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CASE REPORT Open Access

Clinical importance of peri-ictal water drinking

Alawi A. Al-Attas[1*]

Abstract

Background Peri-ictal water drinking is drinking water within a short period or during a seizure. This behavior can be experienced in childhood and adulthood and commonly affects adults suffering from temporal lobe epilepsy. Peri-ictal water drinking has clinical importance for lateralizing signs in the non-dominant hemisphere. It has been found in up to 7–15% of patients with focal epilepsy.

Case presentation This case study involved a 44-year-old right-handed female referred tour center as a case of drug-resistant epilepsy for presurgical evaluation. After evaluation in the Epilepsy Monitoring Unit, the patient was considered a candidate for right temporal lobectomy. The patient exhibited good outcome post-temporal lobectomy.

Conclusions This case highlights the previously observed association between peri-ictal water drinking and the non-dominant hemisphere in patients with epilepsy. Clinicians must not overlook this automatic behavior that both patients and physicians usually underestimate because drinking water is a normal phenomenon.

Keywords Peri-ictal water drinking, Temporal lobe, Localizing and lateralizing signs, Seizure, Ictal vegetative symptoms

Background

In the early twentieth century, peri-ictal water drinking (PIWD) was first described by William G. Lennox and Stanley Cobb [1]. Tissues' vascular volume and osmolality usually control normal water drinking behavior. Hence, information received by peripheral receptors is processed by the hypothalamus and later conveyed to brain structures, thus initiating an urge to drink water [2]. PIWD is closely related to actions taken before, during, or after seizures. It is characterized by drinking within a short period or during a seizure [3]. It can be experienced in both childhood and adulthood, and adults suffering from temporal lobe epilepsy (TLE) are commonly affected by this disease [4]. Furthermore, PIWD has clinical importance for lateralizing signs in the non-dominant hemisphere [5]. It is found widely in 7–15% of patients with focal epilepsy and has been reported as an ictal sign, but a few people have experienced it as a postictal sign. Moreover, PIWD, like other automatisms, presents rare automatic behaviors [6]. The urge to seek water is triggered when the hypothalamus is involved, and its effects on abnormal electrical activities are produced in the temporal lobe [6]. The neural networks involved in water-seeking fluid balance and thirst are active on non-dominant sides. Hence, PIWD indicates the non-dominant hemisphere involvement [4].

Herein, we report a case of a 44-year-old woman with right symptomatic TLE secondary to mesial temporal sclerosis (MTS). PIWD was confirmed by ictal video-electroencephalogram (EEG), magnetic resonance imaging brain (MRI) positron emission tomography (PET) scan, and ictal single-photon emission computerized tomography (SPECT). In addition, we reviewed the literature to evaluate the clinical significance of the localization and lateralization of this type of epilepsy.

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Case presentation

A 44-year-old right-handed female was referred to our center as a case of drug-resistant epilepsy for presurgical evaluation. The patient reported seizure onset at the age of 30 years years, and she reported an aura of being unwell, fear, and epigastric discomfort followed by focal impaired awareness seizure characterized by a loss of awareness. The witness reported that she had some stiffness in the left upper limb. Then, the patient had good communication habits with her family throughout the event. She rarely reported focal to bilateral tonic–clonic seizures. She is taking levetiracetam 1.5 g twice a day and carbamazepine 400 mg twice a day. Apart from febrile seizures at the age of 3 years, no other risk factors were reported. The clinical examination was unremarkable.

After being admitted to the Epilepsy Monitoring Unit (EMU), her interictal EEG revealed a background activity of 9–10 Hz symmetrical and reactive to eye-opening. In addition, both hemispheres' sleep potentials were observed, and frequent sharp waves were detected in the right anterior temporal lobe (Fig. 1).

Throughout the patient's one-week EMU stay, we were able to capture a total of five recurring seizures. According to the patient and the witness (the husband), the seizures were identical to those at home. The seizures characterized by waking up from sleep and pressing a button, followed by headache and epigastric discomfort.

