The localizing value of ictal single-photon emission computed tomography (SPECT) performed with cerebral blood flow agents in patients with epilepsy is based on cerebral metabolic and perfusion coupling. Ictal hyperperfusion is used to localize the epileptogenic zone noninvasively, and is particularly useful in magnetic resonance (MR)-negative partial epilepsy and focal cortical dysplasias. Subtraction ictal SPECT coregistered with MRI (SISCOM) improves the localization of the area of hyperperfusion. Ictal SPECT should always be interpreted in the context of a full presurgical evaluation. Early ictal SPECT injections minimize the problem of seizure propagation and of nonlocalization due to an early switch from ictal hyperperfusion to postictal hypoperfusion during brief extratemporal seizures. The degree of thresholding of SISCOM images affects the sensitivity and specificity of ictal SPECT. Ictal hypoperfusion may reflect ictal inhibition or deactivation. Postictal and interictal SPECT studies are less useful to localize the ictal-onset zone. Statistical parametric mapping analysis of groups of selected ictal-interictal difference images has the potential to demonstrate the evolution of cortical, subcortical, and cerebellar perfusion changes during a particular seizure type, to study seizure-gating mechanisms, and to provide new insights into the pathophysiology of seizures [1)]

1)
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