Case Report

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West Syndrome

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Abstract

West syndrome is a severe epilepsy syndrome composed of the triad of infantile spasms, an interictal electroencephalogram (EEG) pattern termed hypsarrhythmia, and mental retardation, although the diagnosis can be made even if 1 of the 3 elements is missing (according to the international classification).West syndrome is an age-dependent expression of a damaged brain, and most patients with infantile spasms have some degree of developmental delay. The term infantile spasm has been used to describe the seizure type, the epilepsy syndrome, or both. In this article, the term infantile spasm is synonymous with West syndrome. The syndrome's namesake, Dr W J West, gave the first detailed description of infantile spasms, which occurred in his own child. In a letter to the editor of *The Lancet* in 1841, West described the events as "bobbings" that "cause a complete heaving of the head forward towards his knees, and then immediately relaxing into the upright position … [T]hese bowings and relaxings would be repeated alternately at intervals of a few seconds, and repeated from 10 to 20 or more times at each attack, which would not continue more than 2 or 3 minutes; he sometimes has 2, 3 or more attacks in the day." This detailed clinical description was followed approximately 100 years later by the report of the typical interictal EEG pattern termed hypsarrhythmia.

Keywords: Seizure Types; Learning Disabilities; EEG.

Introduction

West syndrome (or infantile spasms) is characterized by the association of clusters of axial spasms, psychomotor retardation and a hypsarrhythmic interictal EEG pattern. It is the most frequent type of epileptic encephalopathy. It may occur in otherwise healthy infants and in those with abnormal cognitive development. The incidence is estimated at between 1 and 1.6/100,000 live birth. Boys are more often affected than girls. Onset occurs between 3 and 7 months of age in 50–70% of cases. Onset at birth or in older infants and children (up to the age of 5) is much less common. The spasms consist of sudden axial flexion or, more often, extension movements and may be associated with ocular deviation. The contractions are most visible in the upper limbs and are frequently followed by crying. However, the spasm may be restricted to an upwards ocular deviation. A cerebral malformation should be considered in the presence of asymmetry. The spasms occur in a series, separated by intervals of 5–30 seconds, and may last for more than 10 minutes. The spasms become more intense as the series progresses. The EEG pattern of the spasms consists of a high-amplitude and diphasic slow wave. The interictal EEG pattern is described as hypsarrhythmic as it is characterized by asynchronous and high-amplitude slow waves and multifocal spikes. Both fast and slow variants, depending on the aetiology, have been reported. The etiology of the syndrome is variable. Cerebral anomalies are detected in 70–80% of cases. The most common causes of these anomalies are malformations (most frequently tuberous sclerosis (Bourneville disease), or sequelae of ischemia or meningoencephalitis), a genetic anomaly (such as trisomy 21, the 1p36 deletion or mutations in the *ARX* or *STK9* genes) or a metabolic disease (such as a mitochondrial disorder or phenylketonuria).

