Operculo insular epilepsy

see also insular lobe epilepsy.

Operculo-insular seizures are heterogeneous and may resemble seizures originating from the temporal, frontal, or parietal lobe. Although surface and invasive EEG recordings are often necessary to detect operculo-insular seizures, electrophysiological features of operculo-insular epilepsies remain poorly characterized.

A study of Levy et al. describes the EEG findings of patients with operculo-insular epilepsy.

Levy et al. reviewed electrophysiological data of all patients (n = 9) with operculo-insular seizures revealed by intracranial EEG and for whom operculo-insular epilepsy was confirmed by good seizure outcome after resective or radiosurgery at the CHUM Notre-Dame, Université de Montréal, Canada between 2005 and 2013. Patients were divided according to whether their seizure focus involved the anterior (group 1; n = 4) or posterior (group 2; n = 5) portion of the insula.

Interictal scalp EEG was lateralizing and showed distinct topographical spike patterns between groups: frontal and temporal in group 1, temporal in group 2. Intracranial recordings showed abundant spikes limited to the operculo-insular region or involving distant areas in the frontal/temporal (group 1) and temporal/parietal lobes (group 2). Ictal intracranial EEG revealed discharges limited to the insula or simultaneously involving extrainsular contacts at onset, notably the orbitofrontal cortex (group 1) and the frontal and parietal opercula (group 2), and propagating to the frontal and temporal lobes in group 1 and to parietal and temporal lobes in group 2.

Spike distribution and seizure propagation in operculo-insular epilepsy follows an anterior-to-posterior pattern mirroring an anterior or posterior insular focus localization. When presented with frontal and/or temporal epileptiform abnormalities, an operculo-insular focus should be considered.

Diagnosis

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They reviewed electrophysiological data of all patients (n = 9) with operculo-insular seizures revealed by intracranial EEG and for whom operculo-insular epilepsy was confirmed by good seizure outcome after resective or radiosurgery at our center between 2005 and 2013. Patients were divided according to whether their seizure focus involved the anterior (group 1; n = 4) or posterior (group 2; n = 5) portion of the insula.

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Presurgical evaluation

Presurgical evaluation of patients with operculoinsular epilepsy and negative MRI presents major challenges. Wang et al., examined the yield of noninvasive modalities such as voxel-based morphometric MRI postprocessing, FDG-PET, subtraction ictal SPECT coregistered to MRI (SISCOM), and magnetoencephalography (MEG) in a cohort of patients with operculoinsular epilepsy and negative MRI.METHODSTwenty-two MRI-negative patients were included who had focal ictal onset from the operculoinsular cortex on intracranial EEG, and underwent focal resection limited to the operculoinsular cortex. MRI postprocessing was applied to presurgical T1-weighted volumetric MRI using a morphometric analysis program (MAP). Individual and combined localization yields of MAP, FDG-PET, MEG, and SISCOM were compared with the ictal onset location on intracranial EEG. Seizure outcomes were reported at 1 year and 2 years (when available) using the Engel classification.RESULTSTen patients (45.5%, 10/22) had operculoinsular abnormalities on MAP; 5 (23.8%, 5/21) had operculoinsular hypometabolism on FDG-PET; 4 (26.7%, 4/15) had operculoinsular hyperperfusion on SISCOM; and 6 (30.0%, 6/20) had an MEG cluster (3 tight, 3 loose) within the operculoinsular cortex. The highest yield of a 2-test combination was 59.1%, seen with MAP and SISCOM, followed by 54.5% with MAP and FDG-PET, and also 54.5% with MAP and MEG. The highest yield of a 3-test combination was 68.2%, seen with MAP, MEG, and SISCOM. The yield of the 4-test combination remained at 68.2%. When all other tests were negative or nonlocalizing, unique information was provided by MAP in 5, MEG in 1, SISCOM in 2, and FDG-PET in none of the patients. One-year follow-up was available in all patients, and showed 11 Engel class IA, 4 class IB, 4 class II, and 3 class III/IV. Two-year follow-up was available in 19 patients, and showed 9 class IA, 3 class IB, 1 class ID, 3 class II, and 3 class III/IV.CONCLUSIONSThis study highlights the individual and combined values of multiple noninvasive modalities for the evaluation of nonlesional operculoinsular epilepsy. The 3-test combination of MAP, MEG, and SISCOM represented structural, interictal, and ictal localization information, and constituted the highest yield. MAP showed the highest yield of unique information when other tests were negative or nonlocalizing.

Case series

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References

