Case Report

Epilepsy with Continuous Spikes and Wave during Slow Sleep: A Case Report

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This report presents a 5.5-year-old girl who presented with multiple types of seizure disorder along with behavioral change, cognitive deterioration, and language impairment. Electroencephalography showed nearly continuous spike-wave during slow wave sleep. Both clinical and electrographic findings were consistent with epilepsy with continuous spikes and wave during slow sleep (CSWS). Although the seizures were well controlled with conventional antiepileptic drugs, improvement of behavioral, cognitive, and language functions was observed only after adding corticosteroid as an adjunctive treatment. Corticosteriod may have a role in treatment in children with CSWS.

Keywords: *Epilepsy, Cognitive deterioration, Continuous spike and wave during slow sleep, ESES*

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Epilepsy is the most common childhood neurological condition. Each year, in the US, approximately 20,000-40,000 children age less than 20 years would have their first unprovoked seizure[1]. Common manifestation in epilepsy are focal or generalized tonic, tonic-clonic, myoclonic jerk, staring episodes such as absence or complex partial seizure.

Among these epilepsies, there is a condition called epileptic encephalopathy which refers to a condition in which frequent seizures or subclinical paroxysmal interictal activity themselves are believed to contribute the progressive disturbance in cerebral function[2]. The well known childhood epileptic encephalopathies are West syndrome (WS) and Lennox-Gastaut syndrome (LGS). Overt clinical manifestations in both syndromes are seizures[2].

In addition, there are two rare epileptic encephalopathies which epilepsy is not a prominent feature but language and/or cognitive deterioration is the major finding. These are acquired epileptic aphasia or Landau-Kleffner syndrome (LKS) and epilepsy with continuous spikes wave during slow sleep (CSWS)[3]. Treatment for both conditions is far from conventional. In addition to standard antiepileptic medications, several treatment options are used in attempts to improve language and cognitive deterioration[4]. These are corticosteroid[5, 6], ACTH[7], intravenous immunoglobulins[8], and surgery[9].

This report presents a patient with CSWS who cognitive and language deterioration failed to response to conventional antiepileptic drugs but remarkably improved after using corticosteroid.

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Case Report

A 5.5-year-old girl presented to our neurology clinic with cognitive impairment and behavioral changes. She was born as a full term baby to nonconsanguinous parents after an uneventful pregnancy. She was initially healthy, had normal intelligence and achieved developmental milestones, including speech, at appropriate age. One year prior to initial evaluation, she, occasionally, had had focal clonic movements of her left face during the night. No medical attention, however, was made. Three months prior to the clinic visit, she was noticed to have deterioration in her school performance and a decrease speech output as well as verbal agnosia. Initial neurological examination disclosed an inattentive girl with poor eye contact and with no response to verbal command. No focal neurological deficit was noted. Initial EEG showed

right centro-temporal spikes. Magnetic resonance image of the brain was normal. A trial of valproic acid was started with completely control of focal motor seizure. Later, she was noticed to have very frequent events staring with eye blinking episodes; the absence seizure. No improvement of cognitive and language deterioration was noted. Three month later, an overnight sleep EEG revealed nearly continuous generalized spike-wave complex, 1-2 Hz, maximum frontal area, during slow wave sleep (Fig 1). A presumptive diagnosis of epilepsy with CSWS was given. A trial of clobazam was started. Her absence seizure was completely controlled with combination of valproic acid and clobazam. A repeat EEG showed frequent focal spikes over the right central-temporal region and the continuous spike-wave complex during slow wave sleep disappeared. However, there was no improvement of her cognitive, behavioral and language functions. Therefore, prednisolone at 2 mg/kg/day was then started. One month after, her mother reported of improvement of her language in which she was able to follow some simple command. After one month of high dose prednisolone, it was gradually tapered to 0.5 mg/kg/day. Her overall cognitive function gradually improved. Four month after institution of prednisolone, she was able to attend a regular school, talked in a short sentence, performed most of her activity of daily living with minimal assistance, wrote and did homework by herself. Significant complications during treatment were weight gain, cushingnoid appearance and steroid induced diabetes which required diet control only.

