

Lennox Gastaut Syndrome: A Case Report

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Abstract

Lennox-Gastaut syndrome (LGS) is a severe form of childhood epilepsy that is defined by generalized multiple type seizures, slowness of intellectual growth, and a specific EEG disturbance. Children affected might previously have infantile spasms or underlying brain disorder but etiology can be idiopathic. LGS seizures are often treatment resistant and the long term prognosis is poor.

Key words: epilepsy, intellectual growth

Case

A six year old boy with normal premorbid development was brought for evaluation of seizure occurring since the age of 18 months. Initially he used to have generalized tonic clonic convulsion, several episodes in a day; however over a period of five years he developed multiple types of seizure: myoclonic jerks, drop attacks and absence seizures. He had been treated without success with multiple anti-epileptic drugs including phenobarbitone, phenytoin, carbamazepine and valproate. At the time of presentation, he was having 7-8 episodes of seizure a day and was on valproate 25mg/kg, carbamazepine 6mg/kg and clonazepam 0.08 mg/kg.

Detailed history revealed that he was born fullterm at hospital. Antenatal, perinatal and postnatal history was insignificant. On examination, there was no dysmorphism. His head circumference was 52cm. There was multiple scar over his scalp but there were no neurocutaneous markers. During examination, he had several absence seizures. Rest of the general and systemic examinations were also normal except that he had a stooping gait with short steps. He used to utter few obscene words. His vision and hearing were also normal.

Investigations revealed normal fundus, a normal MRI brain and baseline metabolic profile. EEG showed

sharp slow waves (Fig 1). He was diagnosed as LGS as he met the three most important criteria for diagnosis which included multiple types of generalized seizures, which are difficult to control, slowness of intellectual growth and specific EEG findings.

The dose of valproate was increased to 45mg/kg and clonazepam to 0.15mg/kg. Carbamazepine was stopped. The seizure was controlled at the time of discharge.

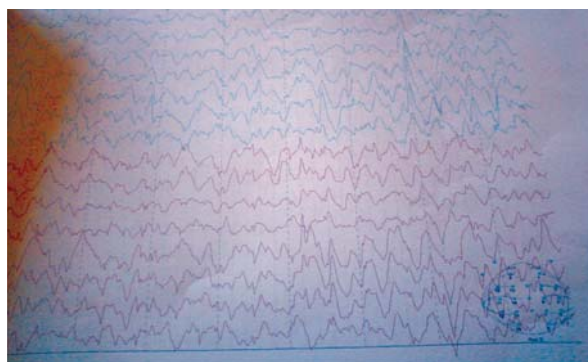


Fig. 1: EEG showing sharp slow waves

Discussion

LGS is one of the catastrophic childhood epilepsies. It is defined by a triad of symptoms: Multiple types of generalized seizures, which are difficult to control; slowness of intellectual growth often accompanied by mental retardation and behavioural problems and

specific electroencephalogram (EEG) pattern called a slow spike and wave pattern (<2.5Hz), which is present when the child is awake¹⁻⁴.

William Lennox described the clinical features of the syndrome in 1930s, and then Lennox and Davis reported the symptomatic triad of the syndrome. Later, Gastaut expanded on the original observations of Lennox and Davis⁵⁻⁶. In addition, the Commission on Classification and Terminology of the International League Against Epilepsy described the criteria of LGS and their frequency are: (1) diffuse slow spike waves in the EEG (100%), (2) Tonic seizures (94%), (3) atypical absences (80%), (4) runs of rapid spikes in NREM sleep (approx. 70%), (5) status epilepticus (60%), (6) atonic seizures (43%). Resistance to therapy and persistence of epilepsy are amongst the most frequent features. Mental retardation is a leading symptom, occurring on average in 90% of cases⁷.

Prevalence

LGS accounts for 1-4% of patients with childhood epilepsy. The prevalence of LGS in Atlanta, Georgia, was reported as 0.26 per 1000 live births. Epidemiologic studies in the western or industrialized world (Israel, Spain, Estonia, Italy, Finland) demonstrated that the proportion of patients with LGS seems relatively consistent across the populations studied and similar to that in the United States⁸. There is no such studies carried out in this part but a study done in AIIMS, India by V Karla et al has shown that 3.5% of the children attending neurology clinic were suffering from epileptic encephalopathy including LGS⁹.

