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Posterior fossa metastases: are there pathognomonic MRI features?

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The most common tumors metastasizing to the brain originate from tumors of the lung, breast, malignant melanoma, gastrointestinal and genitourinary tumors.

Although 85% of metastatic lesions are supratentorial, metastasis is still the most common intraaxial neoplasm of the adult posterior fossa. About 20% of all intracranial metastases occur in the posterior fossa. Multiple lesions are the hallmark, but in the posterior fossa there is a high incidence of solitary lesions (25-50%) (1). Clinical symptoms are nonspecific and no different from primary brain tumors. The most sensitive examination for the detection of intracerebral or intracerebellar metastases is i.v. contrast-enhanced MR imaging. A high-dose (0.3 mmol/kg) immediate study is superior to a normal-dose study and to a delayed study in detecting small lesions. Metastatic lesions can be found anywhere in the brain, but a favorite site is near the brain surface at the corticomedullary junction of both the cerebrum and cerebellum. They are round and better circumscribed than primary tumors. They mostly incite a large zone of peritumoral cerebral edema commensurate with a rapidly growing mass, that is hyperintense on PD/T2w and FLAIR images. On T1-w images most metastases are iso- to hypointense even though in case of hemorrhage T1 hyperintensity is seen. On T2-w images metastases are more frequently hyperintense, but iso- to hypointense lesions can be sometimes detected as well (2). Metastases can be solitary and very large with a necrotic central portion mimicking aggressive primary tumors; in other case they can be very small and numerous and high-dose gadolinium examination can be indicated. The pattern of contrast enhancement can be homogeneous, nodular, inhomogeneous or ring-like (3). The amount of peritumoral edema is variable. In small cortical lesions, edema may be absent but the degree of edema is greater with metastatic lesions than with primary tumors. Metastatic melanoma has been a topic of special

interest in the MR literature because of the presence of paramagnetic, stable free radicals within melanin. The MR appearance is variable depending on the histology of the melanoma and the components of hemoglobin. Most are hyperintense to white matter on T1-w scans and hypointense on T2-w scans. Malignant melanoma is the third most common tumor to involve the brain secondarily. Lung cancer remains the most common source of brain metastases (50% of lung tumor patients have CNS metastases). In the differential diagnosis abscess, primary glial tumor, and radiation necrosis should be considered.

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