

Diagnostic Imaging Pathways - Pituitary Dysfunction or Mass (Suspected)

Population Covered By The Guidance

This pathway provides guidance on the imaging of adult patients with suspected pituitary mass.

Date reviewed: July 2014

Date of next review: 2017/2018






Published: August 2014

Quick User Guide

Move the mouse cursor over the **PINK** text boxes inside the flow chart to bring up a pop up box with salient points.

Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

PITUITARY DYSFUNCTION OR MASS (SUSPECTED)

Date reviewed: July 2014
Please note this pathway is subject to review and revision

- Neurological symptoms e.g. bitemporal hemianopia
- Cushing's syndrome
- Hyperprolactinaemia
- Acromegaly
- Pituitary hormone deficiency or hypothalamic insufficiency
- Diabetes insipidus
- Fever, leukocytosis or signs of sepsis (suspected abscess)
- Known primary malignancy (particularly breast, lung or thyroid)

MRI

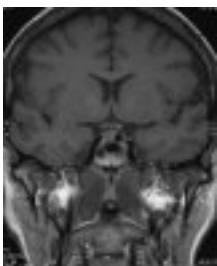
If MRI is unavailable or contraindicated

CT with intravenous contrast

Image Gallery

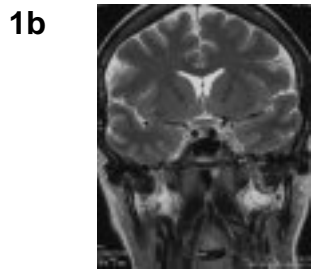
Note: These images open in a new page

1a

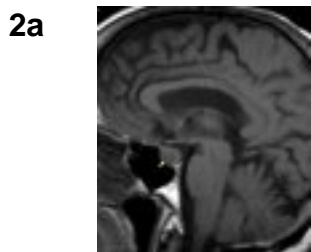
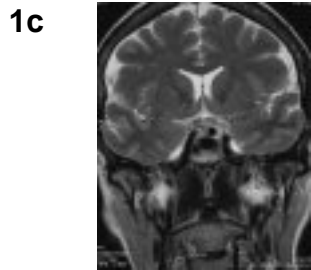


Pituitary Microadenoma

Image 1a (T1 weighted), 1b and 1c (T2 weighted) (Magnetic Resonance Imaging): There is a lesion seen within the pituitary gland centred to the right of the midline which is of high signal intensity on the T2 weighted imaging and shows slightly reduced signal intensity compared with adjacent pituitary on the T1 weighted imaging. Overall, the lesion measures up to 6mm. The lateral aspect of the lesion is abutting the medial aspect of the cavernous segment of the right internal carotid artery. The superior aspect of the

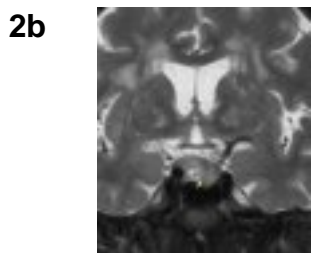


pituitary is directly adjacent to the inferior aspect of the optic chiasm. The appearances are consistent with a pituitary microadenoma.



Pituitary Macroadenoma (Cushing's Disease)

Image 2a and 2b (Magnetic Resonance Imaging): There is a 13mm right sided pituitary adenoma (arrows) causing deviation of the stalk to the left. Slight suprasellar extension is noted without impingement of the chiasm or optic nerves.

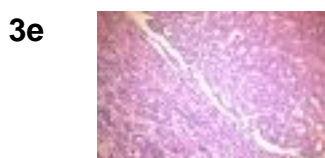


Pituitary Macroadenoma

Image 3a and 3b: Post-mortem specimens showing a circumscribed nodular tumour arising from the anterior pituitary consistent with a macroadenoma.



Image 3c (H&E, x2.5) and 3d & 3e (H&E, x20): Histological sections demonstrating a circumscribed lesion composed of sheets of uniform polygonal cells with centrally placed nuclei and amphophilic cytoplasm. The features are consistent with a pituitary adenoma.



