

Mirror writing in a patient with frontal-lobe epilepsy

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Abstract

A 36-year-old male with non-lesional refractory frontal-lobe epilepsy, diagnosed at 16 years of age, and with a history of four hospitalizations for refractory status epilepticus and admitted to the intensive care unit with focal seizures in the right upper limb, impaired consciousness, and recurrent progression to bilateral tonic-clonic seizures.

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Running title: Mirror writing in frontal-lobe epilepsy

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ABSTRACT

A 36-year-old male with non-lesional refractory frontal-lobe epilepsy, diagnosed at 16 years of age, and with a history of four hospitalizations for refractory status epilepticus and admitted to the intensive care unit with focal seizures in the right upper limb, impaired consciousness, and recurrent progression to bilateral tonic-clonic seizures.

Keywords: Neurology, Mirror writing, Frontal-lobe epilepsy

Key clinical message

During the postictal period, the left cerebral hemisphere was affected by the seizures, and consecutive epileptiform discharges and disinhibition of the right cerebral hemisphere could have occurred, which may explain the observed behavior.

INTRODUCTION

Mirror writing is defined as the writing of letters, words, and sentences in the direction opposite to that of normal writing and with the letters reversed. It is observed in children learning to write and in individuals writing with their non-dominant hand.¹ Left-handers and adults using language that is written from right to left may have the uncommon ability for mirror writing. Pathologically, this alteration may be observed after a focal brain injury, such as a stroke involving the dominant cerebral hemisphere,² traumatic brain injuries, and Parkinson's disease.¹ However, mirror writing in patients with epilepsy has not been reported previously. Herein, we report a case of mirror writing in a patient with epilepsy.

CASE PRESENTATION

A 36-year-old, right-handed male, as confirmed by the Edinburgh Handedness Inventory,^[4] presented with non-lesional refractory frontal-lobe epilepsy, diagnosed at 16 years of age, and with a history of four hospitalizations for refractory status epilepticus (SE); medically induced coma was required. The patient was admitted to the intensive care unit with focal seizures in the right upper limb, impaired consciousness, and recurrent progression to bilateral tonic-clonic seizures, with mirror-writing episodes at a frequency of one every 1–6 months; the electroencephalogram (EEG) showed no signs of ongoing SE (Figure 1). After infectious and metabolic etiologies were excluded and convulsive SE was diagnosed, the patient was treated with intravenous lacosamide (200 mg), levetiracetam (1.5 g), diazepam (40 mg), and phenytoin (1 g). However, the episodic seizures continued. After regaining consciousness following a seizure, the patient had a spontaneous 4-min-long episode of mirror writing with his left hand (Figure 2), lasting until the onset of another seizure (Figure 3). The patient did not speak or respond to verbal commands during the episode. As the patient was unresponsive to treatment, anesthetic induction and deep sedation were required to manage the SE; bispectral index monitoring was used. Under deep sedation with propofol infusion, the EEG did not reveal any paroxysmal activity, and the patient recovered with a good neurological outcome and no sequelae. The patient's family members reported eight mirror-writing episodes following seizures in the previous 4 years; the patient did not remember these events.

DISCUSSION

Patients with dominant-sided paresis due to a stroke to the corresponding hemisphere may rarely show spontaneous and unconscious mirror writing during the initial attempts to write with their non-dominant hand. The non-dominant cerebral hemisphere attempts to imitate the necessary arm movements based on the motor memory forged during the writing-learning process, and these movements are reversed. The literature on the pathophysiology of mirror writing reveals a lack of knowledge of the process. Various hypotheses have been proposed, including alterations of the motor cortex, spatial orientation, and visual and thalamocortical circuits.³ In this case, during the postictal period, the left cerebral hemisphere was affected by the seizures, and consecutive epileptiform discharges and disinhibition of the right cerebral hemisphere could have occurred, which may explain the observed behavior.

