

Methods: We performed EEG and brain MRI to find the semiology of seizures and the cause of developmental delay. Additionally, whole exome sequencing was utilized to identify the disease-causing variant. We categorized variants using private and public databases such as NCBI 1000 genomes, Exome Aggregation Consortium, and HGMD. The variant was classified according to the ACMG guidelines.

Findings: We present a boy who was born to non-consanguineous parents. He had a developmental delay, dystonia, and hyper and focal clonic seizures with an upward gaze. EEG showed a slowing background and some scattered sharp waves. Additionally, the MRI reported macrogyria on the right side. WES revealed a pathogenic variant in ATP1A3 NM_152296.5: c.G2677A. The parent's genotype was homozygous wild-type.

Conclusion: Our results showed that genotype-phenotype correlation plays a crucial role in the diagnosis of the different clinical manifestations of the same variant in the ATP1A3 gene.

Key words: DEE99, ATP1A3, WES