Teaching Points

- A pituitary mass or pituitary fossa dysfunction may present clinically in a number of ways such as hormonal deficiency/excess, visual changes or headache
- A detailed history, examination and biochemical screening is required in conjunction with imaging
- MRI (Magnetic Resonance Imaging) with intravenous gadolinium is the modality of choice. It is accurate in the depiction of the pituitary gland, infundibulum, optic chiasm, cavernous sinuses and neighbouring vascular structures
- If MRI is contra-indicated or unavailable, a CT (Computed Tomography) with contrast is an alternative

Computed Tomography (CT) with IV Contrast

- Coronal CT with intravenous contrast and thin slices is the preferred imaging modality if MRI is unavailable or contraindicated, and can produce diagnostic images [1](#)
- Superior to MRI in demonstration of bony erosion. [2,3](#) CT is also more sensitive than MRI in detecting calcification of soft tissues [4](#)
- There has been promising results in the use of dual-energy CT in differentiating sellar meningiomas and pituitary adenomas. The MR appearances of these two lesions can often be difficult to differentiate and often there can be contraindications to the use of MRI [5](#)
- Inferior to MRI for distinguishing the tumour from the optic chiasm, and in diagnosis of cavernous sinus invasion [3,6,7](#)
- Advantages: relatively less expensive and widely available
- Disadvantages: exposure to ionising radiation
- Information for consumers on Computed Tomography (CT) [InsideRadiology](#)

Magnetic Resonance Imaging (MRI)

- Gadolinium enhanced MRI is the imaging modality of choice for investigation of suspected pituitary fossa lesion [6,8-10](#)
- The use of MRI pre operatively is well established, accuracy between pre operative imaging findings and surgical findings was high in this study [11](#)
- Subtle microadenomas can be difficult to detect and a dynamic contrast enhanced study is often used to assist diagnosis [1,12](#)
- Superior diagnostic accuracy compared to CT. [2,3,6,13-15](#)
- Advantages
 - Accurate depiction of the anatomy of the pituitary gland, infundibulum, optic chiasm, cavernous sinuses, and neighbouring vascular structures [2,6,14,16](#)
 - Helps differentiate fat, haemorrhage and cystic areas from tumour tissue [17](#)
- Disadvantages: expensive and limited availability
- MRI shows an incidental pituitary fossa lesion in approximately 10% of normal individuals [18](#)
- The majority of these are microadenomas with macroadenomas being far less common [19](#)
- There is considerable variation in clinical practice in relation to incidental pituitary lesions and the optimal management strategy is uncertain [20](#)
- Serial imaging has shown that most incidental pituitary adenomas do not increase in size [21,22](#)
- Information for consumers on Magnetic Resonance Imaging (MRI) [InsideRadiology](#)

Pituitary Fossa Mass

- There are a number of causes for a pituitary fossa mass including [23](#)
 - Pituitary adenoma
 - Meningioma
 - Metastasis
 - Germ Cell Tumour
 - Sarcoidosis
 - Tuberculosis
 - Pituitary Abscess
 - Aneurysm
 - Craniopharyngioma
- A pituitary fossa mass can present clinically in a number of ways including [24](#)
 - Deficiency of one of more pituitary hormones
 - Hormone excess - most commonly prolactin
 - Mass effects from an expanding lesion; e.g. bitemporal hemianopia
- Pituitary adenomas are the most common cause of a pituitary fossa mass they comprise between 10 -15 percent of all intracranial tumours and are the most common lesions arising in the sellar region. [1,8,25](#) Pituitary adenomas are also classified depending on the ability to secrete hormones, those secreting hormones are known as functional adenomas and those that do not are referred to as non-functional adenomas. [26](#) They may secrete prolactin, TSH, GH, ACTH or gonadotropins. [8-10](#) The most common pituitary adenomas are prolactinomas [27](#)
- Metastatic disease to the pituitary has been reported in 26 percent of autopsy cases [28](#) with the most common causes being metastatic disease from breast followed by lung and thyroid [29,30](#)
- Plain radiography is insensitive and nonspecific for evaluation of sellar pathology and is no longer used, however an enlarged or eroded sella may reflect a pituitary or parasellar lesion [8-10](#)
- Pituitary microadenoma and even small pituitary macroadenomas are frequently associated with a normal sella size [8-10](#)
- Pituitary adenomas can be classified radiologically in accordance with their size, microadenomas are classified as being <1cm and macroadenomas are classified as being ≥1cm [4](#)

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Date of literature search: June 2014

The search methodology is available on request. [Email](#)

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. [Download the document](#)

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