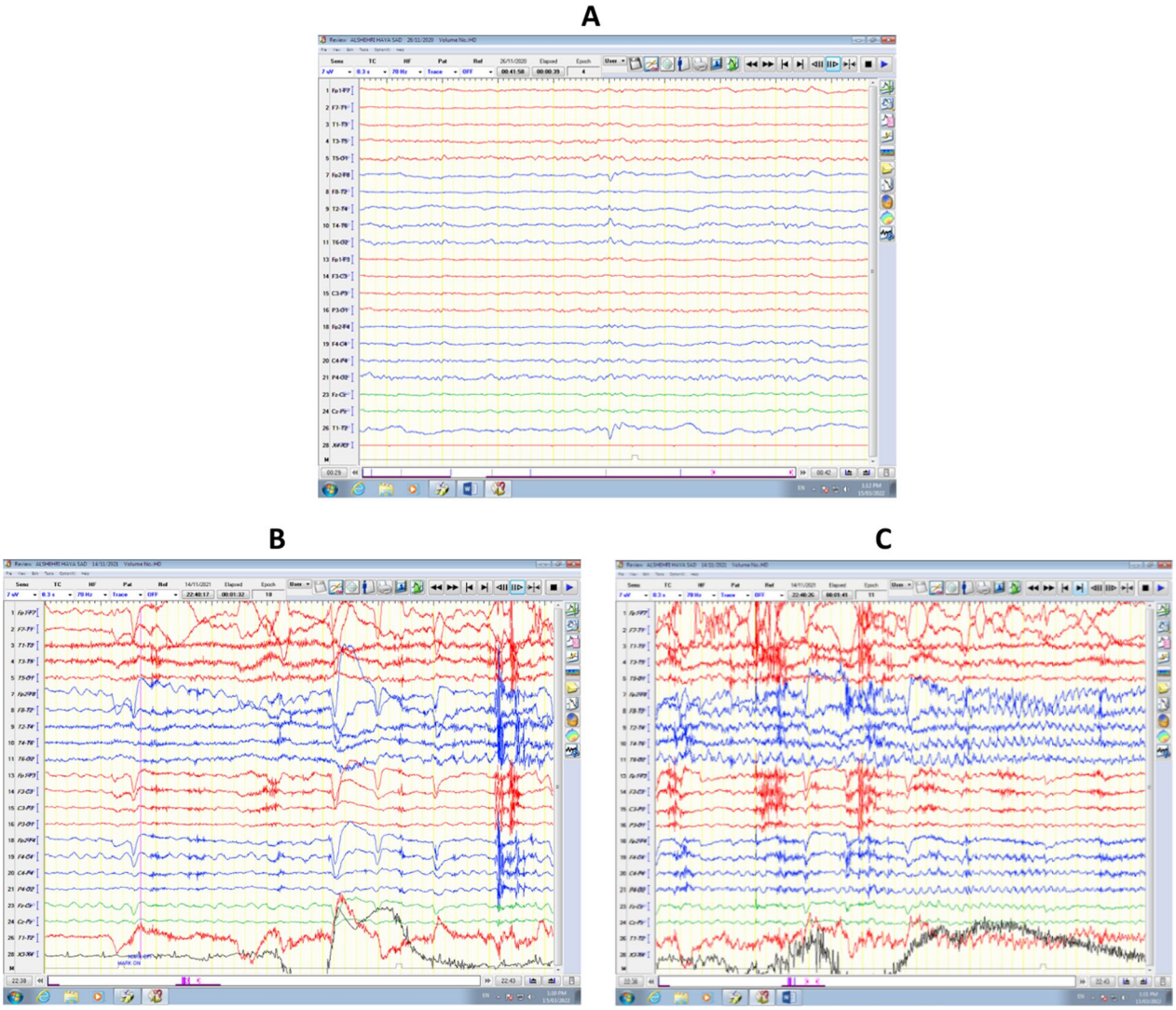

Fig. 1 Interictal EEG revealed sharp waves detected in the right anterior temporal lobe (**A**). Ictal EEG is characterized by rhythmic slow wave activity of about 5–6 Hz over the right temporal head region. The activity evolved in frequency, amplitude, and morphology and remained in that area without any postictal focal slowing (**B–C**)

The patient asked for water and had good communication with the nurse. Moreover, electrographically, the seizures started with rhythmic slow wave activity of about 5–6 Hz over the right temporal head region. The activity evolved in frequency, amplitude, and morphology and remained in that area without any postictal focal slowing. After examining and capturing the seizures, the antiseizure medications (ASMs) were resumed, and no other clinical or subclinical seizures were captured.

An epilepsy protocol MRI revealed a small hippocampus on the right compared to the left, with high-signal intensity on T2/FRAIR. Furthermore, the interior architecture was lost, and the ipsilateral fornix seemed small. These findings suggest right mesial temporal sclerosis (Fig. 2). The PET scan of the brain showed right temporal hypometabolism. Although the epilepsy monitoring unit data in this case were concordant, the neuropsychology assessment, including a full cognitive assessment such as the Wechsler Adult Intelligence Scale and the Wechsler Memory Scale Verbal Fluency Test, among other psychological assessments, was performed, and the report showed that the patient had some moderate verbal memory impairment. In addition, she had a mild ability for visual and spatial details in her memory, which may indicate that the patient could have a contralateral focus on the dominant temporal lobe. Therefore, the ictal SPECT scan was carried out for a more accurate presurgical evaluation, to prevent missing other foci on the contralateral side, and to predict a positive outcome in this relatively young patient. This revealed hypermetabolism in the right temporal head region, supporting the anatomo-electroclinical hypothesis (Fig. 3).

