Pituitary macroadenoma magnetic resonance imaging

- Secondary Pituitary Abscess Inside a Macroadenoma Complicated by Postoperative Hemorrhage and Reinfection: A Case Report
- Specific imaging features of sellar atypical teratoid/rhabdoid tumor or the lack of thereof
- Challenges of Cushing's syndrome and bariatric surgery: a case report with literature review
- Pituitary apoplexy in the setting of severe headache and unconsciousness
- Advanced Magnetic Resonance Imaging Techniques for Localization of a Small Thyrotropin-Secreting Pituitary Tumor
- Cervical osteophyte complex causing compressive myelopathy leading to a diagnosis of acromegaly
- Elevated Dehydroepiandrosterone Sulfate Levels in 2 Patients With Prolactinomas: An Underrecognized Association
- Natural history and predictors of growth in conservatively managed non-functioning pituitary macroadenomas: A volumetric study of 232 tumors

see also Pituitary microadenoma Magnetic resonance imaging

Results did not show usefulness of the Diffusion-weighted magnetic resonance imaging and T1-weighted images for assessing the consistency of pituitary macroadenomas, nor as a predictor of the degree of surgical resection [1)]

MRI is the preferred imaging modality. It is able to delineate the mass exquisitely as well as clearly visualize the optic chiasm, anterior cerebral vessels, and cavernous sinuses [2)]

Overall signal characteristics can significantly vary depending on tumor components such as hemorrhage, cystic transformation, or necrosis.

Preoperative MRI characteristics predict TSH and prolactin level after operation. Furthermore, the adenoma size and volume prior to surgery are the main determinants of normal morphologic reconstruction of pituitary gland [3)]

Superior and inferior extent of the lesion was beyond the defined boundaries of sella in most cases, but the lateral extent was limited, resulting in characteristic “snowman-like” appearance. The imaging characteristics showed solid to predominantly solid consistency, appearing mostly heterogeneously hyperintense on T2-WI, and hypo to isointense on T1-WI with intense postcontrast enhancement. Hemorrhage is less common. Pituitary apoplexy is rare and can result in spontaneous resolution [4)]

Compared with pre-contrast T1-weighted images only, post-contrast images provided considerable additional information, but not infrequently this information could also be extracted from pre-contrast T2-weighted images. Post-contrast images were superior regarding the tumour relationship to the cavernous sinus and to the normal pituitary tissue. T2-weighted images were helpful in the diagnosis of degenerative changes, in particular intratumoural haemorrhage. A positive correlation was found between the T2 value (from dual echo sequences) and the degree of enhancement in areas with an appearance of solid tumour tissue, and the enhancement was significantly lower in GH secreting pituitary neuroendocrine tumor than in non-secreting ones. It is concluded that the use of Gd-DTPA is often justified in pituitary macroadenomas, particularly in pre-operative evaluation [5)].

T1

typically isointense to grey matter

larger lesions are often heterogeneous and vary in signal due to areas of cystic change/necrosis/hemorrhage

T1 C+ (Gd)

solid components demonstrate moderate to bright enhancement

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T2

typically isointense to grey matter larger lesions are often heterogeneous and vary in signal due to areas of cystic change/necrosis/hemorrhage

GRE/SWI

Most sensitive for detecting any hemorrhagic components, which appear as areas of signal loss

calcification is rare but should be excluded by reviewing CT scans

Attempting to predict invasion based on imaging is important preoperatively. Generally, the more laterally a tumor extends into the cavernous sinus, and the more it encircles the internal carotid artery, the greater the likelihood of invasion.

The most convenient method is to assess the degree of encasement of the cavernous portion of the internal carotid artery. Less than 90 degrees makes involvement of the sinus very unlikely, whereas greater than 270 degrees makes involvement almost certain.

Alternatively, an MRI grading system described by Knosp et al based on tumor extension past tangents drawn along the medial, central, and lateral aspects of the supra- and intracavernous internal carotid arteries is easy to use and is predictive of surgical and histological invasion (see Knosp classification system).

In the radiology literature, diffusion weighted imaging and low ADC values provide similar markers of aggressive behavior in brain tumors.

Tamrazi et al., determine a strong correlation of low ADCvalues and MIB-1, demonstrating the potential of diffusion imaging as a possible biomarker for atypical, proliferative adenomas, which may ultimately affect the surgical approach and postoperative management [7].

1)
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