

Pituitary gland imaging

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THE NORMAL PITUITARY GLAND

The pituitary gland lies within the sella. It measures approximately 13 mm in width, 10 mm in length, and 5 mm in height. The diaphragma sella covers the superior surface of the sella. On either side is the cavernous sinus containing the II, IV, V1, V2, and VI cranial nerves and the internal carotid artery.

On T1 weighted (T1W) imaging, the anterior pituitary appears isointense to gray matter and the posterior pituitary is seen as a bright spot due to the presence of neurosecretory granules containing antidiuretic hormone (ADH).

PITUITARY PSEUDOTUMORS

Symmetrical enlargement of the pituitary gland which regresses with therapy is often associated with primary hypothyroidism.

Classification of pituitary adenomas

- Functioning adenomas/nonfunctioning adenomas
- Microadenomas/macroadenomas/giant adenomas
 - Microadenomas < 10 mm in size
 - Macroadenomas > 10 mm in size
 - Giant adenomas > 4 cm in size^[1]

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The following point towards the location of a microadenoma^[2]

- Convex superior surface on the side of the tumor
- Deviation of the pituitary stalk away from the lesion (70%)
- Relatively hypointense on T1
- Delayed enhancement on dynamic magnetic resonance imaging (MRI) [Table 1].

SUPRA SELLAR TUMORS

Craniopharyngioma

The epicenter of the mass lies in the suprasellar region. The mass has a cystic and a solid component. Proteinaceous content within the cyst can appear hyperintense on T1. CT scan confirms the presence of calcification.

Meningioma

The MRI scan shows a homogenously enhancing sellar mass with a large suprasellar component. They appear iso- to hypointense on the T2 weighted (T2W) image. T2 coronal images also reveal a dural tail.

Table 1: Wilson-Hardy classification of pituitary macroadenomas^[3]

Extension	Invasion/spread
Suprasellar extension	
Confined to the sella	Sella normal; tumor ≤ 10 mm
Suprasellar extension reaching the floor of the third ventricle	Sella enlarged; tumor ≥ 10 mm
Tumor indenting the floor of the third ventricle	Localized perforation of sellar floor
Parasellar extension	Diffuse destruction of sellar floor
Intracranial (intradural) extension	Spread via cerebrospinal fluid or blood borne
Cavernous sinus (extradural) extension	

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Rathke's cleft cyst

Cystic mass with enhancing margins.

Arachnoid cysts

Cystic mass hypointense on T1 and hyperintense on T2.

Aneurysms

Appears hypointense on T2 (flow void) and T1. The diagnosis is confirmed on magnetic resonance angiography (MRA).

Hypothalamic hamartoma

Appears isointense to grey matter in T1W images and they do not show any enhancement with gadolinium.

Optochiasmatic glioma

A heterogeneously enhancing suprasellar mass involving the optic chiasm and normal appearing pituitary.

Germinomas

Well-circumscribed, intensely enhancing suprasellar/pineal lesion. Tumor spreading along the cerebrospinal fluid pathway.

Dermoid cysts

Appears hyperintense on T1 due to their increased fat content. They cause focal erosion of bone.

PARASELLAR TUMORS

Chordomas

Heterogeneous enhancement with honey comb appearance. Foci of hemorrhage within the tumor.

Infiltrative diseases

These include sarcoidosis, histiocytosis, hemochromatosis, tuberculosis, metastatic lesions and lymphomas.

Empty sella

Results from the herniation of the subarachnoid space into the sella. Primary empty sella results from a defect in the diaphragma sella. While secondary empty sella occurs following the destruction of the pituitary gland.

Pituitary apoplexy

Hemorrhage into the gland appears hyperintense both on the T2W and T1W images. Infarction of the gland can be recognized as restricted diffusion.

Diabetes insipidus

The common MRI findings include:

1. Absence of the normal hyperintensity of the posterior pituitary.
2. Thickening of the pituitary stalk (normal stalk thickness 3.5 mm).
3. Underlying hypothalamic/pituitary lesions.
4. Associated bone and lung lesions.

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