The mean age onset of seizure is 26-28 months (range, 1 d to 14 y). The peak age at epilepsy onset is older in patients with LGS of an identifiable etiology than in those whose LGS has no identifiable etiology. They rarely start after the age of eight^{2,3}.

Etiology

In about one third of the affected children cause cannot be identified. These cases are referred to as cryptogenic LGS^{2,3}. On the other side, many of the children who develop LGS had a pre-existing brain disorder or injury. Causes identified include tuberous sclerosis, congenital infections, hereditary metabolic diseases, brain malformation, and brain damage (due to birth asphyxia or other birth injuries, encephalitis, meningitis or head injuries). In a study of childhood recurrent seizures in Red Cross memorial hospital in Cape Town, South Africa, 11% suffered from meningitis or encephalitis as a precipitating factor and 55% were intellectually handicapped¹⁰.

Clinical features

Typically, daily multiple seizure types occur in LGS. Of them, tonic seizures occur more frequently and are often nocturnal. Children may have atonic, myoclonic, partial, tonic-clonic or absence seizures. Additionally, about 60% of children may have status epilepticus¹³. Most children with the Lennox-Gastaut syndrome have intellectual impairment and learning disability that ranges from mild to severe. Behavioral problems and depression are also common, which can be attributed to the brain injury, the frequent seizures, and the lack of normal social stimulation or as side effects of Anti-Epileptic Drugs (AEDs)^{5,11}. These children are also more likely to have cerebral palsy, progressive decline in IQ and progressive gait disturbances⁵. They may look irritable, tired or bored. Many children fail to cope with school and need institutional care. The child's development is rarely normal. The seizures can cause sudden falls and/or loss of balance, and patients are advised to wear a helmet to prevent head, face and teeth injury.

The diagnosis of LGS thus depends on the clinical manifestation and typical EEG finding characterized by an interictal EEG disturbance of slow spike-wave pattern (< 2.5 Hz), often accompanied by a burst of fast rhythms of 10 to 12 Hz at night¹⁻³.

Treatment

The optimum treatment for Lennox-Gastaut syndrome has yet to be established¹². Pharmacological treatment consists mainly of one or multiple antiepileptic drugs (AED's). No single treatment regimen could be considered superior to the others, and management depends on the response of the patients. Medical treatment usually starts with valproates followed by adjunctive therapy with either lamotrigine or topiramate^{13,14}.

Most epileptologists have viewed valproate as a first-line drug for LGS since the early 1980's because of: (1) VPA's efficacy against partial seizures and generalized seizures (including absence); (2) lack of exacerbation of any of the seizure types associated with LGS; (3) relative lack of sedative side-effects compared to barbiturates, and (4) relative ease of use compared to the ketogenic diet.

In cases of intractable seizures surgical treatments like vagus nerve stimulation, corpus callosotomy and Electrical stimulation of the centromedian thalamic nucleus are reported to be effective in few cases.

Ketogenic diet is a reportedly effective option for treatment. A ketogenic diet is a high fat, low protein, low

carbohydrates diet that induces ketosis, a state in which there is an excessive amount of ketones in the body. It is very effective and is becoming increasingly popular for treatment of LGS.

Goals and Treatment Objectives

Counseling of the parents or caregiver regarding the nature of the disease is the important part of the treatment. Children with LGS never become seizure free and the goal is to limit the number of seizures while maintaining alertness. The seizures that result in falls and injuries and the atypical absence seizures (that exacerbate the epileptic encephalopathy) should be the primary therapeutic target. Limiting the dose-related sedative and cognitive side effects may improve quality of life for the patient and lastly relative remissions and exacerbations of seizure frequency that are often unrelated to any obvious external factors; quick decisions that lead to discontinuing a drug or adding an additional drug may be regretted later. For clusters of seizures benzodiazepines (rectal diazepam or sublingual/oral lorazepam) can be used.

Prognosis

The long term outcome is poor in terms of seizure control and intellectual development. Catastrophic disorders such as LGS are associated with morbidity and mortality¹. Eighty percent of patients with Lennox-Gastaut syndrome continue to have seizures throughout childhood and into their adult life. The mortality rate ranges from 3 to 7%².

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