Figure 1: T1WI post contrast (left) and axial FLAIR (right) images demonstrate a fairly circumscribed infiltrative lesion involving the cortex and white matter. This low-grade tumor is associated with no appreciable enhancement.
Figure 2: Axial FLAIR (top row left) and coronal STIR (top row right) images demonstrate a poorly-defined infiltrative, hyperintense lesion involving the left temporal lobe, left insula and inferior left frontal lobe. T1WI after contrast administration (bottom) shows no contrast enhancement of this low-grade astrocytoma.

**Basic Description**

- Primary tumor arising from well-differentiated astrocytes
Pathology

- World Health Organization (WHO) grade II
- Well-differentiated, infiltrating, slow-growing
- Malignant degeneration into anaplastic astrocytoma common

Clinical Features

- Commonly presents with seizures
- Average patient age 34 years (20-45 years)
- Median survival: 6-10 years
  - Survival greater in younger patients, gross total resection, IDH1-, ARTX- and MGMT-positive tumors
  - Pontine tumors associated with decreased survival
- Sometimes associated with Li-Fraumeni syndrome and Ollier disease

Imaging

- General
  - Infiltrating, focal or diffuse white matter mass that distorts normal architecture
  - Variable size; frontal lobe masses may be large at presentation
  - Tumor commonly extends beyond region of signal abnormality
- Expansion of involved cortex
  - Two-thirds are supratentorial; frontal lobe involvement most common
  - One-third are infratentorial; brainstem most common, cerebellum uncommonly involved
  - Majority do not enhance
    - Greater degree of enhancement suggests malignant degeneration
  - ± Cysts, calcification (20%)

- Computed Tomography (CT)
  - Hypo- to isodense, poorly-defined, homogenous mass
  - ± Calcification
  - Little to no enhancement on contrast-enhanced CT

- Magnetic Resonance Imaging (MRI)
  - T1WI: homogenously hypointense
  - T2WI: homogenously hyperintense
  - Fluid attenuated inversion recovery (FLAIR): homogenously hyperintense
  - Diffusion-weighted imaging (DWI): no restricted diffusion
  - T1WI+C: Little to no enhancement; greater degree of enhancement suggests higher WHO grade
- MR Perfusion: low relative cerebral blood volume (rCBV) relative to anaplastic astrocytoma (AA) and glioblastoma multiforme (GBM). Typically, the rCBV ratio to normal white matter is less than 1.8

- MR Spectroscopy: mildly elevated choline, mildly depressed N-acetyl aspartate (NAA) peaks and usually no appreciable lactate peak

**Imaging Recommendations**

- MRI with contrast; consider MR perfusion for equivocal cases

For more information, please see the corresponding chapter in [Radiopaedia](https://radiopaedia.org).

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**References**


Kleihues P, et al. Pathology and genetics of tumours of the nervous