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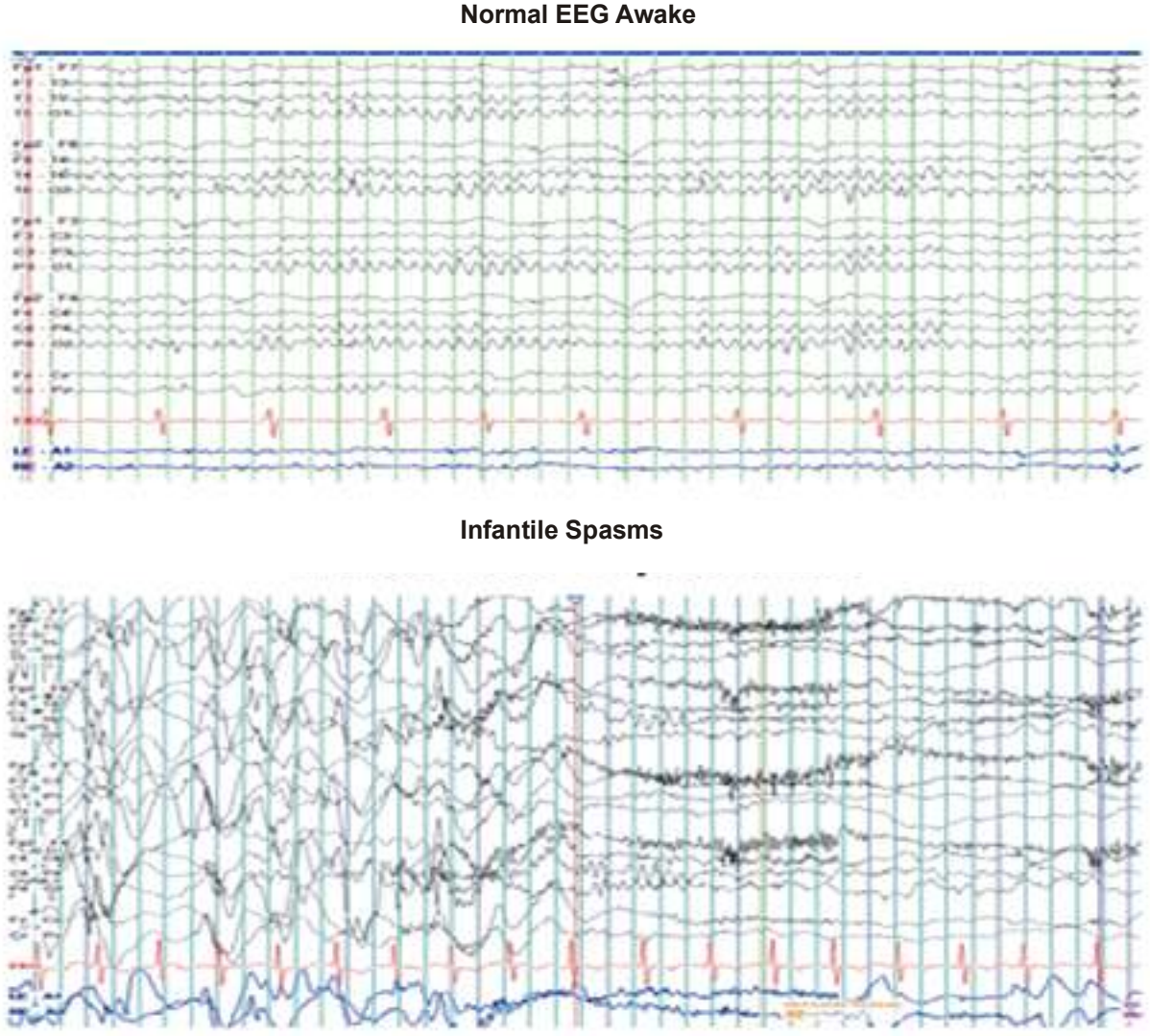
Around 10% of cases of West syndrome are idiopathic: in these infants psychomotor development is normal before onset of the spasms and the contractions and hypsarrhythmia are symmetric and respond to medication. The remaining 10–20% of the cases are cryptogenic and probably associated with an anomaly that has not yet been detected. Diagnosis is based on the clinical picture and EEG pattern. The differential diagnosis may be problematic and should include Sandifier syndrome, benign myoclonus, hyperekplexia (see these terms), gastro-oesophageal reflux and breathe holding spells. Genetic counselling may be useful depending on the aetiology. Treatment is pharmacological. The two most effective treatments are vigabatrin (often used as the first-line treatment) and corticoids (used when treatment with vigabatrin fails). Treatment should begin as early as possible to limit the cognitive deficit caused by the epilepsy. Surgical intervention is only used in cases with localized cerebral lesions. The prognosis varies depending on the aetiology and speed with which treatment is initiated. Even after a first response to treatment, reoccurrence occurs within 6 months in 30% of cases. The spasms tend to resolve after 5 years of age but reoccurrences have been reported. Motor, sensorial or mental sequelae are present in 75% of infants and the epilepsy is resistant to medication in 50–60% of cases.

Case Report

1 year old male presented with chief complaint of cough and running nose from a week. On further history taking, mother complaints of abnormal movement of hand continuous jerky movement.

Fig. 1: EEG Showing Hypsarrhythmia (source: Internet)



On further examination, we found that he does not follow light and he has development delay and a head lag.

Parents consulted a neurosurgeon at age of 6 months for his jerky hand movements and based on his jerky movements and his EEG recording, the doctor diagnosed his condition as "West Syndrome"

Laboratory Investigation:

Hb: 10.2 gm%

TLC: 9800

N-68, L-32, E-2, M-2

Platelet: 3.29 lacs

Serum Sodium: 137

Serum Pottasium: 4.5

Serum Calcium: 9.1

An etiologic diagnosis can be identified in more than 70% of cases [1, 2] which may lead to a specific therapy that can have a dramatic influence on the outcome of the patient. Three key factors lead to the diagnosis. The first factor is age. Infantile spasms are a disorder of the developing nervous system and the spasms typically begin in the first year of life, most commonly between 4 and 8 months of age [3]. Occasionally, they may begin in the neonatal period [4] or rarely, much later in childhood [5]. The second factor is the semiology. Clusters of flexion jerks of the neck, trunk, and extremities lasting 1–2 seconds are typical. Variations occur, such as extension of upper and lower extremities or both. Or, the spells may be very subtle, such as just a brief head drop (so-called Blitz-Nick-Krämpfe or "lightening neck spasms"). Although the spasms may happen as single jerk event, clusters are more common and often occur on awakening in the morning or after a nap [6, 7, 8]. The third factor is a very distinct EEG pattern. EEG abnormality called hypsarrhythmia [9]. Hypsarrhythmia is a very high-voltage, disorganized pattern of EEG abnormality. Hypsarrhythmia or modified hypsarrhythmia is seen in about two thirds of cases. Other patterns, such as multifocal independent spike discharges (MISD), are present in the remainder.

