

IMAGEM EM NEUROLOGIA/IMAGE IN NEUROLOGY

Balo's Concentric Sclerosis Mimicking High-Grade Tumor

Esclerose Concêntrica de Balo: Mimetizador de Tumor de Alto-Grau

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A previously healthy 44-year-old male presented to the emergency department with 3 days progression of speech impairment. On neurological examination he presented moderate motor dysphasia with clearly impaired speech fluency and was unable to name; right central facial paresis was also noted, with no other relevant changes. Magnetic resonance imaging (MRI) of the brain showed a single intra-axial space-occupying lesion, with a tumefactive appearance, mostly hyperintense on T2 and T2 FLAIR, but with a posterior region where alternate bands of hyper- and hyposignal on T2 were defined (**Fig. 1**). At the periphery of the lesion, areas of diffusion-weighted image (DWI) restriction could be observed, as well as topographically corresponding contrast enhancement (**Fig. 2**). These alterations, although indicating a lesion with aggressive behavior, may be present both in tumoral lesions with a high degree of malignancy and in active inflammatory lesions. Advanced MRI techniques were then performed, namely dynamic-susceptibility contrast (DSC) perfusion and spectroscopy, for a better characterization of the lesion. Cerebral perfusion MRI allows the study of vascularization of cerebral lesions and an increase in perfusion, in general, reflects neo-angiogenesis. The lesion presented increased perfusion, mainly on the periphery (**Fig. 3**). Spectroscopy demonstrated inversion of normal metabolite peaks, with increased choline, massively decreased NAA and the existence

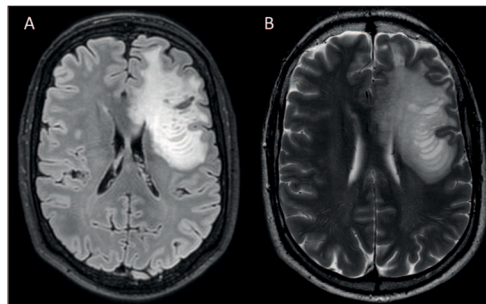


Figure 1. Axial FLAIR (A) and T2-weighted (B) brain MRI showing a left frontal tumefactive lesion, mainly subcortical, presenting with T2 and FLAIR hypersignal, and a distinct pattern of alternating bands of hyper and hyposignal on T2, corresponding to lamellae of the typical onion bulb appearance of BCS.

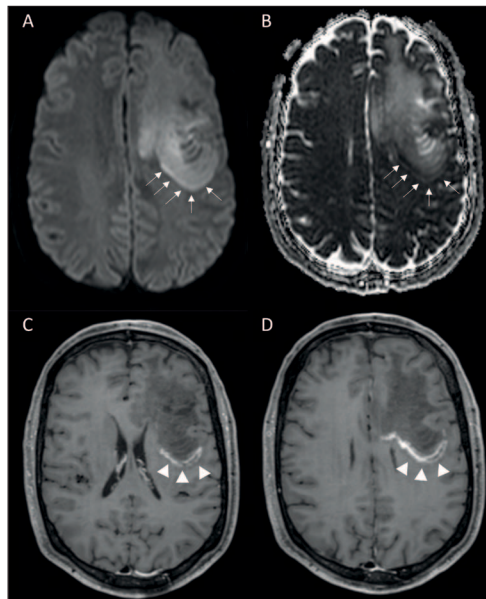


Figure 2. Axial DWI (A), ADC map (B) and post-contrast T1-weighted image (C and D) MRI scans showing peripheral true restricted-diffusion (bright signal-intensity on DWI - arrows on A; and hyposignal on ADC map - arrows on B), indicating high cellularity of the lesion; as well as peripheral contrast enhancement (arrows head on C and D), reflecting blood-brain barrier disruption. Both features are in consistency with high-grade malignancy and active demyelinating lesion.

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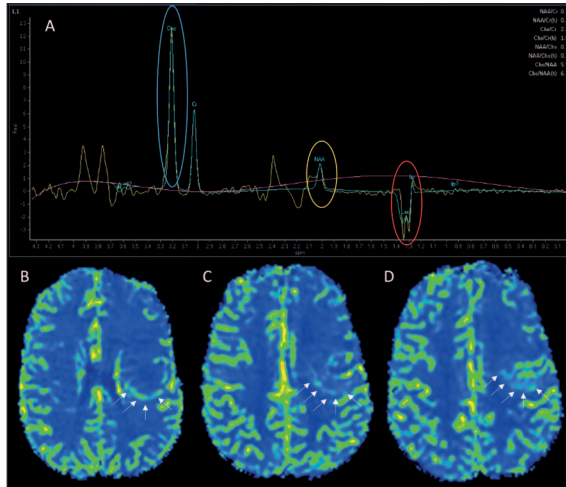


Figure 3. Advanced MRI sequences. Spectroscopy (A) demonstrating inversion of normal metabolite peaks, presenting increased choline (blue circle), reflecting increased cellular turn-over; massively NAA decrease (yellow circle), reflecting destruction of neuronal elements; and a lactate duplet peak (red circle), in consistency with anaerobic conditions, as in aggressive tumors that present hypoxia. Dynamic-susceptibility contrast (DSC) perfusion, relative-Cerebral Blood Volume map (B-D) showing high perfusion on the periphery of the lesion (arrows).

of a lactate duplet (**Fig. 3**). Integrating all the data from conventional and advanced MRI sequences, a high-grade tumoral lesion was favored, and the patient was submitted to an awake craniotomy to excision the lesion. The histological result revealed a demyelinating inflammatory lesion with a pattern of alternating myelin loss with bands of preserved myelin inside the lesion, forming a pattern of concentric rings, compatible with Baló's concentric sclerosis (BCS). The patient was started on corticotherapy with a good clinical response. BCS is a rare form of multiple sclerosis, usually with a pathognomonic MRI pattern with alternating hyper/hyposignal T2 lamellae (onion-bulb appearance).¹ Although the classical aspects of BCS are well described on conventional MRI, the literature on findings in advanced techniques, namely on perfusion, is scarce. Some reports have described changes in spectroscopy, but in none of them there was such a marked decrease in NAA.¹⁻⁴ We found two reports of perfusion studies in BCS in the literature, whose results are contrary to ours, showing hypoperfusion of the lesion.^{2,5} As the treatment of BCS is corticotherapy or immunomodulation, it is essential to make

the diagnosis of this pathology through MRI, avoiding surgery and inevitable complications and morbidity. Therefore, it is important to recognize that the active inflammatory state of the BCS lesions may course not only with alteration of metabolites in spectroscopy, but also with increased perfusion (probably secondary to local vascular dilatation) and these findings, in the presence of the typical conventional MRI appearance, should not preclude the diagnosis of BCS. ■

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