

Mirror writing in a patient with frontal-lobe epilepsy

Vityala Yethindra¹, Elmira Mamytova², Tugolbai Tagaev³, and Sagynali Mamatov²

¹International Higher School of Medicine, International University of Kyrgyzstan

²I K Akhunbaev Kyrgyz State Medical Academy

³International School of Medicine

March 21, 2021

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.

Mirror writing in a patient with frontal-lobe epilepsy

Vityala Yethindra^{1*}, Elmira Mamytova², Tugolbai Tagaev³, Sagynali Mamatov⁴

¹Department of Pathology, International Higher School of Medicine, International University of Kyrgyzstan, Bishkek, Kyrgyzstan

²A.N. Murzaliev Department of Neurology and Clinical Genetics, I.K. Akhunbaev Kyrgyz State Medical Academy, Bishkek, Kyrgyzstan

³Department of Public Health and Healthcare, I.K. Akhunbaev Kyrgyz State Medical Academy, Bishkek, Kyrgyzstan

⁴Department of Hospital Internal Medicine, Occupational Pathology with a Course of Hematology, I.K. Akhunbaev Kyrgyz State Medical Academy, Bishkek, Kyrgyzstan

Running title: Mirror writing in frontal-lobe epilepsy

*Corresponding author: Vityala Yethindra, Department of Pathology, International Higher School of Medicine, International University of Kyrgyzstan, Bishkek, Kyrgyzstan, Email: yethindravityala10@gmail.com, Contact: +91 9121925658

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.

ACKNOWLEDGMENTS

The authors acknowledge their patient for kind cooperation and for providing consent.

FINANCIAL SUPPORT

No financial support was received for the study.

CONFLICT OF INTEREST

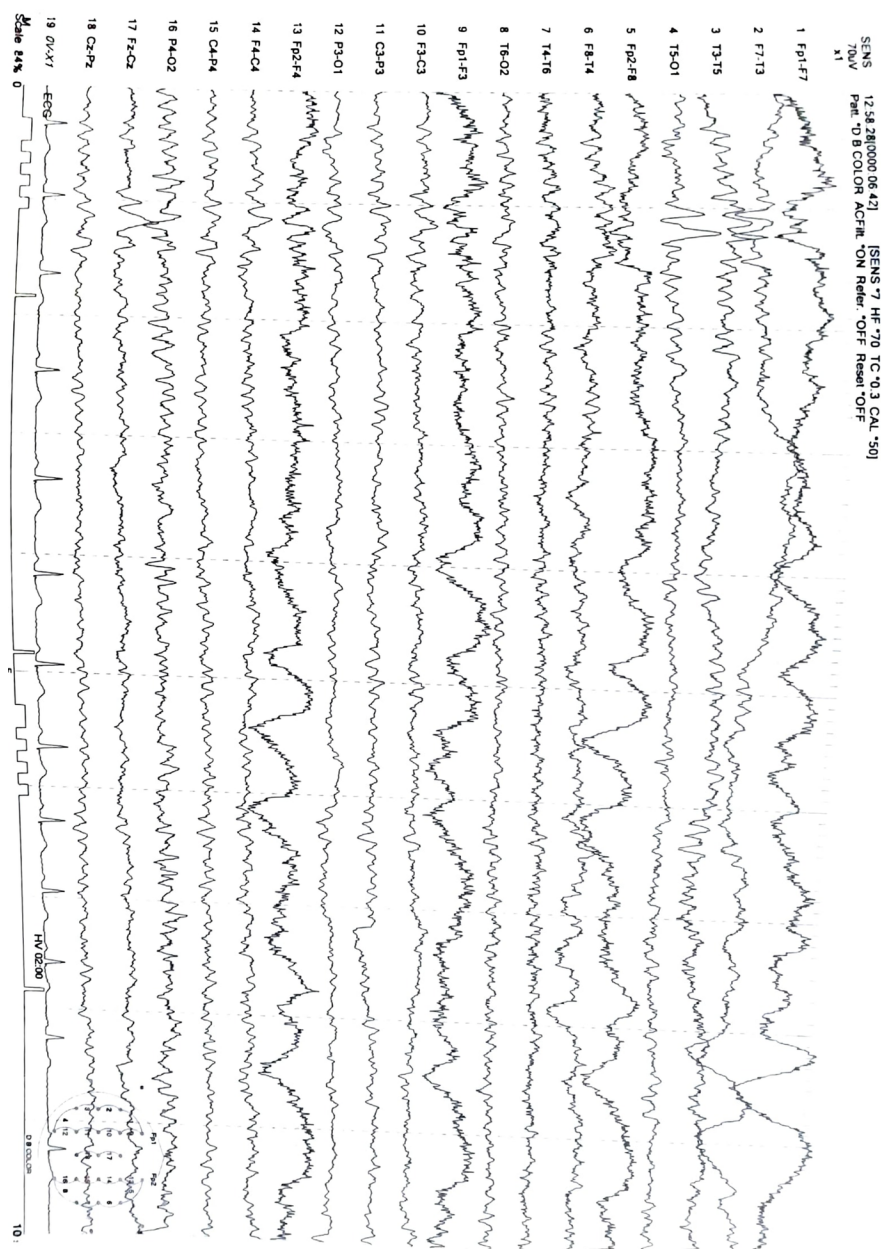
The authors declare no conflicts of interest.

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.

REFERENCES

1. Schott GD. Mirror writing: neurological reflections on an unusual phenomenon. *J Neurol Neurosurg Psychiatry* . 2007; 78(1): 5-13.
2. Paradowski W, Ginzburg M. Mirror writing and hemiplegia. *Percept Mot Skills*. 1971; 32(2): 617-618.
3. Fleming B, Adamides AA. Mirror writing after peri-mesencephalic subarachnoid haemorrhage. *J Clin Neurosci*. 2019; 64: 29-32.
4. Oldfield RC. The assessment and analysis of handedness: the Edinburgh inventory. *Neuropsychologia*. 1971; 9(1): 97-113.





EMOH ODOT THAWI EMOH OGOT
THAWI