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# Intractable ictal vomiting: a new form of reflex epilepsy?

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**ABSTRACT** – In this description of the clinical course of a young female with persistent and protracted vomiting along with occasional loss of consciousness and subtle motor manifestations, the differential diagnosis is debated. The epileptic origin of her symptoms was substantiated by the presence of interictal epileptiform discharges and dramatic response to valproate monotherapy. Possible lobar localizations are discussed with the support of existing literature on this rare ictal manifestation [*Published with video sequence on www.epilepticdisorders.com*].

**Key words:** ictal vomiting, interictal epileptiform discharge, valproate, focal seizure, impairment of consciousness

Vomiting as an exclusive ictal manifestation is most commonly reported with the paediatric epilepsy syndrome described by Panayiotopolous (Panayiotopolous, 1988; Oguni *et al*., 1999; Caraballo *et al*., 2007). Non-idiopathic focal epilepsies involving the temporal lobe and rarely the insular neocortex may produce vomiting along with other semiological features or rarely in isolation (Devinsky *et al*., 1995; Guerrini *et al*., 1995; Pietrafusa *et al*., 2015). Reflex epilepsy related to eating is mostly temporal or insular in origin and has never been reported to present as vomiting and retching episodes. This sets apart this unique presentation in a young female who had incessant vomiting unresponsive to any form of therapy except valproate, and who also had left frontal interictal spikes. The report sets the stage for an open-minded discussion on the rare and often misdiagnosed ictal expression and its roots.

## Case study

A 21-year-old female college student was referred to our neurology clinic to exclude a central cause for vomiting. She started experiencing distressing episodes of prolonged nausea, vomiting, and retching five months ago. An individual bout could last several minutes to an hour with severe retching and a constant urge to empty the contents of the stomach. Heart burn, water brash, abdominal pain, or dyspepsia were conspicuously absent. All of the episodes were temporally related to food intake, starting within a few to a maximum of 10 minutes after a meal. The episodes occurred 1-3 times on

*VIDEO ONLINE*

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most days, but not invariably with every meal. The type and quantity of food were not found to influence the event. There were no other clinical accompaniments, antecedent events, or possible precipitating causes. Her past and family history was not contributory. Upper gastrointestinal endoscopy revealed Helicobacter pylori gastritis, the treatment of which along with proton pump inhibitors and prokinetic agents produced no benefit. Her studies and social and family life were severely hampered. It was then, three months after the onset of illness, that she started losing consciousness on a few occasions, one or two times per month, after about 5-10 minutes of vomiting. The parents reported that she was unresponsive and immobile with loose limbs without any pallor, dilated pupils, or diaphoresis. She woke up after a minute or two without any post-ictal confusion or recollection of the event. Later, on a few occasions, the parents noticed that either of her upper limb would become stiff and/or go into clonic jerking for a few seconds after losing consciousness. This change in course of events landed her in the psychiatric clinic where she was branded with a dissociative disorder. When antidepressants and anxiolytics had run their unfruitful course, the patient was referred to the neurologist. Systemic and neurological examination were unremarkable. The patient soon underwent a 32-channel awake and sleep EEG recording of 45 minutes to explore an ictal origin. Intermittent frontocentral (F3/C3) discharges seen were convincing enough to conclude that the patient was having a form of epilepsy dominated by ictal vomiting (*figures 1, 2*). A contrast-enhanced brain MRI epilepsy protocol (1.5 Tesla) did not reveal any focal pathologies of the brainstem or posterior fossa or any anatomical substrates responsible for epileptogenesis. The patient was started on 600 mg of valproate which produced total relief within three days, which literally transformed her life over the next month, as narrated by the family at her first follow-up visit. Subsequently, she was tapered off the valproate in order to precipitate the event for video-EEG recording. Multiple events were recorded, all of them episodes of vomiting and retching, unaccompanied by other phenomena. There was some discernible theta discharge during the events, but the rest of the recording contained only movement artefacts (*figure 2*). The patient was started on oxcarbamazepine in view of the focality seen on EEG, but she failed to respond. She was reinitiated on valproate with no more episodes reported ever since.

