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Dense Array Electroencephalography-based Electric Source Imaging of Interictal Epileptiform Discharges

S.A. Groppa^{1,2}, D. Ciolac^{1,2}, A. Vataman^{1,2}, and V. Chiosa¹

¹ Nicolae Testemițanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

² Department of Neurology, Institute of Emergency Medicine, Chisinau, Republic of Moldova

Electric source imaging (ESI) based on dense array electroencephalography (EEG) is a non-invasive technique for source localization of epileptic activity. However, the diagnostic accuracy of this tool is still debatable. In this study we aimed to investigate the source of epileptiform discharges in a group of epilepsy patients. For this, 20 patients (24.4 ± 8.0 years, 10 males) with drug-resistant focal epilepsy were included. All patients underwent 256-channel EEG recordings and were imaged on a 3T MRI scanner according to a predefined protocol. For spatio-temporal source reconstruction, LORETA (low resolution brain electromagnetic tomography) solution was applied to interictal averaged spikes. Electric sources of epileptiform discharges were detected in all 20 patients. In 18 (90%) patients source localization was concordant with patients' seizure semiology. The most frequent source was identified in the temporal lobe. Dense array EEG is an accurate modality for localization of epileptogenic brain areas in the pre-surgical evaluation of drug-resistant epilepsy patients.