Furthermore, the case was discussed in an epilepsy surgical meeting, and the recommendation was to conduct a right temporal lobectomy after proper counseling. A psychiatrist evaluated the patient before the surgery to assess her condition and ensure minimal risk and optimal performance. The patient continued to take antiseizure

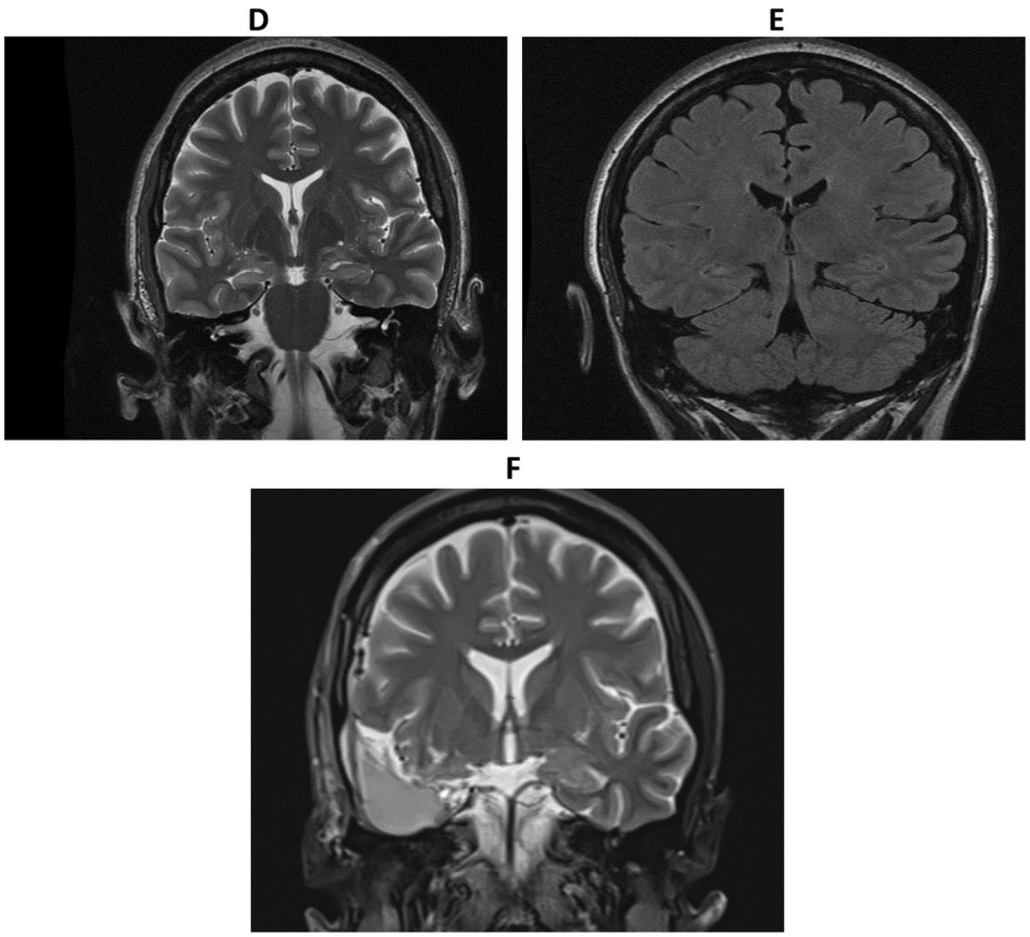

Fig. 2 MRI brain with epilepsy protocol revealed a small hippocampus on the right compared to the left with high-signal intensity on T2/FLAIR weighted coronal. In addition, there is a loss of the internal architecture, and the ipsilateral fornix appears small. These findings are suggestive of right temporal sclerosis (**D**, **E**), and the coronal section T2-weighted image shows post-right temporal lobectomy changes (**F**)