Discussion

The most important diagnostic finding in this patient is continuous spike-wave during slow wave

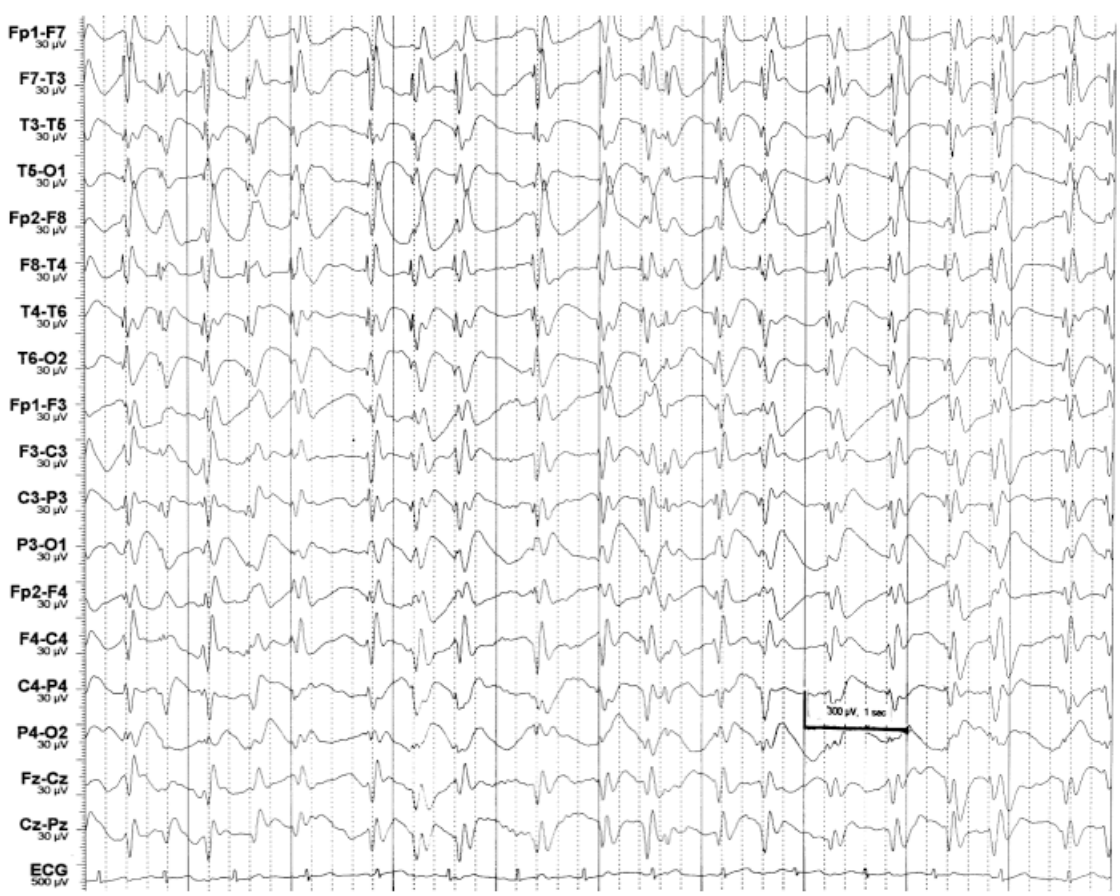

Fig. 1 EEG during slow wave sleep reveals nearly continuous, diffuse 1-2 Hz spike-and-wave discharges, maximum frontal region

sleep. This EEG characteristic is consisted with electrical status epilepticus during sleep (ESES)[4]. The term epilepsy with CSWS is used to describe a clinical condition of global or specific cognitive deterioration in association with typical ESES[10]. It was first described in 6 children in 197[11]. CSWS is a rare childhood epileptic syndrome with 0.2% incidence[12]. CSWS is age-related, occurring between the ages of 5-12 years. Although the majority of the patients have normal neuropsychological and motor function prior to the onset of CSWS, up to one-third have preexisting neurological abnormalities[3]. Several types of seizure have been reported in CSWS, including partial motor seizure, generalized tonic-clonic, complex partial seizure, atonic, and both typical and atypical absence. Motor impairment is also a prominent feature in the form of dyspraxia, dystonia or ataxia[4].

The remarkable features in epilepsy with CSWS are declination in all cognitive functions. Patients may present with behavioral changes (aggressive behaviors, attention deficits and hyperactivity), impairment of global intelligence, and loss of language acquisition[4].

