T2-FLAIR mismatch sign

The T2-FLAIR mismatch sign is a radiological finding that can be seen on magnetic resonance imaging (MRI) of the brain. It is typically seen in patients with gliomas, which are a type of brain tumor.

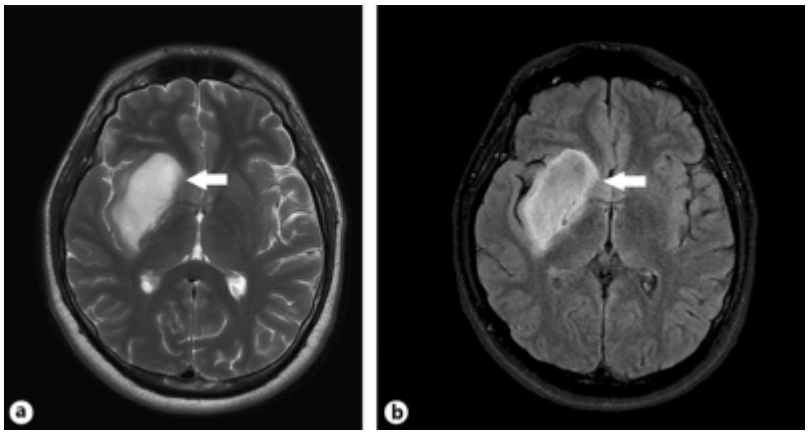
The T2-FLAIR mismatch sign refers to the presence of areas of high signal intensity on T2-weighted MRI sequences that are not present on FLAIR (Fluid Attenuated Inversion Recovery) sequences. In other words, there is a mismatch between the T2 and FLAIR sequences.

The T2-FLAIR mismatch sign is thought to be a marker of the presence of tumor cells that have infiltrated the surrounding brain tissue. These tumor cells can disrupt the normal flow of cerebrospinal fluid, leading to increased T2 signal intensity. However, because FLAIR sequences suppress the signal from cerebrospinal fluid, these tumor cells may not be visible on FLAIR sequences, resulting in the mismatch sign.

The T2-FLAIR mismatch sign is considered to be a useful imaging biomarker for predicting the presence of tumor infiltration in gliomas, and it has been associated with worse prognosis and shorter survival times in patients with these tumors.

The T2-FLAIR mismatch sign describes the MRI appearance considered highly specific for diffuse astrocytoma (Diffuse astrocytoma IDH Mutant, 1p/19q-non-codeleted molecular status), as opposed to other lower-grade gliomas. It is particularly helpful in distinguishing a diffuse astrocytoma from an oligodendroglioma that will not demonstrate T2-FLAIR mismatch.

On T2 weighted images, these tumors have extensive areas of fairly homogeneous and strikingly high signal. On T2-FLAIR, instead, the majority of these areas become relatively hypointense in signal due to incomplete suppression. At the margins of the tumor, a rim of hyperintensity is usually seen. This appearance is typical of the entity previously known as protoplasmic astrocytoma which is, however, no longer recognized as a distinct entity in the current WHO classification of CNS tumors.



MR images showing homogeneous hyperintensity of the lesion on T2 sequences (a) associated with relative Hypointensity in the central portion with a hyperintense periphery on FLAIR sequences (b), representing the T2-FLAIR mismatch sign.

T2-FLAIR mismatch sign in DIPG may be an indicator for better response to radiotherapy and a better prognostic factor [1].

Differential diagnosis

It is important to note that similar signal characteristics can be seen in the bright rim sign of DNET, although almost invariably DNETs are smaller [2].

A study revealed that lesions presenting T2-FLAIR mismatch exhibited extremely long T1- and T2-relaxation time while T2-FLAIR matched lesions showed low to moderate values. On the other hand, IDH-wildtype tumors presented noticeably short T1- and T2-relaxation time. These different relaxation time characteristics seemed to render T2-FLAIR mismatch sign of becoming such a unique and specific image feature for IDH-mutant, 1p19q non-codeleted astrocytoma [3].

1)
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2)
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3)
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