Table 11: Pituitary Anatomy

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Sumida (1994)[133]	MRI of pituitary adenomas: the position of the normal pituitary gland.	Study characterizing the MRI appearance of the normal pituitary anatomy relative to pituitary lesions.	20	Diagnostic / III	The high intensity of the posterior lobe could be differentiated using T1-weighted sagittal imaging in 13 patients (52%). The normal pituitary gland, which enhanced more strongly than tumor, could be differentiated using Gd-DTPA-enhanced MRI on the sagittal images in 22 cases (88%) and on the coronal image in 17 (68%). In 7 patients, the normal pituitary gland surrounded the tumor; it was displaced superiorly in 14 cases and superioposteriorly in 2 but in no case was it displaced anteriorly or downwards. One preoperative radiologic characteristic that can help with the differential diagnosis of sellar lesions can come from the displacement of the normal pituitary gland.
Sumida (1994)[134]	Displacement of the normal pituitary gland by sellar and juxtasellar tumours: surgical-MRI correlation and use in differential diagnosis.	Study characterizing the displacement of normal pituitary gland by pituitary adenomas.	22	Diagnostic / III	The direction of displacement of the normal pituitary gland correlated well with tumor type, so that its position proved helpful in the differential diagnosis. The normal gland was typically displaced superiorly by pituitary adenomas, inferiorly by craniopharyngiomas, and anteriorly by germinomas. One preoperative radiologic characteristic that can help with the differential diagnosis of sellar lesions can come from the displacement of the normal pituitary gland.

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Fujisawa (2002)[135]	Bright pituitary stalk on MR T1-weighted image: damming up phenomenon of the neurosecretory granules.	Patients with and without pituitary adenomas underwent conventional MR imaging. Using T1-weighted images, the pituitary stalk was analyzed and correlated to presence of central diabetes insipidus.	13	Diagnostic / III	The normal pituitary stalk appears as a low-intermediate intensity signal on sagittal and coronal T1WIs with 3 mm-slice thickness. The pituitary stalk appeared as a bright signal in 20 patients; 13 with pituitary adenoma. No patients suffered from symptoms of central DI when the bright pituitary stalk appeared.

There is a significance of the bright pituitary stalk that may suggest functional integrity of the endocrine system and may suggest endocrine function in images. |
| Smith (1994)[136] | Magnetic resonance imaging measurements of pituitary stalk compression and deviation in patients with nonprolactin-secreting intrasellar and parasellar tumors: lack of correlation with serum prolactin levels. | Conventional MR imaging of patients with NFPAs and secretory adenomas were reviewed. Images were assessed for tumor size, angular deviation of the pituitary stalk, and compression of the pituitary stalk. These imaging findings were compared to prolactin levels of the different tumors. | 15 | Diagnostic / III | There was no significant correlation of PRL level and the degree of pituitary stalk compression, stalk deviation, or tumor size. PRL levels were found to be markedly elevated in some patients with a tumor causing little distortion of the pituitary stalk. Conversely, PRL levels were often normal despite evidence of massive distortion of the stalk.

Magnetic resonance imaging evidence of pituitary stalk distortion cannot be used to determine the diagnosis of prolactinoma versus pseudoprolactinoma in most cases. |

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Bonneville (2002)[137]	Preoperative location of the pituitary bright spot in patients with pituitary macroadenomas.	Patients with nonenhanced spin-echo T1-weighted MR images were retrospectively reviewed to identify the location of the high-intensity signal posterior pituitary lobe and correlated to endocrine outcomes.	54	Diagnostic / III	The bright spot corresponding to ADH storage was identified in 44 (81%) patients. Two groups of patients were defined by the height of the macroadenoma: Group A patients (n = 27) had pituitary macroadenomas less than 20 mm in height, and group B (n = 27) had macroadenomas 20 mm or larger. In group A, the bright spot was identified in 25 patients (93%); it was located in the sella in 24 of these cases (96%). In group B, the bright spot was identified in 19 patients (70%); it was in an ectopic location in 14 of these cases (74%). MR imaging can be used to depict the pituitary bright spot in most patients with pituitary macroadenomas before surgery. The bright spot is usually identified at its expected location within the sella in patients with pituitary macroadenomas less than 20 mm in height, whereas an ectopic location is common when pituitary macroadenomas are larger than 20 mm.

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Takahashi (2005)[138]	Ectopic posterior pituitary high signal in preoperative and postoperative macroadenomas: dynamic MR imaging.	Patients underwent conventional MR imaging preoperatively. Enhancement of the posterior pituitary high signal on T1-weighted MR images were assessed. The presence and location of posterior pituitary high signal was correlated with tumor volume.	111	Diagnostic / III	Preoperatively, PPHS was seen only in the normal location in 29 patients (Group A: 26.1%). High signal was detected only in an ectopic location in 58 patients, and early enhancement of this ectopic high signal was confirmed by dynamic MR imaging in 56 patients (Group B: 50.5%). No PPHS was observed in 24 patients (Group C: 21.6%). Adenoma volume was significantly greater for Group B than for Group A ($P < .001$). Among the Group B patients who underwent MR imaging postoperatively (n = 31), the location of PPHS was not changed, except for 2 patients in whom PPHS was absent. Greater volume of adenoma is associated with a higher incidence of ectopic PPHS, and the ectopic change is irreversible.