EEG is an essential diagnostic tool in CSWS. The characteristic EEG features are seen during slow wave sleep. EEG shows nearly continuous bilateral and diffuse slow spikes-wave, 1.5-2 Hz, persisting throughout all slow wave sleep[3]. In the first documented case series, the ESES was presented in at least 85% of non-REM sleep over a period of one month[11]. However, the International League Against Epilepsy (ILAE) criteria is less stringent and requires only the present of ESES during slow wave sleep[10]. A similar and related syndrome is acquired epileptic aphasia or Landau-Kleffner syndrome (LKS). LKS is an epileptic encephalopathy presenting with loss of language in a previously normal child with or without clinical seizures. EEG findings are bilateral symmetrical or asymmetrical multifocal spikes and spike-waves most frequently located in the temporal and parieto-occipital regions. In CSWS, the epileptiform discharges are more prominent over the frontal-central regions[13]. There are overlap symptoms between CSWS and LKS. However, the most prominent neuropsychological feature in LKS is acquired aphasia while all cognitive declines are prominent in CSWS. It has been postulated that LKS is one of clinical feature of CSWS[4].

Neuroimaging studies in CSWS are abnormal in about one-third of the patients. The most common abnormalities are brain atrophy and abnormal brain development. Since the mortality is low, no actual brain pathology of this syndrome is reported[4].

Our patient developed focal motor seizure for almost one year prior to the development of cognitive and language deterioration. EEG during cognitive deterioration showed bilaterally synchronous spike-wave during slow wave sleep. Both clinical history and EEG findings were consistent with epilepsy with CSWS according to the criteria set by ILAE[10].

Although, the etiology and pathogenesis of CSWS is unclear[4], it is generally believed that ESES is the cause of cognitive regression. Disappearance of ESES either spontaneously or from medication results in improvement of over all cognitive function and behavior but complete recovery is rare[3].

The aims of treatment in epilepsy with CSWS are to control epileptic seizures and to improve cognitive and language functions. Treatment of epileptic seizure is based on types of seizures. The most effective medications for this syndrome is the combination of benzodiazepine and valproic acid[4]. Carbamazepine should be avoided since it may aggravate ESES[4]. Although seizures are relatively difficult to control, a long term remission is favorable in CSWS. Complete absence of continuous spike-wave during sleep is more difficult to achieve. Since it is believed that ESES is the cause of cognitive deterioration, aggressive therapy to suppress this activity is recommended[4, 13, 14]. Benzodiazepines , adrenocorticotrophic hormone, and corticosteroid have been reported to suppress the electrical status and result in improvement of language function in LKS[5-7]. Later, corticosteroid was adopted in CSWS with also significant improvement in language, cognition, and behavior[15, 16]. Some authors believed that early treatment may be more successful[7, 16]. Other treatments in LKS include intravenous immunoglobulins[8] and surgical treatment, such as multiple subpial transection[9]. These treatments, however, are not currently used in CSWS.

Although seizures and ESES may disappear spontaneously or with medication, the overall prognosis in these patients is relatively unfavorable. Cognitive, language and behavior problems generally improve with a disappearance of ESES. Complete recovery is rare. Only one-half of patients live a in a normal life as adults[4].

In conclusion, a case of epilepsy with CSWS is reported. Although seizures were controlled and ESES disappeared with combination of valproic acid and clobazam, a remarkably improvement of overall cognitive functions were seen only after a course of high dose of corticosteroid. This supports the use of corti-

costeroid for this syndrome. Significant sides effects from corticosteroid may occur; thus, it should be used when other therapies fail to improve cognitive and language dysfunctions.

References:

