Lateralized Rhythmic Delta Activity Synchronous with Hippocampal Epileptiform Discharges on Intracranial EEG

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A 54-year-old woman suffering from medial temporal lobe epilepsy underwent simultaneous recordings with intracranial electroencephalogram (EEG) and high-density scalp EEG. Interictal scalp EEG showed intermittent 2.5-Hz lateralized rhythmic delta activity (LRDA) in the right frontotemporal region, synchronous with the right hippocampal epileptiform discharges on intracranial EEG. The association between seizures and LRDA is frequency-dependent: only frequencies ≥ 1.5 Hz are associated with seizures [1]. Nearly all patients with LRDA have focal injury on the side of the rhythmic activity [2]. As our case illustrates, LRDA can correspond to irritative activity in the medial temporal lobe and could therefore be considered an interictal epileptiform abnormality (Fig. 1, 2).

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Statement of Ethics

The present research project was approved by the relevant ethics committee (Commission Cantonale d’Ethique de la Recherche, République et Canton de Genève, Switzerland). The patient gave written consent to participate and to publish the case (including publication of images).

Disclosure Statement

P.D.S. and P.M. report no competing interests. S.V. and M.S. report that they are shareholders of Epilog NV. M.S. received speaker’s fees from Philips and Desitin.

Fig. 1. a Ten-second scalp EEG (bipolar montage) showing 2.5-Hz LRDA in the right frontotemporal region. **b** Ten-second intracranial EEG (bipolar montage) showing epileptiform discharges in the right hippocampus (maximum in HAD1-3 and HPD 1-3, high-

lighted in Fig. 2a). EEG, electroencephalogram; FOD, fronto-orbital cortex; AD, amygdala; HAD, anterior hippocampus; HPD, posterior hippocampus; D, right hemisphere.

Fig. 2. **a** Depth electrode localization and visualization performed with the iELVis toolbox (<https://github.com/iELVis/iELVis>). **b** Coronal FLAIR MRI showing asymmetry in size of the right hip-

pocampus compared to the left one, interpreted as the presumed epileptogenic lesion. FLAIR MRI, fluid-attenuated inversion recovery-magnetic resonance imaging.C

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