DDx for Tumor Mimics

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This broad spectrum of conditions has a variable appearance that at times can mimic malignancy. This discussion features the imaging characteristics of each condition and attempts to highlight the key differentiating factors, when available.

Many tumors have a variety of mimics. We highlight here the most common broad categories of intracranial tumors, namely, high-grade glioma, low-grade glioma, diffuse glioma, lymphoma, and metastases. The mimics list for each of these tumors is by no means exhaustive but is meant to aid in the search for the patient's true diagnosis.

High-Grade Glioma, Including Glioblastoma

- Imaging
  - Heterogeneous, hyperintense mass demonstrating a thick, irregularly enhancing rim of tissue
  - Surrounding FLAIR-hyperintense signal that represents either vasogenic edema or a nonenhancing infiltrating tumor
  - Often has areas of necrosis and hemorrhage
  - Tumor commonly extends beyond the margins of visualized signal abnormality, often indistinguishable from surrounding nonenhancing edema
  - Often involves or crosses the corpus callosum
- Possible nontumor mimics
  - Amyloidoma
  - Aspergilloma (if singular)
  - Bacterial abscess (if singular)

    - Blastomycosis
    - Cerebral hemorrhage
    - Immune reconstitution inflammatory syndrome (IRIS)
    - Pseudoprogression/radiation necrosis
    - Subacute infarction
    - Tuberculoma
    - Tumefactive demyelination

Low-Grade Glioma

- Imaging
    - Often more well defined than higher-grade gliomas
    - Round or irregularly shaped
    - Most have mild or no enhancement, although some may be avidly enhancing
    - Involve cortex and/or white matter without strongly respecting the boundary between the two
    - Can have cystic change (especially ganglioglioma, dysembryoplastic neuroepithelial tumor (DNET), pilocytic astrocytoma)
    - Usually slow-growing
- Possible nontumor mimics
    - Acute disseminated encephalomyelitis (ADEM)
    - Cortical dysplasia
    - Giant perivascular spaces
    - Heterotopia
    - Immune reconstitution inflammatory syndrome (IRIS)
    - Neurofibromatosis Type 1 (NF1), focal abnormal signal intensity (FASI)
    - Progressive multifocal leukoencephalopathy (PML)

    - Tumefactive demyelination

Diffuse Glioma

- With the update to the WHO classification of brain tumors in 2016, diffuse glioma encompasses a broad subset of diagnoses, including grade II and III astrocytic tumors, grade II and III oligodendrogliomas, grade IV glioblastomas, and diffuse gliomas of childhood
- Imaging
    - The imaging characteristics are therefore heterogeneous, ranging from well-circumscribed T2WI/FLAIR-hyperintense lesions without enhancement to more infiltrative-appearing lesions demonstrating serpiginous enhancement and central necrosis
- Possible nontumor mimics
    - Acute disseminated encephalomyelitis (ADEM)
    - Aspergilloma (if singular)
    - Bacterial abscess (if singular)
    - Blastomycosis
    - Cerebral hemorrhage
    - Immune reconstitution inflammatory syndrome (IRIS)
    - Pseudoprogression/radiation necrosis
    - Subacute infarction
    - Tuberculoma
    - Tumefactive demyelination

Lymphoma

- Imaging
    - T1WI-hypointense lesions with variable enhancement (depending on immune status) with low ADC values suggesting hypercellularity
        - Immune competent—diffusely enhancing

        - Immune compromised—ring of enhancement
        - Commonly hyperdense on CT imaging
    - Commonly involves or crosses the corpus callosum
    - Basal ganglia, periventricular white matter, and corpus callosum are commonly involved
    - Calcifications in the posttreatment setting
- Possible nontumor mimics
    - Amyloidoma
    - Aspergilloma
    - Arteriovenous malformation (AVM) (on CT imaging)
    - Bacterial abscess
    - Blastomycosis
    - Candidiasis
    - Cerebral hemorrhage
    - Cryptococcus
    - Histoplasmosis
    - Immune reconstitution inflammatory syndrome (IRIS)
    - Pseudoprogression/radiation necrosis
    - Neurosarcoidosis
    - Subacute infarction
    - Toxoplasmosis
    - Tuberculoma
    - Tumefactive demyelination

Metastases

- Imaging
    - Round, peripherally enhancing lesions in regions of heightened vascularity (gray–white interface or basal ganglia)

    - Signal is highly variable
        - Some will demonstrate focal hemorrhage on MRI-CT imaging
            - Breast and bronchogenic carcinoma rarely hemorrhage, but the overall increased prevalence of these tumors makes a hemorrhagic lesion much more likely to be one of these 2 tumors
            - Thyroid, teratoma
            - Choriocarcinoma
            - Islet cell tumors
            - Renal cell carcinoma
            - Melanoma
        - Some will have restricted diffusion
    - ~50% are solitary at the time of diagnosis
- Possible nontumor mimics
    - Amyloidoma/cerebral amyloid angiopathy
    - Aspergilloma
    - Arteriovenous malformation (AVM)
    - Bacterial abscesses
    - Blastomycosis
    - Cavernous malformation
    - Cerebral hemorrhage
    - Coccidiomycosis
    - Cryptococcosis
    - Histoplasmosis
    - Pseudoprogression/radiation necrosis
    - Neurosarcoidosis
    - Subacute lacunar infarctions
    - Toxoplasmosis

- Cerebral tuberculosis/tuberculoma

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