

Mesial frontal lobe epilepsy as a clinical entity with characteristic symptom complexes: The relevance of ictal body turning along three axis

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Background and Objective: Semiology distinguishing mesial-frontal seizures from lateral-frontal and orbitofrontal seizures helps with presurgical evaluation of refractory epilepsy.¹ The clinical utility of mesial-frontal semiology was evaluated.

Methods: In the first part of study 152 consecutive patients undergoing frontal-lobe surgery between 1997 and 2005 were further selected if seizure localization was achieved by analysis of resection margins (mesial-frontal, lateral-frontal or orbitofrontal), intracranial exploration and achievement of Engel-class I outcome. Eighty four patients had their habitual seizures (167 seizures) analyzed by video-encephalography (VEEG) using a semiology checklist of 47 items² during the early-phase (electrographic onset to 10 second after this) and late-phase (rest of seizure episode). Localization semiology was analyzed by ² test with Bonferroni correction and cluster analysis when occurrence exceeded 10% in at least one region. In the second part of study 253 consecutive patients undergoing non-frontal-lobe surgery between 1997 and 2005 were further selected if seizure localization was achieved by the same method as above. One hundred and forty four patients had their habitual seizures (288 seizures) analyzed by VEEG and screened with the mesial-frontal semiology from the first part of study (but limited to early-phase only).

Results: The statistically-significant localizing semiology for mesial-frontal region in the early phase consisted of ictal body-turning along horizontal body axis (BT1) (58.2%), crawling (58.2%), restlessness (56.4%), facial expressions of anxiety (41.8%), fear (36.4%), grimacing produced by bilateral facial contraction (34.5%), barking (30.9%), headshaking (23.6%), pelvic-raising (23.6%) and semi-turning (18.2%) (all p<0.00143). Ictal body turning along horizontal axis perpendicular to the body axis (BT2) (36.4%) and bimanual bipedal automatism (BBA) (25.5%) were prevalent in mesial-frontal seizures yet without localizing value. Ictal body turning along a vertical axis (BT3) occurred infrequently (<10%). BT1 was the only localizing semiology which may have a potential lateralizing role. However, further analysis did not support an ipsilateral or contralateral predicting value for BT1. In the late phase, restlessness (52.7%), facial expressions of fear (43.6%), anxiety (40%), headshaking (27.3%) and crawling (27.3%) were statistically significant items. In addition, hyperkinetic lower-limb movement (25.5%) and recurrent utterances (16.4%) were also statistically significant (all p<0.00161). BBA (61.8%), dystonic limb posture (45%), hyperkinetic upper limb movement (41.8%), clonic limb jerks (38%) and BT2 (27.3%) were prevalent in the late phase without localizing value. No mesial frontal localizing items in the late phase had potential lateralizing value. Overall, BT1 occurred in 58 seizures (29 patients) of which 32 may localize to mesial frontal area, 6 to lateral frontal area, none to orbitofrontal area and 20 to non-frontal areas. BT1 gave a 55% positive predictive value (32/58) for localizing seizures to the mesial frontal region, 58% sensitivity (32/55), 94% specificity (374/400), 94% negative predictive value (374/397) and positive likelihood ratio 9.7. When the clinical syndrome of BT1, restlessness, facial expressions of fear, anxiety and barking was screened, it occurred in 12 seizures localizing to mesial frontal region but only 2 seizures localizing to non-mesial frontal region. This clinical cluster of semiology improved the positive predictive value to 86% (12/14).

Conclusion: Ictal body-turning along horizontal body axis (BT1) and semiology with physiological movement are not only prevalent semiology items of mesial-frontal lobe epilepsy but they also distinguish mesial-frontal seizures from lateral-frontal/orbitofrontal seizures.

References

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