The power button sign: a newly described central sulcal pattern on surface rendering MR images of type 2 focal cortical dysplasia.

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Abstract

PURPOSE:

To compare the occurrence of several central sulcus variants and to assess the reproducibility of a sulcal pattern named the power button sign (PBS) in patients with type 2 focal cortical dysplasia (FCD2) and healthy control subjects.

MATERIALS AND METHODS:

The local institutional review board approved the study, and written informed consent was waived for patients and was obtained from control subjects. Four readers reviewed three-dimensional (3D) T1-weighted magnetic resonance (MR) images in 37 patients (13 with negative MR imaging findings) with histologically proven FCD2 of the central region and 44 control subjects on the basis of a visual analysis of a 3D reconstruction of cortical folds. They searched for central sulcus variations (interruptions, side branches, and connections) and for a particular sulcal pattern, namely, the interposition of a precentral sulcal segment between the central sulcus and one of its hook-shaped anterior ascending branches (ie, PBS). Inter- and intraobserver reliability, specificity, and sensitivity were calculated.

RESULTS:

The central sulcus showed a greater number of side branches ($P < .001$) and was more frequently connected to the precentral sulcus ($P < .001$) in patients with FCD2 than in control subjects. The PBS was found in 23 (62%) of 37 total patients with FCD2, in six (46%) of 13 with negative MR imaging findings, and in only one control subject. Inter- and intraobserver rates were excellent (0.88 and 0.93, respectively) for the detection of PBS. FCD2 was located either in the depth of the ascending branch of the central sulcus (14 of 23, 61%) or in its immediate vicinity (nine of 23).

CONCLUSION:

Given its excellent reproducibility and specificity, the PBS, when present, could become a useful qualitative diagnostic MR criterion of FCD2 in the central region.

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