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CONFLICT OF INTEREST

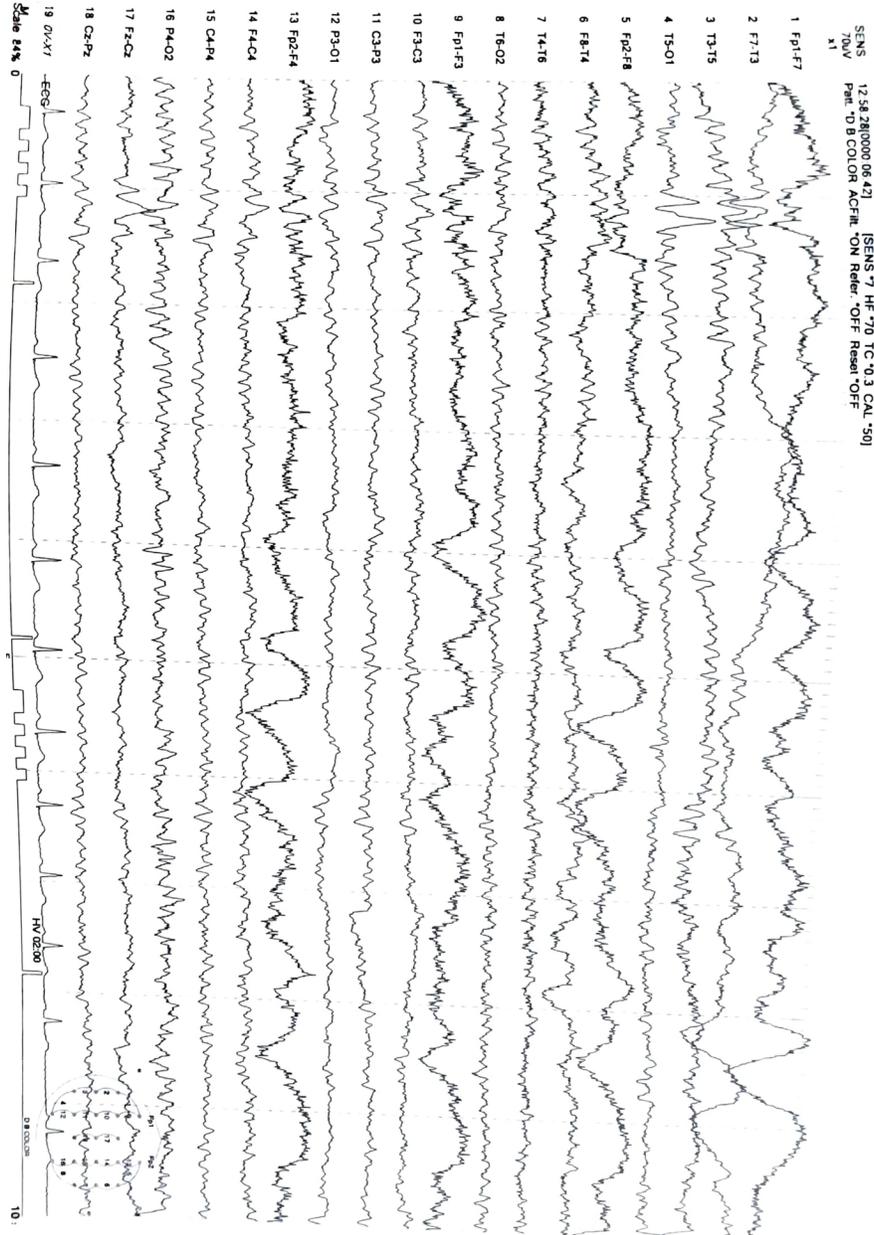
The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception, design of the work, manuscript preparation, and data acquisition: Vityala Yethindra, Elmira Mamytova, Tugolbai Tagaev, Sagynali Mamatov, Clinical management: Vityala Yethindra, Elmira Mamytova, and Manuscript preparation and data acquisition: Vityala Yethindra, Tugolbai Tagaev.

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