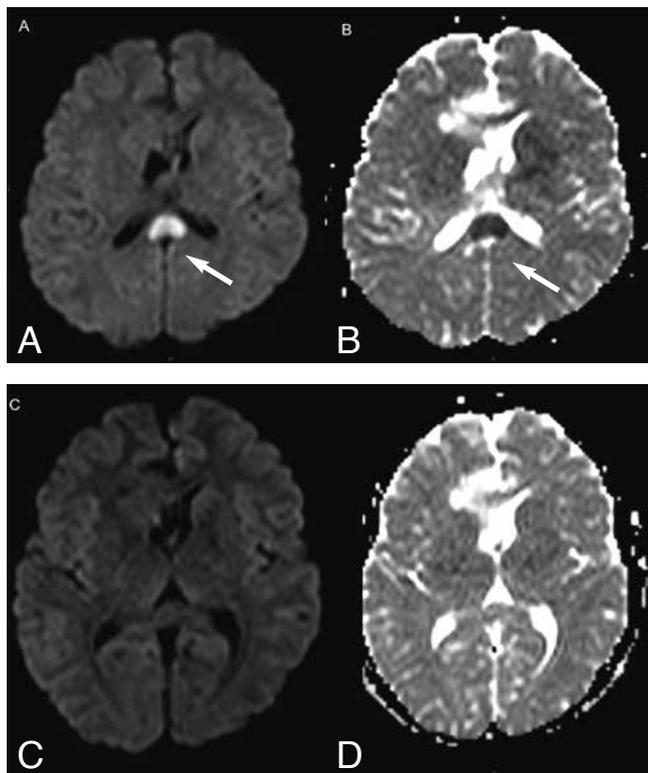


## IMAGES IN CLINICAL RADIOLOGY



### *Transient restricted diffusion in the splenium of the corpus callosum after brain surgery*

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We present the case of a 16-year-old male with 4<sup>th</sup> surgical intervention of a frontal oligodendroglioma grade II because of metabolic and morphologic progression. One day after surgery he developed headache and low-grade fever lasting for 2 weeks. No neurological deficit was observed and biology showed no inflammatory syndrome or metabolic disorder.

Early postoperative MRI of the brain shows, in the central portion of the splenium of the corpus callosum (CC), an ovoid area of homogeneous restricted diffusion, seen as a round homogeneous hyperintensity on diffusion-weighted imaging (DWI) (Fig. A) with decreased ADC values (Fig. B). This lesion is hyperintense on T2-weighted images and on fluid attenuated inversion recovery (FLAIR) images, and slightly hypointense on T1-weighted images and shows no enhancement after contrast agent administration (not shown).

Follow-up MRI, after one month, shows complete resolution of the signal anomaly of the splenium of the CC on DWI (Fig. C) and its corresponding ADC map (Fig. D).

Isolated and focal reversible restricted diffusion in the

central area of the splenium of the CC is a particular phenomenon occurring in patients with viral encephalitis, metabolic disorders and status epilepticus or antiepileptic drugs withdraw.

In our case, the presence of low-grade fever and the absence of metabolic or epileptic related disorder suggests encephalitis/encephalopathy as the most probable cause of this entity.

#### *Comment*

DWI is useful for evaluating cytotoxic edema due to excitotoxic brain injury, a common final pathway for various neurologic diseases. When excitotoxic injury with less energy failure happens, it seems to cause a cytotoxic edema of astrocytes and myelin sheaths, which protect neurons, and it seems to be transient and therefore, resolves on follow-up MR imaging. This mechanism is seen in epilepsy (status epilepticus or abrupt withdrawal of antiepileptic drugs), toxic-metabolic disorders (hyponatremia and hypoglycemia) or in viral encephalitis/encephalopathy (Influenza virus, rotavirus, herpes-virus, adenovirus...).

Regardless of the cause, clinically it may present with headache, fever, and seizures or may be silent. Callosal disconnection syndrome is not associated.

The specific location in the central splenium of the CC may be explained by the presence of a large number of glutamate receptors and high enzymatic activity in this location.

Based on the imaging of isolated, central area of restricted diffusion in the splenium of the CC on DW imaging a history of epilepsy or metabolic disorder or infectious syndrome should be evaluated and treated and a follow up MR examination should be proposed to confirm diagnosis based on the reversibility of the signal abnormality.

Isolated focal reversible restricted diffusion in the splenium of the corpus callosum may be related to infection, metabolic disorders or epileptic conditions causing excitotoxic injury to astrocytes. Knowledge of MRI imaging findings and the spectrum of diseases and conditions might prevent unnecessary invasive examinations and treatments.

#### *Reference*

1. Mortitani T, Smoker W.R.K., et al.: Diffusion-Weighted Imaging of Acute Excitotoxic Brain Injury. *AJNR Am J Neuroradiol*, 2005, 26: 216-228.