

Hot water epilepsy: A rare form of reflex epilepsy

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ABSTRACT

Hot water epilepsy is a form of reflex epilepsy in childhood. We report two children from Saudi Arabia, who presented with seizures following pouring hot water on their head, while bathing. They were not treated by anti-epileptic medication. By decreasing the temperature of the water used for bathing, the seizures were avoided to a large extent in them. This form of epilepsy is reported to be seldom present in various countries but there are no records of its presence in Saudi Arabia.

Key words: Hot water epilepsy, reflex epilepsy, somato- sensory stimuli

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Introduction

Hot water epilepsy (HWE) is a well-defined entity within the forms of reflex epilepsies, which occurs while bathing with hot water.^[1,2] Allen first described HWE in 1945 and subsequently there have been many reports of its prevalence in both children and adults.^[2] HWE is a term used to encompass a reflex epileptic condition, characterized by pouring hot water (40–50°C) on the head.^[3] although it has been reported from all parts of the world, it is more prevalent in South Indian population as most of the reported cases have been from there.^[4] It has been rarely reported in other European countries and isolated case reports have been published from Japan and Turkey.^[5] The differences among countries may depend on climatic conditions, bathing habits and probably genetic susceptibilities. Here, we report two cases of HWE from Saudi Arabia.

Case Reports

Case 1

A 1-year-old Saudi male child had presented to the emergency ward with history of generalized seizures. Mother noticed that after pouring hot water on the head, while giving the ritual bath, the child suddenly became floppy and developed generalized seizures with loss of consciousness. His birth was uneventful and the development was normal. Mother admitted that there was family history of similar seizures in her sister's

child, following hot water bath. While examination, the child was afebrile, conscious, moving all four limbs and there were no long tract signs. Routine blood tests, including complete blood count, biochemistry and neuroimaging [magnetic resonance imaging (MRI) brain study] as well as sleep EEG were within normal limits. Diagnosis of HWE was made and the parents were counseled regarding its benign course and no anti-epileptic medications were prescribed. Parents were advised to reduce the temperature of the water to tolerably lower levels, while giving bath to this child. In the follow-up visits, although the seizure recurrences were not encountered, there was one episode of minor motor fit when the boy stepped into the bath tub with his elder brother, accidentally. Parents were convinced about the problem of their child and were aware of the correct temperature of the water which would not trigger the seizures in him.

Case 2

An 11-year-old Saudi girl was referred for the evaluation of seizure disorder; she was diagnosed with epilepsy elsewhere and was on regular anti-epileptic medication, namely sodium valporate. On questioning, she had been getting generalized brief convulsions whenever she was bathing with hot water and there was no improvement with the above medication. She admitted that splashing water only on her body never induced seizures on her, while a head bath had invariably precipitated it. She was born after uncomplicated pregnancy and the psychomotor development was normal. There was no

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family history of seizures and, interestingly, though the father was of Saudi origin, her maternal grandparents were from India. Apart from routine blood tests, EEG and MRI brain studies were done and showed normal reports. Genetic studies could not be offered because of the technical as well as financial constraints. The father and the patient were counseled in detail regarding the water temperature reduction while bathing and the medication was withdrawn. In the follow-up visits, the patient had a few infrequent seizures initially and later she became seizure-free after water at the correct temperature was used, as per our advice.

Discussion

Reflex epilepsy is a condition in which seizures are provoked exclusively by an external stimulus and account for 6% of all epilepsies.^[6] HWE is an unusual form of reflex epilepsy, precipitated always, by bathing in hot water. Thus, this mode of reflex epilepsy requires a specific thermal cutaneous stimulus. Both partial and generalized tonic seizures have been described secondary to hot water bathing, suggesting that the seizures might be influenced by the same afferent pathway.^[7,8] Most of the reported cases in the past were from southern parts of India and none of our patients had their origin from there, as they were born to Saudi parents, although the first Saudi patient's mother had an Indian origin.

Hot water is known to precipitate severe myoclonic epilepsy in infants, but HWE is a unique form of generalized or partial tonic, clonic seizures, even reported exceptionally with cold water, during tub bathing or taking a shower.^[9] The exact mechanism of HWE remains uncertain and seizures had been reported during a bath even when water is not poured over the head. Self-induced seizures occur in 10–20% of the patients.^[10] In India, ritual immersion baths at temperature around 45°C are reported to trigger epileptic fits.^[4] At this higher temperature of water, warmth receptors were said to be stimulated at the highest rates. Thus, an aberrant thermo-regulatory center, which is sensitive to sudden spurt in regional temperature following hot water bath, could be the precipitation cause for HWE.^[10] Another reasonable mechanism, described on physiological grounds, could be a defective inhibitory influence over afferent volleys of somatosensory stimuli such as warm or hot water poured over large body surface. In this context, HWE could be comparable to febrile seizures in the above-suggested mechanism of occurrence, although fever-induced fits were not significant in these patients.^[11] An experimental animal model mimicking HWE has been developed in order to understand the

pathophysiological mechanism.^[12] Familial clustering in HWE has suggested a genetic component as the probable cause of the disorder and a genetic locus in the 10th chromosome had been identified (10q21,3-q22,3).^[13] The diagnosis is entirely based upon history only, as inter-ictal electroencephalography and neuroimaging studies were reported to be normal. Shankar *et al.* had reported autopsy findings in three patients with HWE and concluded that there could be an aberrant thermoregulation in such genetically susceptible patients with possible environmental influences.^[14] Kowcas *et al.* reframed the term as bathing epilepsy rather than hot water epilepsy because their patients had seizures with warm water but not with hot water.^[15] Nechay *et al.* postulated altered autonomic regulations or some form of channelopathies as the underlying mechanisms for this disorder.^[16] Satishchandra related this disorder as a form of geographically specific epilepsy syndrome, where some cases might have genetic basis with added environmental influence.^[17]

There is no role of anti-epileptic treatment in HWE because of its symptomatic nature of seizures; altering the temperature of water or changing the method of washing would prevent the occurrence of these seizures^[18]. Anti-epileptic drugs are only indicated when such patients continue to have seizures even during regular baths with normal water temperature or non-reflex seizures.^[15] Since seizures show a tendency to decrease spontaneously, withdrawal of medication, if it had been given, should be carefully undertaken only after several months. The above two case descriptions were made to highlight the rarity of its occurrence and to emphasize that HWE could be controlled exclusively by lifestyle modification without resorting to anti-epileptic medication.

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