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Saeki (Feb 2003)[139]	Posterior pituitary bright spot in large adenomas: MR assessment of its disappearance or relocation along the stalk.	Patients with conventional MR imaging were classified into posterior pituitary bright spot visible and nonvisible groups using T1-weighted MR images. Tumor shapes were classified into hourglass or barrel types. These imaging findings were compared to presence of diabetes insipidus.	69	Diagnostic / III	Posterior pituitary bright spot most commonly occurred at the distal pituitary stalk immediately above the diaphragm in 48 patients with hourglass-type adenoma. In the remaining 7 patients with barrel-type adenoma, PPBS occurred in the sella or in varying sites along the pituitary stalk. Postoperatively, 2 patients, whose PPBS became nonvisible, developed persistent diabetes insipidus. The PPBS-nonvisible group included 14 (20%) patients. Five had hourglass-type and 9 had barrel-type adenoma. Occurrence of the barrel type was marked. In these patients, 4 developed postoperative permanent diabetes insipidus.

PPBS was more commonly nonvisible in the barrel-type adenoma and is associated with postoperative DI. |
| Eda (2002)[140] | Demonstration of the optic pathway in large pituitary adenoma on heavily T2 weighted MR images. | Patients underwent T2-weighted reversed MR imaging. The relation of the pituitary adenoma to optic pathway and the appearance of the optic chiasm was identified. These imaging findings were correlated to the degree of visual field deficits. | 28 | Diagnostic / III | The optic chiasm was located anterior in 4 cases, superior in 22, and posterior in 2 in relation to the adenoma. Detectability of each optic component was higher on T2R images than on conventional T1-weighted images.

This preoperative MRI information makes it possible to visualize directly the optic pathway even in huge adenomas and is useful in predicting surgical anatomy and selecting a proper surgical approach. |

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Sumida (1998)[141]	Demonstration of the optic pathway in sellar/juxtasellar tumours with visual disturbance on MR imaging.	Patients with sellar/juxtasellar tumors and visual field defects prospectively underwent spoiled gradient recalled acquisition in steady state or conventional MR imaging. Visualization of the optic pathway was compared using the 2 modalities.	108	Diagnostic / III	The rates for visualization of the optic nerves, chiasms, and tracts were 50%, 77.8%, and 89.8%, respectively. In contrast, on SPGR coronal image the rates were 80.6%, 96.3%, and 92.6% respectively.

The rate of visualization of optic pathway structures on SPGR imaging (without enhancement) is greater than that on CSE T1-weighted imaging. This may be important in preoperative for surgical planning for lesions around the sella turcica. |
| Carrim (2007)[142] | Predicting impairment of central vision from dimensions of the optic chiasm in patients with pituitary adenoma. | Patients with MR imaging and Goldman perimetry charts were evaluated. Area of the chiasm, central height of the chiasm, and perpendicular height of the tumor were correlated with visual field impairments. | 19 | Diagnostic / III | There was a strong, statistically significant linear correlation between H (chiasm) and bitemporal (Pearson's coefficient $r = -0.69$, $P = .001$), binocular ($r = -0.63$, $P = .004$), and binasal ($r = -0.52$, $P = .01$) central field loss. A similar relationship was observed between H (tumor) and bitemporal ($r = 0.55$, $P = 0.015$) and binocular ($r = 0.46$, $P = .05$) central field loss.

Height of the chiasm and height of the tumor on MRI preoperatively can be used to predict extent of central visual impairment. |

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Tokumaru (2006)[143]	Optic nerve hyperintensity on T2-weighted images among patients with pituitary macroadenoma: correlation with visual impairment.	Patients underwent conventional MR imaging. T2-weighted images were used to evaluate optic nerves in terms of: signal intensity and degree of optic chiasm compression. The imaging characteristics were compared to visual field disturbances.	27	Diagnostic / II	Signal intensity abnormality of the optic nerve was seen at the site of compression and in the ventral side of the tumor. These patients did not demonstrate signal intensity abnormality posterior to the tumor. Presence of such signal intensity abnormalities was correlated with the degree of optic chiasmal compression and with VA disturbance. Recovery of VA after treatment was correlated with disease duration. Hyperintensity of the optic nerves ventral to the pituitary macroadenoma was associated with VA impairment. Recovery of VA after treatment was correlated with disease duration. MR imaging of the optic nerves can provide valuable information for identification of visual impairment and prognosis.
Saeki (2003)[144]	MR imaging study of edema-like change along the optic tract in patients with pituitary region tumors.	Patients with pituitary adenomas touching or compressing the optic pathway underwent T2-weighted MR imaging. Images were assessed for edema-like change along the optic tract and correlated to optic chiasm compression.	25	Diagnostic / III	After therapeutic decompression of the optic pathway, the edema-like change disappeared and large Virchow-Robin spaces, present under normal conditions, became visible along the optic tract. Edema-like change occurs in association with pituitary region tumors other than craniopharyngiomas.