## Discussion

This short report describes a young patient with mainly autonomic seizures dominated by ictal vomiting and occasional focal seizures with impairment of consciousness (Berg *et al*., 2010).

In an analysis of 24 patients with ictal vomiting by Panayiotopoulos, benign childhood epilepsies, especially those of occipital origin, emerged as the leading cause (Panayiotopoulos, 1988). The phenomenon in adults is considered to originate primarily from the temporal lobe and is usually accompanied by other ictal phenomena (Devinsky *et al*., 1995; Shuper and Goldberg-Stern, 2004; Pietrafusa *et al*., 2015). Among the benign occipital lobe epilepsies, Panayiotopolous syndrome and idiopathic photosensitive occipital lobe epilepsy can exhibit ictal vomiting (Guerrini *et al*., 1995). Ictal vomiting in the setting of PS has certain distinct characteristics:

– prolonged retching, nausea, and vomiting lasting several minutes;
– preserved/minimally impaired consciousness during the emetic phase of seizures;
– loss of consciousness following the episode with loss of tone (ictal syncope), along with other autonomic manifestations;
– vomiting and/or autonomic seizures being the predominant seizure type;
– and ictal vomiting/autonomic features occurring in the initial part of the seizure itself (Oguni *et al*., 1999; Caraballo *et al*., 2007).

The odd points of this case were:

– a temporal relationship with food;
– a lack of other autonomic manifestations or prolonged loss of consciousness;
– a high frequency (daily episodes);
– and, most importantly, age at presentation.

Classically, the seizures in PS last beyond 30 minutes but they can be as brief as a few minutes. PS is typically seen in the 4-6-year age group, with the oldest case reported in the literature being 14 years (Oguni *et al*., 1999; Caraballo *et al*., 2007). The consistent relationship with food intake makes an adult presentation of PS extremely unlikely.

Thus, we come to the possibility of focal epilepsy with a reflex component. A temporal focus can recruit the autonomic nuclei by travelling via the hypothalamus or by disinhibition of the central pattern generators in the reticular area (Shuper and Goldberg-Stern, 2004; Pietrafusa *et al*., 2015). Pietrafusa *et al*. (2015) described a child, 4 years and 7 months old, with hippocampal sclerosis and type 1 focal cortical dysplasia presenting with isolated ictal vomiting, in addition to classic temporal lobe seizures. An interictal recording showed temporal spikes with suprasylvian diffusion, while stereo-EEG recording implicated a focal discharge originating in the amygdala and head of the hippocampus without propagation to the insula or neocortex. Right temporal lobectomy with anterior