The Etiologic Diagnosis

The reported causes of infantile spasms are extensive and broad categories of etiologies, including (i) CNS infection, which may have occurred prenatally (e.g., transplacental infections), perinatally (e.g., herpes simplex virus), or postnatally (e.g., meningitis or encephalitis); (ii) brain developmental abnormalities, such as lissencephaly, focal cortical dysplasia, or hemimegalencephaly; (iii) neurocutaneous syndromes, including tuberous sclerosis, neurofibromatosis, and incontinentia pigmenti; (iv) hypoxic ischemic encephalopathy; (v) chromosomal or genetic abnormalities, such as Down syndrome, Miller–Dieker syndrome, or ARX mutation; and (vi) rarely, a metabolic disorder. While the metabolic disorders are important, they represent only a small percentage of patients. Metabolic workup and specific chromosomal or gene testing is quite expensive and should be reserved for patients for whom an etiology is not identified in the initial evaluation.

Physical and Neurologic Examination

Several etiologic diagnoses can be identified by careful examination. Many patients are developmentally delayed and have evidence of cerebral palsy [12]. Examination of the skin, especially for evidence of neurocutaneous disorders, is particularly important. The most common neurocutaneous disorder is tuberous sclerosis, which typically has characteristic "ash leaf" spots [13].

Magnetic Resonance Imaging

Neuroimaging has been a significant advancement in the last several decades in the diagnosis of the underlying etiologies of infantile spasms. A very extensive list of neurologic abnormalities can be seen on MRI scan, including cortical dysplasia, porencephalic cyst, and evidence of brain injury events, such as hypoxic ischemic encephalopathy, trauma, or infection.

Metabolic Workup

If examinations and imaging are unrevealing, then and only then the patient should have a metabolic workup. More than 50 genetic/metabolic diseases have been associated with infantile spasms [14]. A good first step is to administer 100mg pyridoxine intravenously to identify pyridoxine-dependent seizure disorder. If that is unsuccessful, then routine blood work, looking especially for an anion gap, urine for organic acids, serum for amino acids, lactate, pyruvate, and ammonia, should be performed. A lumbar puncture to assess for glucose, amino acids (specifically for glycine), since hyperglycinemia may be detected only in CSF [15] as well as evidence of infection may be revealing.

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Treatment

There is only one goal for treatment of infantile spasms: the complete control of spasms. If spasms cannot be controlled, the child is unlikely to do well developmentally, and a 50% or 90% reduction does not provide for this possibility. Unfortunately, for many patients, the only goal that can be obtained is amelioration of seizures, because the underlying diagnosis precludes normal development (e.g., lissencephaly or status posthypoxic ischemic encephalopathy, with severe brain damage). ACTH and vigabatrin. Older medications, such as phenobarbital, carbamazepine, or phenytoin, are rarely helpful. There is growing evidence that some of the newer drugs, high-dose intravenous immunoglobulin, and the ketogenic diet may be effective. For patient with localizable brain abnormalities, cortical resection offers the possibility of seizure control if medications fail.

Adrenocorticotropic Hormone

Dosing ranges from 0.2 IU/kg/day to 150 IU/m^2. A commonly used ACTH dose is 40 IU/day.

Vigabatrin

Vigabatrin generally is well tolerated in young children. There are reports of hypotonia, somnolence, or insomnia all of which would be expected from a drug that enhances GABA activity. Visual field constriction is the one serious side effect that substantially limits the use of vigabatrin. The visual loss is usually very subtle, so it took more than a decade to recognize the side effect.

Pyridoxine

Pyridoxine (vitamin B_6) dependency is a very rare cause of infantile spasms. A trial of 100-mg pyridoxine given intravenously should be administered if diagnosis remains in doubt after the history, examination.Side effects include loss of appetite, irritability, and vomiting—all of which are relatively common but modest compared with those associated with ACTH or vigabatrin. Pyridoxine has not found favor outside of Japan and a few other epilepsy centers.

Other Drug Therapies

One of the earliest nonsteroid treatments for infantile spasms were the benzodiazepines (Several of the new anticonvulsants have some evidence of efficacy.

- Zonisamide
- Topiramate
- Felbamate
- Lamotrigine

Nondrug Therapies

There are three nondrug therapies that should be considered as options when other therapies have failed: the ketogenic diet, high-dose intravenous immunoglobulin, and surgery.

The ketogenic diet is a decades-old therapy that has had resurgence in popularity. Two recent retrospective reports of 40 children with infantile spasms indicate that the diet may control spasms in 20 to 35 percent of patients who are intractable to other therapies [16, 17]. Most of the children tolerated the diet well, but there were adverse events, including renal stones, gastritis, hyperlipidemia, and gastroesophageal reflux.

High-dose intravenous immunoglobulin has been reported to be helpful in a variety of seizure disorders[1]. Intravenous immunoglobulin doses ranged from 100 to 200 mg/kg/dose administered every 2 to 3 weeks to 400 mg/kg/day for five consecutive days.

The final nondrug therapeutic option is cortical resection and should be considered for patients who have failed ACTH and Vigabatrin or both, and have evidence of localizable abnormalities, such as cortical dysplasia, porencephaly, or tuberous sclerosis.

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