Movement Disorders
CLINICAL PRACTICE

CASE REPORT

Isolated Abdominal Motor Seizures of Mesial Parietal Origin: Epileptic Belly Dancing?

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Abdominal movements are a rare presentation of epileptic seizures. Previously reported patients were known to have epilepsy, were already receiving antiepileptic drugs, presented with focal status epilepticus, and/or their seizure motor phenomenology also included the eyes, face, limbs, and even loss of awareness. Localization of the epileptogenic and symptomatogenic zones has therefore been controversial (Table 1).[1–8]

Here, we present a treatment-naïve patient with focal seizures secondary to a mesial parietal hemorrhage whose epileptic motor phenomenology exclusively involved abdominal muscles. In this patient, the epileptogenic zone most likely corresponded to the mesial parietal region and the symptomatogenic zone to the primary sensorimotor representation of the trunk. Based on video-EEG and MRI findings, we propose a seizure propagation pattern that could be applied to previously reported cases.

Case Report

A 77-year-old right-handed man with a history of diabetes and hypertension presented with 3 days of intermittent, short-lasting episodes of involuntary, painless abdominal movements. There was no loss of awareness, and he denied visual, sensory, visceral, or autonomic symptoms. Neurological examination revealed episodes of semicontinuous, right-greater-than-left, clonic-like abdominal contractions lasting for 10 to 20 seconds (Video, segment 1). These episodes did not vary with distraction, breath-holding, speaking, tactile stimuli, or positional changes. They increased in frequency during drowsiness and were also present during sleep. Neurological examination between episodes was unremarkable. Brain MRI studies during one of these episodes showed an acute subcortical hemorrhage in the left mesial parietal region, with adjacent cortical cytotoxic edema extending cranially through the medial aspect of the left parietal lobe to reach the postcentral and central sulci near the vertex (Fig. 1). Further workup was consistent with a venous angioma.

Continuous video-EEG monitoring demonstrated interictal epileptiform activity in the mesial parietal and left parieto-occipital regions (electrodes Pz/P3/O1), propagating to mesial central and left fronto-central regions (electrodes Cz/C3/Fz/F3), particularly during drowsiness. During the abdominal dyskinesia, this interictal epileptiform activity concurrently evolved into an ictal pattern consisting of 3.5- to 4-Hz, rhythmic, and sharply contoured activity in the mesial parietal region and left posterior quadrant (electrodes Pz/P3/T5/O1), propagating anteriorly to mesial central and left frontocentral regions (electrodes Cz/C3/F3; Video, segment 2). Treatment with levetiracetam 500 mg twice-daily, followed by additional phenytoin 100 mg three times daily, was necessary for complete remission of the abdominal motor seizures over 3 days.

Discussion

Abnormal abdominal movements have been illustratively described by the term "belly dancer's dyskinesia" (BDD), which originally referred to semicontinuous, slow, contorting movements displacing the umbilicus in a semicircular fashion after abdominal injury.[9] Other peripherally induced dyskinesias present with unusual phenomenology similar to BDD, and several descriptive terms are used ("painful legs moving toes"; "jumpy stumps"). We have recently described peripherally induced dyskinesias involving the muscles of the back similar to BDD for which we used the term "dancing."[10] This term might be confusing, but it could be useful to describe the unique phenomenology of peripherally induced dyskinesias.[9,10]

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TABLE 1 *Summary of cases of abdominal motor seizures reported in the English literature*