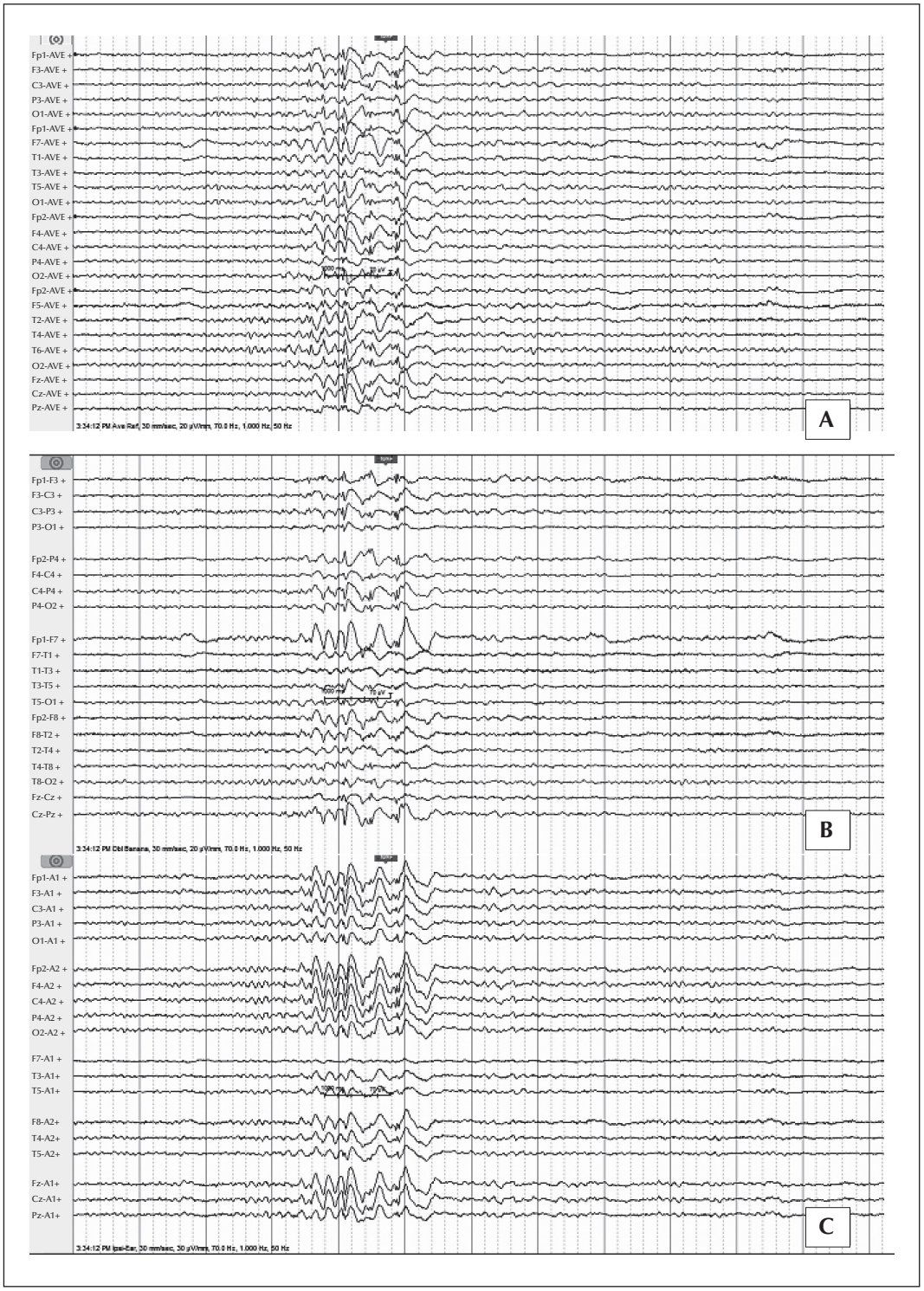


**Figure 1.** (A-C) Frontocentral (F3/C3) spike-and-wave discharges with secondary generalization.

hippocampectomy rendered her seizure-free. Previous reports of intracranial recording using stereo-EEG and subdural grids also support a mesial temporal origin. The insula has also been implicated in the genesis of ictal vomiting but other characteristic features, such as a choking sensation, salivation, and sensory phenomena, were lacking (Isnard *et al*., 2004; Catenoix *et al*., 2008). Suprasylvian diffusion of

