Epilepsy

A disorder, not a single disease. Characterized by recurrent (2 or more), unprovoked seizures.

Epilepsy is characterized by unpredictable and sudden paroxysmal neuronal firing occurrences and sometimes evolving in clinically evident seizure.

Epilepsy is associated with disruption of integration in distributed networks, together with altered localization for functions such as expressive language. The relation between atypical network connectivity and altered localization is unknown.

These seizures are episodes that can vary from brief and nearly undetectable to long periods of vigorous shaking.

In epilepsy, seizures tend to recur, and have no immediate underlying cause while seizures that occur due to a specific cause are not deemed to represent epilepsy.

There is a critical need for new drugs and approaches given than at least one-third of all epilepsy patients are not made free of seizures by existing medications and become “medically refractory”.

Findings indicate a critical contribution of astrocytes, star-shaped glial cells in the brain, to neuronal and network excitability and seizure activity. Furthermore, many important cellular and molecular changes occur in astrocytes in epileptic tissue in both humans and animal models of epilepsy.

Epidemiology

see Epilepsy epidemiology.

Classification

see Epilepsy classification.

Pathophysiology

Deciphering the pathophysiology of epilepsy has advanced the understanding of the cellular and molecular events initiated by pathogenetic insults that transform normal circuits into epileptic circuits (epileptogenesis) and the mechanisms that generate seizures (ictogenesis). The discovery of >500 genes associated with epilepsy has led to new animal models, more precise diagnoses and, in some cases, targeted therapies [1)].

Etiology

see Epilepsy etiology.

Pathogenesis

Epilepsy pathogenesis

Clinical features

People with epilepsy experience headaches irrespective of their sex or age. The burden of headaches is very important in patients with epilepsy, since headaches usually cause a moderate or severe burden to their quality of life and suggest a clear clinical need. Clinicians should recognize headache as a common comorbidity of epilepsy, as it may influence antiepileptic drug choice, and may need specific treatment [2)].

Diagnosis

see Epilepsy diagnosis.

Treatment

see Epilepsy treatment.

Outcome

see Epilepsy outcome.

Brain tumor-related epilepsy (BTE)

Is common in low- and high-grade gliomas. The risk of seizures varies between 60% and 100% among low-grade gliomas and between 40% and 60% in glioblastomas. The presence of seizures in patients with brain tumors implies favorable and unfavorable factors. New-onset seizures represent an early warning sign for the presence of a brain tumor and count as a good prognostic factor for survival. Recurrence or worsening of seizures during the course of disease may signal tumor progression. Each of the modalities for tumor control (i.e., surgery, radiotherapy, chemotherapy) contributes to seizure control. Nevertheless, one third of BTE shows pharmacoresistance to antiepileptic drugs (AEDs) and may severely impair the burden of living with a brain tumor. For symptomatic therapy of BTE, seizure type and individual patient factors determine the appropriate AED. Randomized controlled trials in partial epilepsy in adults to which type BTE belongs and additional studies in gliomas indicate that levetiracetam is the agent of choice, followed by valproic acid (VPA). In the case of recurring seizures, combining these two drugs (polytherapy) seems effective and possibly synergistic. If either one is not

effective or not well tolerated, lacosamide, lamotrigine, or zonisamide are additional options. A new and exciting insight is the potential contribution of VPA to prolonged survival, particularly in glioblastomas. A practice guideline on symptomatic medical management including dose schedules of AEDs is supplied [3].

Case series

see Epilepsy case series.

1)
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2)
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3)
Vecht CJ, Kerkhof M, Duran-Pena A. Seizure Prognosis in Brain Tumors: New Insights and Evidence-Based Management. Oncologist. 2014 Jun 4. pii: theoncologist.2014-0060. [Epub ahead of print] Review. PubMed PMID: 24899645.