

A 16-year-old girl with focal seizures and impaired awareness: divergent non-invasive data related to a diffuse epileptogenic network

Angelo Russo¹, Prasanna Jayakar², Ian Miller²,
Sanjiv Bhatia^{3,4}, Michael Duchowny^{2,4}

¹ IRCCS, Institute of Neurological Sciences of Bologna, Child Neurology Unit, Bologna, Italy

² Department of Neurology and Comprehensive Epilepsy Program, Brain Institute, Nicklaus Children's Hospital, Miami, Florida

³ Departments of Neurological Surgery, Nicklaus Children's Hospital, Miami, Florida

⁴ Department of Neurology, University of Miami Miller School of Medicine, Miami, Florida, USA

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- Mesial temporal lobe epilepsy (MTLE) is the most frequent form of drug-resistant epilepsy and is commonly associated with hippocampal sclerosis.
- Although the hippocampus is the primary epileptogenic area for most patients with TLE and HS, the epileptogenic network may extend beyond the hippocampus.
- Occipital lobe epilepsy constitutes a major diagnostic challenge because of its propensity to rapidly spread to distant sites in the temporal and frontal lobes in up to 50% of cases.
- The well-established projection pathway from the occipital cortex to both ipsilateral and contralateral temporal structures often makes the distinction between seizure onset in the occipital and temporal lobe challenging.
- The olfactory aura in our patient is commonly observed in seizures arising from both the temporal and occipital lobes.

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- It is important to interpret the auras in conjunction with other seizure features, especially if the aura is discordant with other localizing signs, as has been observed in patients with TLE who are evaluated for surgery.
- Multiple auras can occur in different seizures or in the same seizure, either simultaneously or sequentially, and appear to be experiences from sequential or simultaneous activation of multiple symptomatogenic zones.
- It is possible that different single auras reflect different propagation pathways from the same focus.

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- There is a growing consensus that large-scale networks subtend the core phenomena of epilepsy, including seizure generation, cognitive dysfunction, and response to treatment.
- Within this conceptual framework, however, the concept of the hub is of special importance for surgical therapy as it is likely that some brain regions are more responsible for seizure onset and propagation (hub), while others (nodes) are only remotely involved.
- While epileptic activity could result from localized abnormal neuronal activity in connected network regions or abnormal regional interactions, seizure freedom is unlikely without removing the primary hub.
- From a practical standpoint, our case demonstrates that the hippocampus was only a non-pacemaker propagating network node, while the occipital lobe harboured the primary epileptogenic zone.
- Thus, when invasive investigations confirm a specific epileptogenic source, it is reasonable to perform a minimally invasive procedure excluding the HS.