

Hot Water Epilepsy: Case Report

Sıcak Su Epilepsili Bir Olgu

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Geliş Tarihi/Received: 06.01.2010
Kabul Tarihi/Accepted: 28.09.2010

*This case report was presented as a poster
in 43rd National Congress of Neurology,
10-15 November 2007, Antalya, Turkey.*

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ABSTRACT Hot water epilepsy refers to a specific type of reflex epilepsy precipitated by the stimulus of bathing with hot water. This article reports an 18-year-old male with a six years history of progressive hot water epilepsy. Initially, the seizures had been precipitated by hot water bathing only. Then progressively worsened and had started to be triggered by minor external stimuli such as face-washing alone and even with the smell of shampoo. The patient's psychomotor development was normal. Neurologic examination and laboratory investigation revealed no abnormality. He responded well to the treatment with valproate (1000 mg/day). The pathophysiology of epilepsy provoked by hot water is still unknown. The patients with hot water epilepsy should be treated in the early stage of the disease. Because it is possible that other precipitating factors can be added and spontaneous nonreflex seizures may develop by time if they are not treated properly.

Key Words: Epilepsy; epilepsy, reflex; seizures

ÖZET Sıcak su epilepsisi, sıcak su ile banyo sırasında tetiklenen, refleks epilepsinin özel bir formudur. Bu çalışmada altı yıldır progresif sıcak su epilepsisi öyküsü olan 18 yaşında erkek olgu bildirildi. Başlangıçta, nöbetler sadece sıcak su banyosu ile tetiklenirken daha sonraki yıllarda yüz yıkama ve şampuan kokusu gibi minör stimulus ile de nöbetler tetiklenmeye başladı. Olgunun psikomotor gelişimi normaldi. Nörolojik muayene ve laboratuvar incelemelerinde anormallik yoktu. Nöbetler valproat tedavisine iyi yanıt verdi (1000 mg/g). Sıcak su ile provoke olan epilepsinin patofizyolojisi henüz bilinmemektedir. Sıcak su epilepsili olgular hastalığın erken dönemlerinde tedavi edilebilirler. Çünkü erken dönemde doğru tedavi edilmezlerse, diğer presipitan faktörlerin eklenmesi ve spontan nonrefleks nöbetlerin gelişme ihtimali vardır.

Anahtar Kelimeler: Epilepsi; epilepsi, refleks; nöbetler

Türkiye Klinikleri J Neur 2010;5(3):179-81

Seizures precipitated by specific sensory or cognitive stimuli are called "reflex seizures". Reflex seizures can manifest in the form of generalized or partial seizures, and account for 4-7% of patients with epilepsy. Epilepsy precipitated by the stimulus of bathing with hot water pouring over the head is known as "hot water epilepsy (HWE)".¹

This condition was first described in 1945 by Allen in a 10-year-old boy who experienced seizures during bathing.² Afterward, there were isolated reports from all over the world.²⁻⁵ The largest series of HWE has been reported from Southern India where the percentages were 6.9% with a prevalence of 60/100000 among all epilepsy patients.^{6,7} The second largest series of HWE cases were from Turkey, where the incidence has been re-

ported as 0.6%.^{8,9} The reasons for high incidence in these regions were speculated to be the bathing habits, especially pouring the hot water over the head, and genetic factors.¹⁰ Children are more frequently affected than adults and male predominance was reported.¹¹

This condition is rather a self-limited type and reports for progression is uncommon. In this study, we present the clinical progress of a case with a hot water epilepsy and the treatment approach.

CASE REPORT

An 18-year-old male patient presented with a six year history of seizure while bathing. The patient was born at term without complications. He exhibited normal psychomotor development. His history included meningitis at four months of age, and a single febrile convulsion when he was two years old. There was no family history of epilepsy or febrile convulsion. These attacks occurred while he was bathing. His bathing habits was to pour cupfuls of water from a bucket in quick manner directly over his head. Convulsion episodes occurred 40-60 seconds after the water was poured. The patient described that during these episodes he had a dream-like aura, which was followed by nausea and vomiting. Then he became unresponsive, with eyes gazing upward, and started tonic-clonic contractions that lasted for approximately one minute. There was no history of associated incontinence and post-ictal drowsiness lasted for about one minute. At the onset of his disease, while the seizures were reported to have been precipitated only by hot water but four years later, warm water, face washing alone and even the smell of shampoo has induced the seizures. However he reported to have no seizures when he washed his head or face with cold water, and sponging his body with warm water he did not experience these attacks. We do not have any information about feeling of pleasure and self induction of seizures with this patient. The patient reported no spontaneous seizures. The findings on neurologic examination and laboratory testing were all normal. Interictal and sleep deprivation electroencephalography (EEG) were in normal limits.