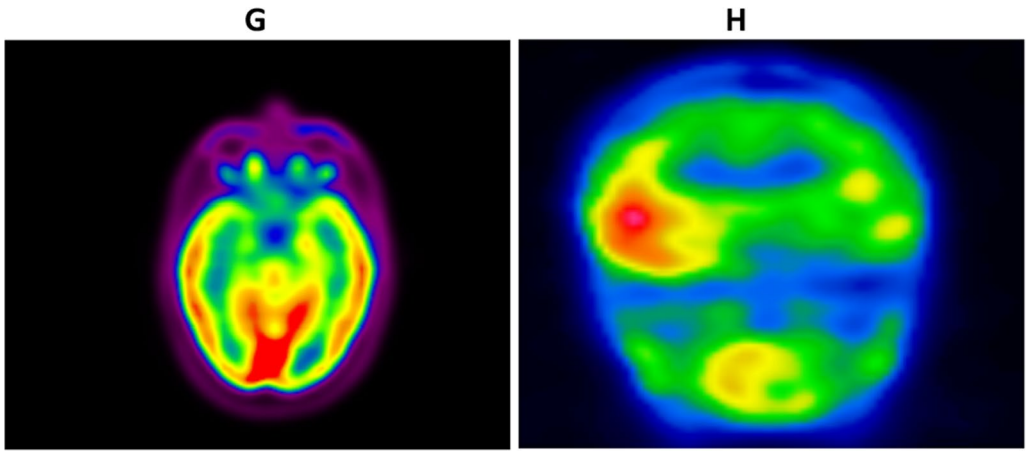

Fig. 3 PET/CT brain scan shows mild asymmetrical hypometabolism of the right temporal lobe is more evident in the medial region (**G**), and ictal SPECT shows ictal hyperperfusion on the right temporal lobe (**H**)

medications, and three and six months later, she was evaluated in the epilepsy clinic and reported free of seizures. Engel class I classification.

Discussion

Peri-ictal (ictal and postictal) vegetative symptoms have been identified in both childhood and adulthood epilepsy. For instance, common vegetative symptoms include blood pressure changes, hyperventilation, salivation, apnea, and vocal impacts during seizures [7]. Some patients also experience nausea and vomiting, increased sweating, piloerection, and mydriasis. Although the common peri-ictal vegetative symptoms (such as tachycardia, blood pressure changes, paleness and redness in the face, and mydriasis), other vegetative symptoms (such as coughing, speech behavior, bloating, water drinking, and incontinences) are rare [8]. PIWD is usually observed in temporal lobe epilepsy [3]. Lennox and Cobb published the first case of PIWD in 1933; since then, different reports have been published describing PIWD in patients affected by temporal lobe epilepsy, mainly of symptomatic etiology [1, 9]. Szűcs et al. investigated the reliability of the lateralizing sign of PIWD to the right temporal lobe in eight patients out of 55 cases with temporal lobe epilepsy. They concluded no evidence for the lateralization value of peri-ictal water drinking in TLE [9]. In contrast, in a series of 65 cases with drug-resistant epilepsy, Trinka et al. reported excellent outcomes after epilepsy surgery in seven cases out of ten cases of PIWD lateralized to the non-dominant temporal lobe [10]. Errguig et al. reported two cases of PIWD due to non-dominant temporal lobe epilepsy; one case showed a favorable post-surgery outcome [11]. Moreover, in 1981, Re'millard et al. discussed 20 patients with complex partial (focal impaired awareness seizures) associated with PIWD. All of their patients had EEG evidence of non-dominant temporal involvement [12]. Musilova et al. retrospectively investigated rare PIWD behavior in 97 patients who developed 380 seizures of temporal lobe epilepsy (TLE). They found that 97 patients (25%) had PIWD raised from the non-dominant temporal lobe [3]. To date, more than 64 adult cases of epileptic seizures associated with PIWD have been reported. The most common pathology encountered in the reported cases of PIWD was MTS, followed by brain tumors of different types. In most reported cases, a favorable post-operative outcome was also achieved (Engel class I or II) [5]. Similarly, our case exhibited a good outcome, and the pathology report was consistent with MTS.

The clinical significance of reporting such a case is crucial because, up until now, Saudi Arabia and other Arab countries have only had a few cases that have been reported [4]. As of this writing, the literature has also documented roughly 64 adult cases of PIWD. In TLE, PIWD cases were recorded in a range of 7 to 15.3% of patients [6]. In the literature, the link between PIWD and a non-dominant hemisphere has not yet been established with certainty [9]. As a result, a more extensive and successful analysis with a larger patient group is needed given the importance of PIWD in the planning of surgical resection. Recent studies also indicate PIWD cases that originate in extratemporal areas [13]. Most crucially, because drinking water is so common, it can be easy for medical staff to overlook this undetected vegetative behavior. In light of this, it is crucial to report such cases.

