


Subcortical Band Heterotopia Shows Increased Perfusion on Arterial Spin Labeling Maps

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Subcortical band heterotopia (SBH) results from arrested migration of neurons in the subcortical or deep white matter (WM).¹ It is characterized by the presence of a smooth band of poorly organized neurons, extending between the germinal matrix and the cortex. In the SBH, the parenchyma consists of four layers: deep WM, heterotopic gray matter, subcortical WM, and cortex. A high incidence of epilepsy has been reported in patients with SBH and detecting the epileptic focus might be useful in their management. An increased neuronal activity has been previously reported in SBH by showing increased glucose uptake in positron emission tomography (PET) and increased perfusion in Single Photon Emission Computed Tomography (SPECT).² We present a case of SBH showing on arterial spin labeling (ASL) increased relative cerebral blood flow of the heterotopic band, like that of the cortex. ASL, which assesses brain perfusion without intravenous injection of any contrast material, might be useful in the evaluation of neuronal activity of an SBH and thus in the detection of the epileptogenic area (Figure 1).

CONFLICT OF INTEREST

None.

STATEMENT OF AUTHORSHIP

Writing original draft: VGX, GAA, AG, FS.
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 Data Analysis and interpretation: MIA, LGA, FS, AG, VGX.
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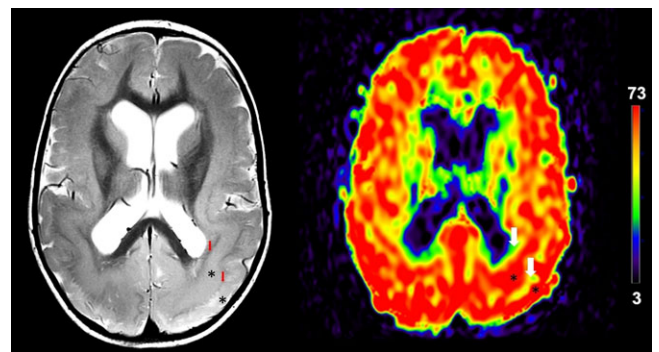


Figure 1: T₂-weighted and perfusion image of a subcortical band heterotopia case. Axial T₂ (left) (TR 2945ms, TE 80 ms, 364 × 280 matrix, 4-mm slice thickness, Gap 1 mm, FOV 200 × 189) shows a four-layer appearance of the parenchyma (white matter-red arrows, gray matter-asterisks), Axial color arterial spin labeling (ASL) (TR 3955 ms, TE 23 ms, 64 × 65 matrix, 6-mm slice thickness, Gap 0 mm, FOV 160 × 169) relative cerebral blood flow (rCBF) map (right) shows a four-layer appearance with high rCBF (red color) in the cortex and the heterotopic band (asterisks) and lower rCBF (green color) in the white matter (arrows). Image registration was performed using the Statistical Parametric Mapping.

REFERENCES

- Severino M, Geraldo AF, Utz N, et al. Definitions and classification of malformations of cortical development: practical guidelines. *Brain*. 2020;143:2874–94.
- Ito K, Nakata Y, Matsuda H, et al. Evaluation of FDG-PET and ECD-SPECT in patients with subcortical band heterotopia. *Brain Dev*. 2014;36:578–84.

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