Cranial magnetic resonance imaging revealed no structural lesions. For treatment we suggested him to change the method of bathing, such as sponging instead of pouring water over the head and using cold water for head and face, and sponging his body with warm water rather than hot bath water. Treatment with carbamazepine combined with recommendations as washing method gave no relief. However, the patient responded well to valproate therapy (1000 mg/day).

Informed consent was obtained from the patient.

DISCUSSION

We report a case of HWE in whom seizures worsened progressively. Hot-water epilepsy is a benign condition with good prognosis in the majority of cases.^{10,11} However, the pathogenetic mechanism of this form of reflex epilepsy remains unknown. Repeated exposure of the heads of adult rats to hot water (45°C) induced experimental seizures, which is comparable to the phenomenon of kindling by repeated stimulation with subthreshold electrical current. Klauenberg and Sparper called this *hyperthermic kindling*.¹² Satishchandra et al. postulated that the similar phenomenon of hyperthermic kindling might be responsible for the development of HWE in humans.⁶

In this patient seizures occur rapidly after contact with hot water on head, suggesting that repeated skin stimulation with hot water over his head is responsible for precipitating an attack. During the time period of progression some changes in triggering factors could be seen due to kindling effect. Triggering stimulus in this type of epilepsy is complex and involves combinations of such factors as contact with water, temperature of the water, specific area of stimulation, and also perhaps repeated stimulation with pouring water.^{6,11} The HWE patients probably have an aberrant thermoregulatory system and are extremely sensitive to the rapid increase in temperature occurring during hot water head baths, which precipitates seizures. This aberrant thermoregulation seems to be genetically determined.¹⁰

In our case all the provoked attacks began with complex partial and developed generalized tonic-

clonic seizures. He had suffered febrile convulsion and meningitis in childhood. And he reported no epileptic seizure spontaneously. Seven to 11% patients had a history of febrile convulsion before the development of reflex epilepsy. A positive family history of HWE was observed in 7%-15%.^{6,7} There are reports of epileptic abnormality located on the temporal and frontal region on EEG in HWE patients.^{6,8-10,13} Tezer et al. reported five of 89 patients with HWE had cerebral lesions such as occipital medial cortical dysplasia, arachnoid cyst in the temporal region, hippocampal sclerosis, hippocampal atrophy.¹³ In this patient he had a history of febrile convulsion and meningitis but EEG and MRI revealed no abnormality.

Mani et al. reported 42 patients with HWE in 1968, 9 out of 42 patients seizures were produced by both hot or cold water bath. And in two patients seizures were precipitated with warm water. The duration of symptoms of 42 patients were 2-11 years before admission and they were not under treatment. During follow-up period 4 out of 14 patients developed spontaneous nonreflex epilepsy.¹⁴ Satishchandra et al. reported 25.4% of patients developed spontaneous nonreflex epilepsy, 8.9% of patients have seizures after the onset of HWE, even with cold-water bathing, and 7.8% of patients had seizures even during body bath when water was not poured over the head during follow-up.⁶ Recently some authors reported cases of HWE whom seizures were precipitated by warm water (temperature around 28-35°C).^{3,4} Savitha et al. re-

ported that seizures were precipitated with cold water on head or washing face with hot water in 14% and 11% of 71 patients.¹⁵ Five to 10% of patients with HWE have seizures during a body bath when water is not poured over the head, at a later stage in natural history.¹⁰ In our case four years later of history he had warm water induced seizure with head bathing and face washing. It is possible that duration length of disease is important. Our patient were not under treatment during six years until he admitted to our hospital.

In HWE reducing the temperature of water alone may control seizures in some, while antiepileptic drugs are needed by others.⁶ Altering the water temperature is unlikely to be beneficial in this patient as he had seizures with both hot and warm water baths.

In conclusion, HWE is a rare disorder. Most of the HWE cases are known to have a good long-term prognosis and the disease resolves with age. As in our case if HWE patients receive no treatment, by time, the seizures may progress and worsen. The patient with HWE should be treated at the early stage of the disease. Because it is possible that other precipitating factors can be added, seizures may be induced with warm water, and treatment with antiepileptic drugs may be necessary to control seizures.

Acknowledgements

The authors wish to thank Dr. Betül Gözel Ulusal for helpful suggestion of English revision.

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