Parietal lobe epilepsy

Seizures with onset in the parietal lobe may be difficult to diagnose, especially in children, because of the subjective nature of the experience that occurs. Positive and/or negative sensory features occur. Typically paraesthesia is reported but disorientation, complex visual hallucinations, vertiginous and visual illusions and disturbance of body image (somatic illusion) can occur. Receptive language impairment can occur with dominant hemisphere involvement. Ipsilateral or contralateral rotatory body movements can occur. There is often involvement of other lobes as the seizure spreads.

Subtypes of parietal lobe seizures Primary sensory area (post-central gyrus) Seizures onset with contralateral (or rarely ipsilateral or bilateral) focal somatosensory seizure, most commonly paraesthesias with tingling and/or numbness. There may be prickling, tickling, crawling or electric-shock sensations in the affected body part. The sensory abnormality may spread sequentially along a body part as the seizure spreads on the cortex according to the sensory homunculus (Jacksonian march), when this occurs motor activity in the affected body part commonly follows. Less common sensory features include pain and thermal perceptions (such as sensations of burning or cold).

Non dominant parietal cortex Seizures may be characterized by body image distortions with feelings of movement (e.g. floating) or altered posture (e.g. twisting movement) in a stationary limb. Somatic illusions such as feeling of a body part being enlarged (macrosomatognosia), shrunken (microsomatognosia) or absent (asomatognosia), or elongated (hyperschematica) or shortened (hyposchematica) may also occur. Distal body parts and the tongue are more commonly affected.

Secondary sensory area (parietal upper bank of the sylvian fissure) Focal cognitive seizures are seen, followed by a feeling of inability to move which may spread sequentially through body parts in a Jacksonian march (ictal paralysis), this may be followed by clonic jerking in affected body parts.

Parieto-occipital junction Focal cognitive seizures are seen with visual illusions including macropsia (objects in a section of the visual field appear larger) or micropsia (objects appear smaller). Versive eye movements (typically contralateral) or epileptic nystagmus may be seen. If nystagmus is seen, this is typically with the fast component to the side contralateral to the hemisphere of seizure onset with the slow component returning to the ipsilateral side. Eye movements typically occur with retained awareness, and may be accompanied by head or trunk version. Complex visual hallucinations may occur.

Paracentral lobule Seizures arising in the non-dominant hemisphere may be characterized by sexual sensations affecting the genitalia. The subsequent phase of the seizure may be accompanied by sexualized behavior.

Dominant parieto-temporal region Focal cognitive seizures are seen characterized by language impairment with difficulties reading, calculating and writing.

Fronto-parietal operculum Seizures are characterized by facial (mouth and tongue) clonic movements (which may be unilateral), laryngeal symptoms, articulation difficulty, swallowing or chewing movements and hyper-salivation. Autonomic (e.g. epigastric, urogenital, gastrointestinal, cardiovascular or respiratory) and emotional (e.g. fear) features are common. Gustatory hallucinations are particularly common.

Despite the extensive body of research in clinical neurology on the functional organization of posterior cortices, parietal and occipital lobe epilepsy (PLE and OLE) have not as yet received the attention afforded frontal and temporal lobe epilepsy (FLE and TLE), perhaps due to their low prevalence. Posterior epilepsies however, represent a challenge for epileptology in general and neuropsychological differential diagnosis in particular. Our main purpose was to examine the likely existence of a pattern of cognitive dysfunction characterizing patients suffering from seizures with a parietal and/or occipital ictal onset. We hypothesized that such patients would present difficulties in the visuospatial and visuoconstructive domains, since spatial analysis and synthesis is an inherent feature of posterior cortical systems. Participants were 14 patients with epilepsy and 14 healthy controls matched for demographic characteristics (gender, age, and education level). We used an extensive battery of neuropsychological tests to assess auditory-verbal memory and learning, episodic memory, attention and working memory, verbal abilities, haptic perception, arithmetic abilities, and executive functions. Special attention was given to visuospatial abilities. Depression and anxiety symptoms were assessed through a self-administered questionnaire. Nonparametric (Mann-Whitney U test) statistical tests were conducted. We found that patients with epilepsy performed significantly worse in visuoconstruction, verbal, and executive functions compared to their healthy matches. Finally, we interpret our findings from the perspective of Luria of mental functions organized into functional systems and the current trends in epileptology to view epilepsy as a system (network) problem [1)].

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