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Perspective

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Role of Magnetic Resonance Imaging in Epilepsy

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Introduction

Epilepsy is a chronic neurological disorder defined by the central nervous system's rapid, recurring, and transitory malfunction caused by aberrant, excessive neuronal activity. Epilepsy affects more than 50 million people globally, posing a significant global health burden. In developing countries, the problem is more acute than in developed countries. Epilepsy is twice as common in low and middle-income nations as it is in high-income countries, according to reports. Furthermore, in low-income economies, the prevalence is higher in rural areas than in urban areas. In affluent economies, sophisticated technology utilised in epilepsy diagnosis, such as magnetic resonance imaging (MRI), are widely available, however in certain underdeveloped countries, they are not or only available in large cities. According to the International League Against Epilepsy (ILAE), everyone with epilepsy should get a high-quality MRI in the ideal circumstances.

The Characteristics of "MAGIC TVs" cMRI

"M": Mesial Temporal Sclerosis (MTS)

MTS refers to the sclerosis of structures in the mesial temporal lobe, such as the hippocampus, amygdala, uncus, and others, the most prevalent of which is hippocampal sclerosis (HS). The most frequent pathology driving refractory mesial temporal lobe epilepsy is HS, which is pathologically diagnosed by neuronal loss and persistent fibrillary gliosis [1]. Patients with MTLE frequently have a history of an early triggering insult, such as febrile convulsions in childhood, CNS infections, head injuries, and so on. Refractory recurrent seizures would develop after a seizure-free period of several years.

"A": Aatrophy/Gliosis

Many neurologic events, such as trauma, infarctions, infections, and so on, lead to atrophy, and trauma is the most common cause of focal atrophy associated with epilepsy. Low signal intensity on T1WI, high signal intensity on T2WI, and low signal intensity on T2FLAIR, which stands for focal or diffuse volume loss of the brain, with high signal intensity on T2FLAIR around the lesion, standing for peripheral tissues.

"G": Hypothalamic Hamartoma (HH) Gelastic Seizures

HH is a congenital non-neoplastic lesion with typical symptoms such as gelastic seizures and precocious puberty, as well as imaging abnormalities. On cMRI, grey matter is uniformly isointense on T1WI, mildly hyperintense or isointense on T2WI, and there is no contrast enhancement.

"I": Infection

Infection is the most common cause of epilepsy worldwide. The term "infectious aetiology" refers to a patient who has epilepsy rather than seizures that occur during an infection's acute phase, such as meningitis or encephalitis. In most cases, infectious epilepsy develops after an acute infection as a result of the gliosis or atrophy stated earlier. In all stages of disease, atypical organisms such as parasitic infections.

"C": Malformations of Cortical Development

MCDs are a diverse range of abnormalities that emerge from the disruption of critical cerebral cortical developmental processes, and have been identified as a primary cause of drug-resistant epilepsy and developmental delay [2].

Discussion

For the following reasons, this article focuses on the structural genesis of epilepsy. The doctor should seek to discover the aetiology as soon as the patient experiences their first epileptic seizure, with a focus on those that have treatment implications, the most significant of which is structural aetiology.

Conclusion

The importance of cMRI in the early detection of epilepsy with structural abnormalities cannot be overstated. The very accurate categorization of these images is vital for the right diagnosis and therapy of these epilepsy patients due to the range of causes and presentations.

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