Verbal production- induced epileptiform abnormalities in a patient with previous structural non-convulsive status epilepticus

G. Fabris [1], L. Pellegrino[1], R. Ragone[1], A. L. Bisogno[1], S. Favaretto[2], D. Seppi[2], G. De Nardi[2], A. Grego[2], S. Facchini[1, 3], M. Corbetta[1, 3, 4], F. Dainese[2]

1. *Dipartimento di Neuroscienze, Università degli Studi di Padova (Pd)*
2. *Unità di Neurofisiologia Clinica, UOC Clinica Neurologica, Azienda Ospedale-Università Padova (Pd)*
3. *Padova Neuroscience Center, Università degli Studi di Padova (Pd)*
4. *Veneto Institute of Molecular Medicine, Fondazione Biomedica (Pd)*

BACKGROUND

Relationship between right hemisphere and language is still under debate. Right hemisphere lesions can lead to disorders affecting pragmatic and integrative aspects of language. Aphasia, defined as impairment of core linguistic functions, can occur in individuals with atypical language lateralization.

CASE DESCRIPTION

A 64-year old patient who in 2008 experienced right fronto-parietal intraparenchymal hemorrhage (ICH), resulting in residual left motor syndrome and drug-resistant structural epilepsy. He was on therapy with Levetiracetam (LEV) up to 1000 mg twice daily (discontinued), Lacosamide (LCS) 200 mg twice daily, and zonisamide (ZNS) 200 + 100 mg. In August 2024, the patient was admitted to the Emergency Department for two critical events starting with non-motor symptoms, followed by clonic movements of the left limbs. He was administered 2 mg of intravenous midazolam on-site. Clinical examination showed left facio-brachio-crural motor hemiparesis, left homonymous lateral hemianopsia (epileptogenic zone), and falcating gait. No speech impairment. A brain CT scan was performed, showing malacic area in right-fronto-parietal region (previous ICH) and no significant acute lesions (***Figure 1)***. An electroencephalography (EEG) was conducted, which suggested possible NCSE (non-convulsive status epilepticus) with a centro-parieto-temporal IIC (interictal epileptiform discharges) pattern on the right, with attenuation of epileptiform abnormalities after administration of 5 mg of diazepam. A follow-up EEG revealed ongoing epileptiform abnormalities during verbal production. A Video-EEG was then performed ***(Figure 2-3)***.

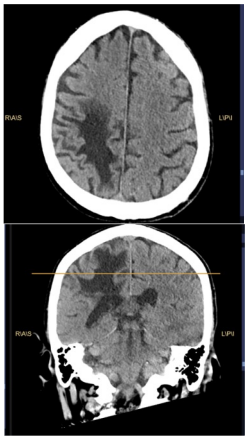

Figure 1: CT-scan showing malacic area in right-fronto parietal region in previous ICH

VIDEO-POLYGRAPHIC-EEG:

Bursts of 2-6 seconds of polymorphic occipital lateralized theta activity mixed with bifocal and trifocal sharp waves in fronto-centro-temporal regions exclusively during verbal production ***(Figure 2-3)***.

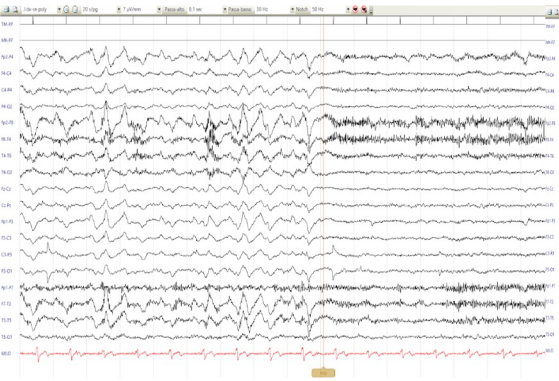

Figure 2: differences in EEG during and after stopping verbal production

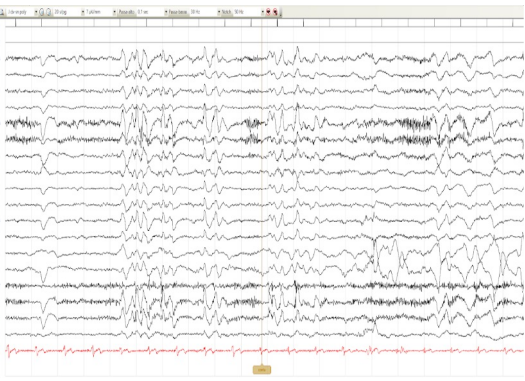

Figure 3. EEG during verbal production

Neurological examination during Video-EEG: no impairment in verbal production, naming, repetition and comprehension with fluent spontaneous speech.

Discussion and conclusion: Anti-epileptic treatment with Lacosamide and Zonisamide was implemented (LCS 150 mg twice daily, ZNS 200 mg twice daily), Levetiracetam was stopped and Cenobamate 200 mg was added. This case shows intericatal epileptiform abnormalities during verbal production in a patient with history of right fronto-parietal hemorrhage with no clinical evidence of speech impairment. This case highlights the importance of right hemisphere and its critical role in language networks.

References

1. Dewarrat GM, Annoni JM, Fornari E, Carota A, Bogousslavsky J, Maeder P. Acute aphasia after right hemisphere stroke. J Neurol. 2009 Sep;256(9):1461-7. doi: 10.1007/s00415-009-5137-z. Epub 2009 Apr 12. PMID: 19363625.