Reference	Age and Sex	Phenomenology Description	Seizure Type	Lesion and/or Seizure Focus Location
Nathanson 1978[11]	Varied (4 cases)	Coma with brainstem signs and bilateral clonic axial contractions (face, tongue, palate, pharynx, diaphragm, abdomen)	Focal motor with or without loss of awareness versus status epilepticus	Brainstem ("lowest-level seizures")
Matsuo 1984[1]	19-year-old woman	Right truncal spasms spreading to right limb muscles; postictal right hemiparesis described	Focal motor	Contralateral parietal (abscess, meningioma, idiopathic)
	66-year-old woman	Left lower abdominal spasms with postictal left hemiparesis		
	42-year-old man	Right abdominal contractions spreading to right shoulder, neck, face, and eyes		
Rosenbaum 1990[2]	65-year-old man	Left hemiparesis followed by clonic left-sided seizures that localized to the left abdomen after antiepileptic therapy; recurrent seizures involved left-sided abdominal, limbs, and facial muscles	Focal motor status epilepticus	Right frontoparietal metastasis
Chalk 1991[12]	66-year-old man	Short episodes of brief, rhythmic (2–3 Hz) left abdominal contractions with occasional proximal left leg involvement and subclinical facial contractions	Focal motor status epilepticus	Right parasagittal
Fernandez-Torre 2004[3]	77-year-old woman	Dysphasia, left-sided hemiparesis, hemianesthesia, hemiasomatognosia, and clonic twitching with right-sided gaze deviation that localized to the left abdomen after antiepileptic therapy (video available)	Focal motor status epilepticus (bilateral cortical myoclonus)	Right frontal metastasis (also right temporal, left mesial frontal, and right cerebellar metastases)
Dafotakis 2006[5]	62-year-old man	Clonic twitching of left abdominal muscles (video available)	Focal motor status epilepticus	Unknown (transient right parietal MRI abnormalities during status)
Tezer 2008[6]	25-year-old woman	Treated epileptic patient with increased seizure frequency including right abdominal and facial myoclonic twitching at 1 to 2 Hz (video available)	Focal motor status epilepticus	Left mesial parieto-occipital (cortical displasia)
Oster 2011[4]	59-year-old man	Right abdominal spasms followed by additional right limb clonic contractions and occasional tonic-clonic generalization	Focal motor onset with and without secondary generalization	Left mesial frontoparietal (ictal single-photon emission computed tomography)
Ribeiro 2015[7]	69-year-old man	Treated epileptic patient with dysphasia, right hemiparesis and continuous right-sided abdominal myoclonic jerks (video available)	Focal motor status epilepticus	Left occipital (in the context of prrvious left frontal temporo-occipital hemorrhage)
	75-year-old man	Left hemiparesis, left-sided gaze deviation, and continuous left-sided myoclonic movements that localized to left abdomen after antiepileptic treatment (video available)		Right occipital (in the context of prior right occipital infarction)
Aljaafari 2018[8]	26-year-old man	Treated epileptic patient with right neck and shoulder pulling, with or without arm contractions and right head deviation, followed by right abdominal clonic movements and occasional tonic-clonic generalization (video available)	Focal motor onset with and without secondary generalization	Left mesial parietal

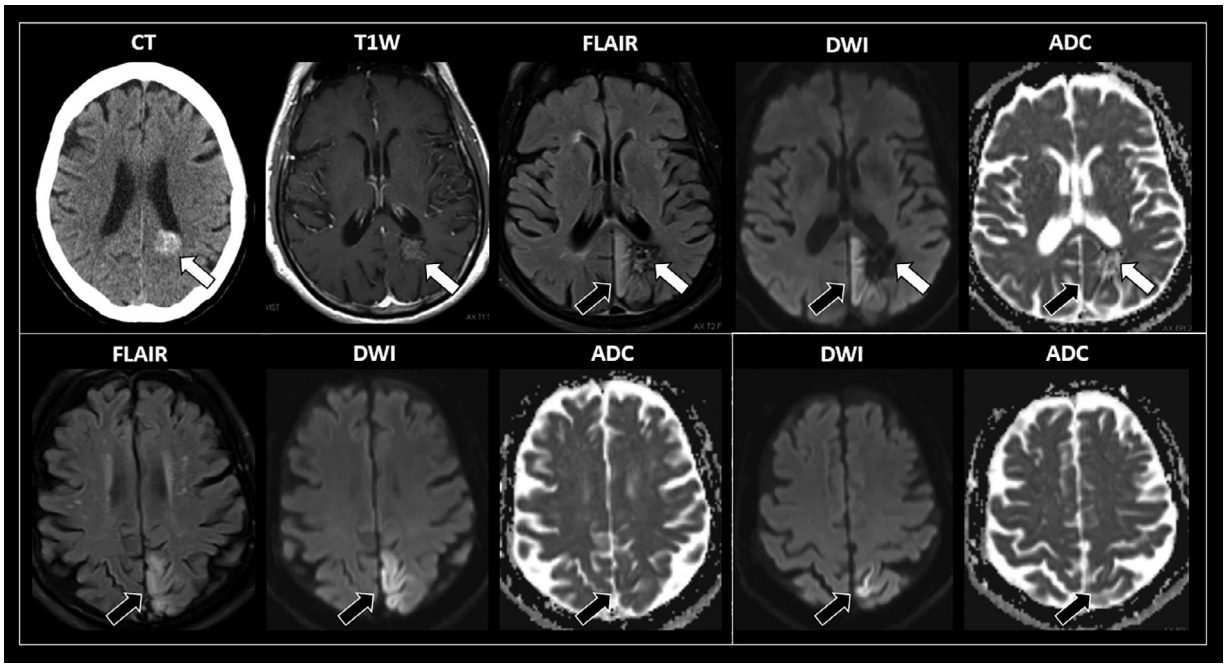

FIG. 1. Sequential axial imaging studies of this patient with recurrent abdominal motor seizures. Images inside a white square correspond to the same axial cut. An acute subcortical hemorrhage is evidenced in the left mesial parietal region (white arrows). There is adjacent cortical cytotoxic edema extending cranially through the mesial aspect of the left parietal lobe to reach the postcentral and central sulci near the vertex. This region corresponds to the somatotopic localization of the sensorimotor areas corresponding to the trunk (black arrows). MRI sequences: T1W, T1-weighted MR with intravenous contrast; FLAIR, fluid-attenuated inversion recovery; DWI, diffusion-weighted imaging; ADC, apparent diffusion coefficient.

