Pituitary Tumours

Introduction

The Pituitary gland is located at the base of the brain and is often called the 'master gland' of the body because its function is to produce a variety of hormones, which are chemicals that control many functions in the body. The pituitary hormones, which may be affected by pituitary tumours include prolactin, growth hormone, adrenocorticotrophic hormone, follicle-stimulating hormone, luteinising hormone and thyroid-stimulating hormone. Tumours of the pituitary gland are the most common cause of masses in this region of the brain in adults and represent between 10-15% of all brain tumours. Growth of pituitary tumours may cause a variety of neurological problems including problems related to hormone disturbances and visual symptoms including visual loss or visual field deficits.

Classification

The majority of tumours of the pituitary gland are pituitary adenomas. Pituitary adenomas are benign tumours that may be comprised of a variety of cell types that are contained in the pituitary gland. There are two primary ways that pituitary tumours are classified, by size and cell type. Tumours that are smaller than one centimetre in size are called microadenomas and tumours larger than one centimetre in size are called macroadenomas. Pituitary adenoma classification and incidence based on cell types are summarised below:

Cell Type (Hormone)	Incidence
Prolactin	40%
Growth Hormone	20%
Null Cell (No Hormone)	20%
Adrenocorticotrophic Hormone	15%
Gonadotrophic Hormones	2%
Thyroid Stimulating Hormone	1%
Other	2%

Presentation/Symptoms

Pituitary tumours may present with a wide variety of symptoms primarily related to the size of the tumour or hormone disturbances caused by the tumour. Growth of some pituitary tumours may cause headaches or double vision from compression of the nerves that control eye movement.

Visual deficits are the most common symptom of pituitary tumours leading patients to seek medical attention. However, often the visual loss is slow to progress and may not be noticed for months of years after initial symptoms. Patients with pituitary tumours may experience decreased visual acuity or peripheral visual field deficit, including the classic tunnel vision pattern of visual field loss from compression of the optic chiasm by the tumour growing from below.

Hormonal symptoms are related to the particular cell type of the pituitary tumour. Tumours of a particular cell type that produce excess of that hormone may also lead to deficiencies in other hormones due to the tumour itself causing compression of the remaining normal functional cells of the pituitary gland. A summary of common symptoms related to tumours of each of the different cell types is summarised below:

Increased Hormone	Symptoms
Prolactin	infertility, excess breast milk
Growth Hormone	gigantism, acromegaly
Adrenocorticotrophic Hormone	Cushing's disease – obesity, fatigue
Thyroid Stimulating Hormone	weight loss, palpitations, sweating

Decreased Hormone	Symptoms
Prolactin	failure to produce breast milk
Growth Hormone	short stature, low blood glucose
Adrenocorticotrophic Hormone	Addison's disease
Gonadotrophic Hormones	loss of libido, infertility, body hair loss
Thyroid Stimulating Hormone	weakness, confusion, weight gain

Investigation Laboratory/Radiological

Routine investigations used to diagnose pituitary tumours include radiological imaging and blood tests. A CT scan may visualise the tumour and identify bleeding in suspected apoplexy but MRI scans provide better resolution and dynamic imaging helps to demonstrate small microadenomas.

Blood tests to assess levels of pituitary hormones such as prolactin, growth hormone, adrenocorticotrophic hormone, follicle-stimulating hormone, luteinising hormone and thyroid-stimulating hormone are routinely conducted to identify the possible cell type of the tumour which would produce excess of a particular hormone and also to identify any hormone deficiencies resulting from the tumour.

Treatment

The three main treatment options for patients with pituitary tumours are surgery, radiotherapy and medical treatment. Surgery to remove the pituitary tumour can be conducted via a craniotomy or more commonly an operation through one of the air sinuses in the base of the skull called a trans-sphenoidal approach.

Surgical excision is the primary treatment method in large macroadenomas causing compression of the optic pathway and vision loss, growth hormone-secreting tumours causing acromegaly and adrenocorticotrophic hormone-secreting tumours causing Cushing's disease.

Post-operative radiotherapy may be considered in cases where complete excision of the tumour is not possible or where there is persistent elevation of hormone levels despite surgery.

Medical treatment of pituitary tumours aims to restore hormone levels to normal. Deficient hormones can be replaced before of after surgical treatment as necessary. Prolactin-secreting tumours are treated with medications such as bromocriptine or cabergoline to restore normal hormone levels. Some large prolactin-secreting tumours are treated with a combination of medication and surgery. When medical treatment of prolactin-secreting tumours fails, surgery is necessary to remove the tumour to correct the hormonal abnormality.

Prognosis

Pituitary adenomas are benign tumours and prognosis is positive with appropriate treatment. Up to 70% of patient with visual failure from pituitary tumours recover following appropriate treatment and many symptoms of hormone imbalances resolve with surgical removal of the tumour or medical treatment.