Incidental Sellar Lesions

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Introduction

Magnetic resonance imaging (MRI) studies and computerised tomography (CT) are becoming more readily available and widely used modalities of clinical investigations. An increasing number of mass lesions involving the sellar region are now being detected on MRI and CT performed for reasons unrelated to pituitary diseases. These incidental sellar lesions include neoplastic conditions such as pituitary adenomas, meningiomas, craniopharyngiomas, gliomas and metastases. Non-neoplastic lesions may include Rathke’s cleft cysts, carotid artery aneurysms, granulomas, hypophysitis, mucocoeles, and other uncommon pathologies. This article will focus on the two most commonly encountered entities - incidental pituitary adenomas and Rathke’s cleft cysts.

Pituitary Incidentaloma (PI)

The incidence of PI is around 10% at autopsy, distributed equally throughout the age groups and between the sexes. The reported incidences of PI on contrasted MRI range widely from 2 to 34%. It is of note that some normal individuals may have ‘normal pituitary hypertrophy’ that exceeds the normal size boundary of 9 mm, and which may occasionally mimic a PI. Artefacts such as beam-hardening effects on CT and susceptibility distortions on MRI may also cause diagnostic difficulties.

PI may be functioning (hormone-secreting) or non-functioning lesions. However, about 75% of the latter are in fact gonadotroph adenomas, and others may stain positively for adrenocorticotrophic hormone (ACTH), growth hormone (GH), prolactin (PRL) or thyrotropin (TSH) singly or in combinations. These are sometimes referred to as ‘silent’ corticotroph, somatotroph, lactotroph, thyrotroph or mixed adenomas, respectively.

Clinical presentation

The fact that these adenomas are incidental findings does not necessarily mean that they are clinically silent. A detailed history and clinical examination are essential for the detection of subtle symptoms and signs that may suggest hormonal hypersecretion, hypothalamic/pituitary hypofunction, and visual field deficits. Rarely, PI may be associated with hydrocephalus due to third ventricular obstruction, and cranial nerve palsy due to cavernous sinus involvement.

Evaluations of pituitary incidentaloma

PI diagnosed on CT should be further evaluated by contrasted MRI of the pituitary region. The visual field should be formally assessed for optic chiasm or optic nerve compression - the former being classically associated with bitemporal hemianopia, whilst the latter may cause loss of vision in the ipsilateral eye and a junctional scotoma in the contralateral eye.

Symptoms of hypersecretion may be very subtle, and biochemical evaluation is warranted even when no clinical signs and symptoms are detected. This is particularly relevant for the diagnosis of silent somatotroph and corticotroph adenomas. Although it is not clear whether such lesions are associated with the increased risks for metabolic and oncological complications like their symptomatic counterparts, there is evidence to suggest that these tumours may have a worse prognosis than those which produce overt symptoms. Early detection and timely management is therefore important. In general, up to 40% of macroadenomas are associated with hypopituitarism and careful endocrinological evaluation is indicated. The reported incidence of hypopituitarism in microadenomas may range from 0 to 50%, and it is controversial whether routine screening is necessary.

A detailed discussion of pituitary evaluation is beyond the scope of this article. Briefly, screening tests for Cushing’s disease include the overnight dexamethasone suppression test, the 24-h urinary free cortisol level and, more recently, a midnight salivary cortisol level. The latter has greater than 93% specificity and sensitivity. A random serum insulin-like growth factor-1 (IGF-1) level is useful for the screening of acromegaly. Hyperprolactinaemia may result from genuine hypersecretion or pituitary stalk dysfunction secondary to tumour compression. A prolactinoma commonly causes a markedly raised PRL level of greater than five times the upper limit of normal. A very large prolactinoma may produce enough PRL to saturate the antibodies in the assays (the ‘hook effect’), resulting in a misleadingly low serum PRL level.

Other tests include total testosterone level in men, oestriadiol in women, early morning serum cortisol for hypocortisolism, and T4 and TSH for secondary hypothyroidism. Lutinising hormones (LH), follicular stimulating hormone (FSH) and alpha-subunit may also be tested as part of the assessment of the gonadal axis. Diabetes insipidus is uncommon before surgery in the case of PI. The selective loss of a single pituitary hormone (e.g., ADH or ACTH) is even rarer and, when
associated with a thickened pituitary stalk, should raise the suspicion of hypophysis.