Several etiologies for BDD have been reported, mostly localizing to the corresponding thoracoabdominal spinal cord segments and/or peripheral nerve innervation. Nevertheless, belly dancers perform a broad variety of movements, including semirotatory, clonic-like, and asymmetric movements. Thus, BDD has been inappropriately extended to describe irregular, jerky, and asymmetric movements that could be epileptic in origin ("epileptic belly dancing"). Even though EEG and brain imaging are normal in most cases, seizures have been consistently included in the differential diagnosis of BDD.

In this patient, the episodic, short-lasting, clonic-like, asymmetric dyskinesias suggested an epileptic etiology. Left-sided movements might have been transmitted from right-sided clonic seizures, and concurrent electromyographic recordings might have helped clarify this. The clinical, video-EEG, and MRI findings in this case suggest that (1) the epileptogenic zone most likely corresponded to the cortical region medially overlying an acute subcortical hemorrhage in the left mesial parietal region, and that (2) the symptomatogenic zone extended cranially to reach the somatotopic primary sensorimotor representation of the trunk in the postcentral and central gyri near the vertex. Although most reported cases presented with focal status epilepticus, neither clinical nor EEG criteria were met in this case.

In patients with abdominal motor seizures, epileptic activity arising in mesial brain regions might therefore spread through the "noneloquent" mesial cortex to eventually reach the primary sensorimotor region corresponding to the trunk, without involving other primary sensorimotor areas. This propagation pattern could be applied to previously reported cases of abdominal motor seizures originating in parasagittal, mesial frontal, parietal, and occipital regions (Table 1).[1–8] In cases of abdominal motor seizures, scalp EEG recordings are not as helpful to accurately localize the epilepto- and symptomatogenic zones given their deep foci. Yet, source localization techniques utilized in a recently reported case revealed a similar propagation pattern as the one we propose.[8] Multimodal assessments, including novel electrophysiological and molecular imaging techniques, could shed further light on these epileptic circuits.[4,8]

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Author Roles

Research Project: A. Conception, B. Organization, C. Execution; (2) Data Analysis: A. Design, B. Execution, C. Review and Critique; (3) Manuscript Preparation: A. Writing of the First Draft, B. Review and Critique.

K.J.L.: 1A, 1B, 1C, 2A, 2B, 3A

E.A.S.: 1A, 2A, 2C, 3B

L.T.: 1A, 2A, 2C, 3B
A.E.L.: 1A, 2A, 2C, 3B
A.M.K.: 1A, 1B, 1C, 2A, 2B, 3B

Disclosures

Ethical Compliance Statement: We confirm that the approval of an institutional review board was not required for this work and that the appropriate written informed consent was obtained from the patient. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

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Supporting Information

Supporting information may be found in the online version of this article.

Video S1. Abdominal motor seizures during continuous video-EEG monitoring. Segment 1. Example of an abdominal motor seizure consisting of right-greater-than-left clonic abdominal contractions lasting for approximately 15 seconds, without additional motor phenomenology or loss of awareness. Segment 2. Continuous video-EEG monitoring demonstrating interictal epileptiform activity in the mesial parietal and left parieto-occipital regions (electrodes Pz, P3, and O1) that propagates to mesial central and left frontocentral regions (electrodes Cz, C3, Fz, and F3). During another episode of abnormal abdominal movements, this interictal epileptiform activity evolves into an ictal pattern consisting of 3.5- to 4-Hz rhythmic and sharply contoured activity in the mesial parietal and left posterior quadrant regions (electrodes Pz, P3, T5, and O1), propagating anteriorly to mesial central and left frontocentral regions (electrodes Cz, C3, and F3). This electrographic seizure lasted for approximately 30 seconds and gradually returned to the above-described interictal activity. EEG activity was recorded with scalp electrodes positioned according to the 10-20 international system. Depicted signals from average referential montage were recorded at a sample rate of 500 Hz with the high-frequency filter at 70 Hz and the low-frequency filter at 1 Hz. Concurrent electromyography was not obtained.