1. Hirtz D, Berg A, Bettis D, Camfield C, Camfield P, Crumrine P, et al. Practice parameter: treatment of the child with a first unprovoked seizure: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. Neurology 2003;60:166-75.
2. Engel J Jr. Classification of epileptic disorders. Epilepsia 2001;42:316.
3. Tassinari CA, Rubboli G, Volpi L, Meletti S, d'Orsi G, Franca M, et al. Encephalopathy with electrical status epilepticus during slow sleep or ESES syndrome including the acquired aphasia. Clin Neurophysiol 2000;111:S94-S102.
4. Tassinari C. Electrical status epilepticus during slow wave sleep (ESES or CSWS) including acquired epileptic aphasia (Landau-Kleffner syndrome). In: Roger J BM, Dravet CH, Genton P, Tassinari CA, Wolf P, editors. Epileptic syndrome in infancy, childhood and adolescent. 3rd ed. London: John Libbey, 2002: 265-83.
5. Marescaux C, Hirsch E, Finck S, Maquet P, Schlumberger E, Sellal F, et al. Landau-Kleffner syndrome: a pharmacologic study of five cases. Epilepsia 1990;31:768-77.
6. Tsuru T, Mori M, Mizuguchi M, Momoi MY. Effects of high-dose intravenous corticosteroid therapy in Landau-Kleffner syndrome. Pediatr Neurol 2000;22:145-7.
7. Lerman P, Lerman-Sagie T, Kivity S. Effect of early corticosteroid therapy for Landau-Kleffner syndrome. Dev Med Child Neurol 1991;33:257-60.
8. Mikati MA, Saab R. Successful use of intravenous immunoglobulin as initial monotherapy in Landau-Kleffner syndrome. Epilepsia 2000; 41:880-6.
9. Morrell F, Whisler WW, Smith MC, Hoeppner TJ, de Toledo-Morrell L, Pierre-Louis SJ, et al. Landau-Kleffner syndrome. Treatment with subpial intracortical transection. Brain 1995;118(Pt 6): 1529-46.
10. Proposal for revised classification of epilepsies and epileptic syndromes. Commission on classification and terminology of the international league against epilepsy. Epilepsia 1989;30:389-99.
11. Patry G, Lyagoubi S, Tassinari CA. Subclinical "electrical status epilepticus" induced by sleep in children. A clinical and electroencephalographic study of six cases. Arch Neurol 1971;24:242-52.
12. Kramer U, Nevo Y, Neufeld MY, Fatal A, Leitner Y, Harel S. Epidemiology of epilepsy in childhood: a cohort of 440 consecutive patients. Pediatr Neurol 1998;18:46-50.
13. Smith MC, Hoeppner TJ. Epileptic encephalopathy of late childhood: Landau-Kleffner syndrome and the syndrome of continuous spikes and waves during slow-wave sleep. J Clin Neurophysiol 2003;20:462-72.
14. McVicar KA, Shinnar S. Landau-Kleffner syndrome, electrical status epilepticus in slow wave sleep, and language regression in children. Ment Retard Dev Disabil Res Rev 2004;10:144-9.
15. Okuyaz C, Aydin K, Gucuyener K, Serdaroglu A. Treatment of electrical status epilepticus during slow-wave sleep with high-dose corticosteroid. Pediatr Neurol 2005;32:64-7.
16. Sinclair DB, Snyder TJ. Corticosteroids for the treatment of Landau-kleffner syndrome and continuous spike-wave discharge during sleep. Pediatr Neurol 2005;32:300-6.

Epilepsy with Continuous Spikes and Wave during Slow Sleep: รายงานผู้ป่วย 1 ราย

สุรชัย ลิขสิทธิ์วัฒนกุล

รายงานนี้นำเสนอผู้ป่วยเด็กหญิงไทยอายุ 5.5 ปีที่มาพบแพทย์ด้วยอาการสำคัญคือ อาการชักซึ่งมีทั้งแบบกระตุกเฉพาะที่และแบบเหม่อลอย ร่วมกับการมี พฤติกรรมเปลี่ยนแปลง การถดถอยของระดับสติปัญญาและความสามารถพูดและทำความเข้าใจภาษาลดลง การตรวจคลื่นสมองพบว่ามีคลื่นลมชักแบบ spike-wave เกือบตลอดเวลาในขณะหลับ (continuous spike-wave during slow wave sleep) อาการของผู้ป่วยและคลื่นสมองที่ตรวจพบนั้นเข้าได้กับ โรค epilepsy with continuous spikes wave during slow sleep ถึงแม้อาการชักจะควบคุมได้ดีด้วยยากันชัก แต่อาการถดถอยของระดับสติปัญญา ความสามารถในการเข้าใจภาษาและความสามารถในการพูดนั้นดีขึ้นมาก ภายหลังจากได้รับการรักษาร่วมกับยาสเตียรอยด์ ดังนั้นการใช้ยาสเตียรอยด์ในผู้ป่วยกลุ่มอาการนี้อาจจะมีประโยชน์โดยเฉพาะอย่างยิ่งเมื่ออาการของผู้ป่วยไม่ตอบสนองต่อยาตัวอื่นๆ