**Management of incidental pituitary adenomas**

Tumours which are hypersecreting require treatment. For non-functioning PIs, the indications for surgery include the initial tumour size, the presence of mass effect and tumour progression. Not all PIs grow. For microadenomas, the lesion size may increase in around 10%, decrease in 6 %, and remain static in over 80% of patients. Upfront surgery is generally not indicated and patients may be followed by repeated MRI, initially at 6-month, then at year-1, -2 and -5. For macroadenomas, close to 24 to 50% of cases will increase in size. The tumour volume doubling time has been found to vary widely from 0.8 to 27.2 years, however. Most authorities advocate surgery for incidental macroadenomas given their greater propensity for growth. Macroadenomas which are managed conservatively should be followed up very closely.

Patients with established visual defects certainly require treatment. Surgery may also be considered for lesions abutting the optic chiasm in young patients even in the absence of visual field loss. It is controversial if hypopituitarism alone would indicate surgery since although hypopituitarism is potentially correctable with tumour resection, the latter may also cause iatrogenic loss of function. Careful counselling is needed especially for female patients of reproductive age who may have concerns about future child-bearing. Some authorities also recommend surgery for lesions which show evidence of recent haemorrhages.

The treatment of choice for most PI is transsphenoidal removal. Recent development has seen the increasing use of endonasal endoscopic transsphenoidal surgery as a minimally invasive alternative to the conventional transseptal microscopic approach. Medical therapy alone with dopamine agonists or octreotide is effective for only 10 to 20% of non-prolactinomas but may be considered for patients who are unfit for or reluctant to have surgery. There is at present not enough evidence to support radiosurgery as a standard first-line treatment for PI.

**Rathke’s Cleft Cyst (RCC)**

Rathke’s cleft cysts are benign lesions commonly thought to be the remnants of the Rathke’s pouch. The cyst content may vary from clear CSF-like to thick mucoid-like materials. Histologically, RCCs are lined by single or pseudo-stratified cuboidal or columnar epithelium although squamous metaplasia can occur that may mimic craniopharyngioma. The incidence of RCC found at autopsy is around 13 to 33%.

It is important but at times difficult to distinguish between RCC, cystic pituitary adenoma and craniopharyngioma radiologically. These conditions have different natural histories and require very different treatment approaches. On CT, all may appear as hypo- or isodense lesions although craniopharyngiomas are more likely to show calcifications. On MRI, both RCC and craniopharyngiomas may show a wide range of intensities on T1- and T2-weighted images, depending on the nature of the cyst contents. For example, higher protein concentrations may lead to shortened T1 and T2 relaxation times, increasing the intensity of T1-weighted and decreasing the intensity of T2-weighted images. Rim enhancement may be seen in a number of RCCs and may be attributed to the presence of a circumscribed area of pituitary tissue, inflammation, haemosiderin, cholesterol crystals, or squamous metaplasia in the cyst wall. A small intracystic nodule corresponding to proteinaceous deposition that has high T1 and low T2 intensities, and which does not enhance, is a very characteristic appearance of RCC. A RCC with hyperintense signals on both T1- and T2-weighted images may also resemble a haemorrhagic pituitary adenoma. Recently, diffusion weighted images (DWI) have been found to be useful for the distinction between these conditions.

The majority of RCC are asymptomatic. The common clinical presentations resemble those of pituitary adenomas, and may include headache, visual field loss, and hypopituitarism. The evaluation of a newly diagnosed RCC should follow those listed above for PI except for hypersecretion, which is not a feature of RCC.

The propensity of growth is relatively low for RCC. The majority would remain static. Asymptomatic RCC should be observed. Even those with mild symptoms may be managed conservatively because some of these lesions have been known to shrink or disappear spontaneously. RCCs with significant symptoms or increase in size can be readily treated surgically by means of transsphenoidal removal. The endocrine outcome following surgery, however, remains suboptimal - reversal of pituitary deficits is uncommon, and diabetes insipidus may occur not infrequently. The reported risks of recurrence may range from 8% to close to 40%. Surgical biopsy is also indicated when a histological exclusion of other sellar pathologies is required.

**Summary**

Both PI and RCC should receive thorough imaging, visual, and hormonal evaluations preferably by endocrinologists and neurosurgeons. Due to the benign nature of these conditions, most can be managed conservatively. The main indications for treatment include the presence of visual field deficits, hormonal hypersecretion, and disease progression. Transsphenoidal resection is the treatment of choice in the majority of cases.

**References**