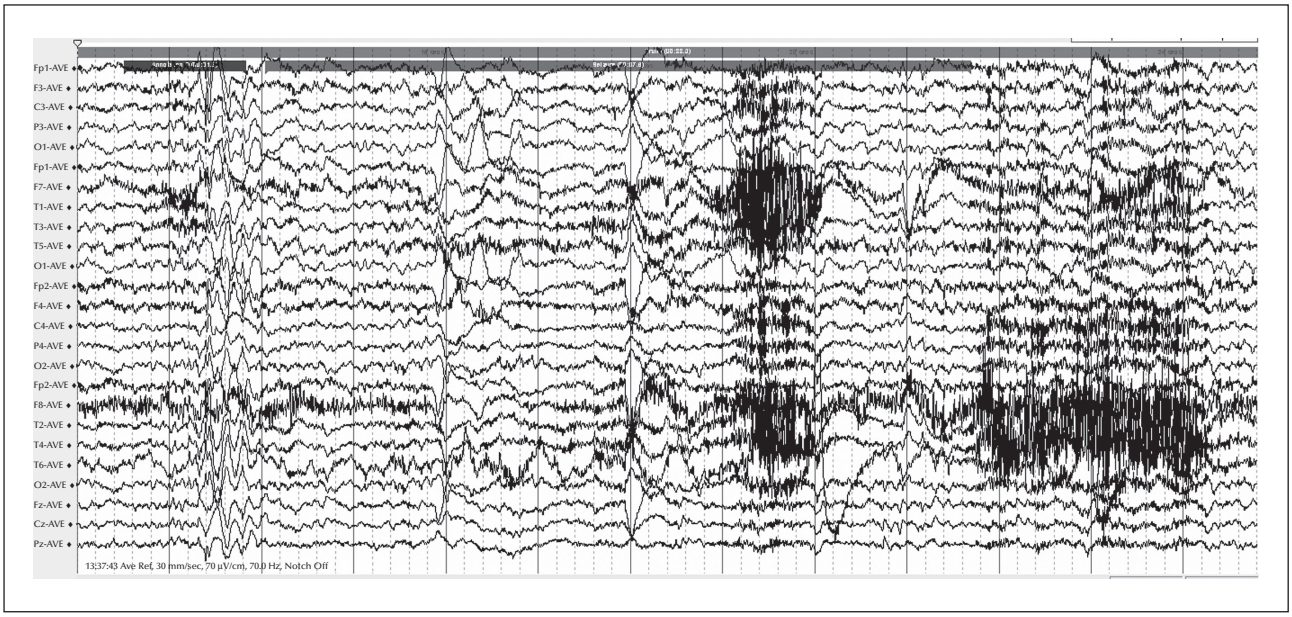


**Figure 2.** EEG recording of patient during an episode of vomiting and retching.

electrical activity from a deeper focus, such as the insula, can also account for the frontal localization on surface EEG. Sekimoto *et al*. used magnetoencephalography (MEG) for dipole localization in ictus emeticus. Interictally, frontal dominant slowing and bilateral occipital and parietal spikes were observed in the two adult patients they studied. Interictal SPECT performed on one of them showed left frontal hypoperfusion. MEG revealed a dipole in the parietal lobe, bilaterally in one, and unilaterally on the left in the other (Sekimoto *et al*., 2007). Although the parietal lobe or the frontal lobe, as observed in our patient, cannot be incriminated as the epileptic focus based on interictal data alone, they can account for ictal vomiting via ictal propagation to the insula or temporal lobe. The reflex aspect can occur due to probable sensory stimulation of the oropharyngeal apparatus, or the site, smell or taste of food, or gastric filling sensation. The usual presentation of eating epilepsy (reflex epilepsy related to food intake), however, is that of a temporal lobe epilepsy with hypomotor seizures and dyscognitive aura without conspicuous ictal vomiting. The episode can occur during the eating process or 30 minutes before or after the meal. Many of these patients have antecedent history of head/birth trauma or other brain insults such as encephalitis, which occurred in the remote past (Senanayake, 1994; Rémillard *et al*., 1998). Our patient had none of these characteristics to conclude that this could be an atypical presentation of this well recognized entity. There is a high incidence of eating epilepsy in the rice-eating population of Sri Lanka (Senanayake, 1994). Although the presence of spontaneous interictal epileptiform discharges suggests a tendency for unprovoked seizure, they have not occurred to date. The responsiveness to valproate points towards a diagnosis of generalized epilepsy but the consistent focality on interictal EEG cannot be overlooked. This case therefore bears resemblance to the various epilepsies discussed but does not conform entirely to any. Therefore, we propose that this is a unique form of partial epilepsy recruiting a wider network responsive to valproate, resulting in ictal vomiting with a clearly evident reflex component. □

**Supplementary data.**
Summary didactic slides are available on the www.epilepticdisorders.com website.

**Disclosures.**
None of the authors have any conflict of interest to declare.

## Legend for video sequence

Patient experiences retching and vomits few minutes after ingestion of food.

**Key words for video research on www.epilepticdisorders.com**

*Phenomenology:* ictal vomiting
*Localisation:* temporal lobe epilepsy
*Epilepsy syndrome:* Panayiotopolous syndrome
*Aetiology:* reflex epilepsy

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## TEST YOURSELF

(1) When vomiting is observed in focal epilepsies, what are the most common localizations?

(2) What are the characteristics of ictal vomiting seen in the paediatric epilepsy syndrome described by Pananyiotopoulos?

*Note: Reading the manuscript provides an answer to all questions. Correct answers may be accessed on the website, www.epilepticdisorders.com, under the section "The EpiCentre".*