Conclusions

PIWD epilepsy, usually characterized by drinking water within a short period of a seizure, affects both the young and the elderly. It has clinical significance for lateralizing signs in the non-dominant hemisphere of the brain. We described a case of PIWD arising from the non-dominant hemisphere of a patient who underwent a right temporal lobectomy. Outstanding results were achieved through surgical treatments, and the outcomes were maintained throughout the follow-up.

Abbreviations

PIWD	Peri-ictal water drinking
TLE	Temporal lobe epilepsy
MTS	Mesial temporal sclerosis
EEG	Electroencephalography
MRI	Magnetic resonance imaging brain
PET	Positron emission tomography scan
SPECT	Single-photon emission computerized tomography
EMU	Epilepsy Monitoring Unit
ASMs	Antiseizure medications

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Author contributions

AAA: concept behind the work, collecting the case medical history and investigations and writing the manuscript, drafting, editing, and revising the final manuscript,

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Availability of data and materials

The corresponding author takes full responsibility for the data, has full access to all the data, and has the right to publish any data separate from any sponsor.

Declarations

Ethics approval and consent to participate

All procedures performed in this case followed the ethical standards of the Research and Ethical Committee of the Prince Sultan Military Medical City. However, the case report is exempt from the Institutional Review Board (IRB) approval.

Consent for publication

Patient provided written informed consent for publication of her clinical details and/or clinical images.

Competing interests

The author declares that there is no competing interest.

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References

1. Lennox WG, Cobb S. EPILEPSY: XIII, Aura in epilepsy; a statistical review of 1,359 cases. Arch Neurol Psychiatry. 1933;30:374–87.
2. Baumgartner C, Koren J, Britto-Arias M, Schmidt S, Pirker S. Epidemiology and pathophysiology of autonomic seizures: a systematic review. Clin Auton Res. 2019;29:137–50.
3. Musilová K, Kuba R, Brázdil M, Tyrlíková I, Rektor I. Occurrence and lateralizing value of "rare" peri-ictal vegetative symptoms in temporal lobe epilepsy. Epilepsy Behav. 2010;19:372–5.
4. Alanazi GM. A young man with Peri-ictal water drinking. Neurosciences. 2021;26:85.
5. Huang S, Al-Abri H, Sachdeva A, Alkhachroum AM, Shatzman S, Lüders H. Recurrent focal seizures as a feature of status epilepticus presenting as a peri-ictal water drinking. Epilepsy Behav Case Rep. 2018;10:129–32.
6. Pietrafusa N, Trivisano M, De Palma L, Serino D, Moavero R, Benvenga A, et al. Peri-ictal water drinking: a rare automatic behaviour in temporal lobe epilepsy. Epileptic Disord. 2015;17:384–96.
7. Karadaban Emir G, Ünal Y, Kutlu G. Peri-ictal water drinking and temporal lobe epilepsy: a case report peri-iktal Su İçme ve temporal lob epilepsisi: Olgu Sunumu. Epilepsi. 2017;23:123–6.
8. Fauser S, Wuwer Y, Gierschner C, Schulze-Bonhage A. The localizing and lateralizing value of ictal/postictal coughing in patients with focal epilepsies. Seizure. 2004;13:403–10.
9. Szucs A, Fogarasi A, Rásonyi G, Kelemen A, Narula L, Tóth V, et al. Peri-ictal water drinking in temporal lobe epilepsy: is it a reliable lateralizing sign? Epilepsy Behav. 2007;11:578–81.
10. Trinka E, Walser G, Unterberger I, Luef G, Benke T, Bartha L, et al. Peri-ictal water drinking lateralizes seizure onset to the nondominant temporal lobe. Neurology. 2003;60:873–6.
11. Errguig L, Lahjouji F, Belaidi H, Jiddane M, Elkhamlichi A, Dakka T, et al. Peri-ictal water drinking and other ictal vegetative symptoms: Localizing and lateralizing the epileptogenic zone in temporal lobe epilepsy? Two case reports and review of the literature. Rev Neurol (Paris). 2013;169:903–10.
12. Rémillard GM, Andermann F, Gloor P, Olivier A, Martin JB. Water-drinking as ictal behavior in complex partial seizures. Neurology. 1981;31:117–24.
13. Tanno Y, Matsudaira T, Usui N, Ogawa H, Tokumoto K, Kawaguchi N, et al. Periictal water drinking revisited: occurrence and lateralizing value in surgically confirmed patients with focal epilepsy. Epilepsia Open. 2023;8:173–82.

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