Pituitary Tumor

Definition

Pituitary tumors are neoplasms in the sella turcica. More than 80% of pituitary tumors are adenomas.

Epidemiology

Pituitary adenomas are the most common intracranial neoplasms. The prevalence of these tumors is approximately 8.5% to 10% in autopsy reports or MRI scan findings.

Pathophysiology

The pituitary gland is located in the sella turcica of the sphenoid bone. It has two main lobes, the anterior lobe and posterior lobe. The anterior lobe produces seven hormones: growth hormone, thyroid-stimulating hormone, adrenocorticotrophic hormone, follicle-stimulating hormone, luteinising hormone, and prolactin. The posterior lobe stores hormones produced in the hypothalamus, which are oxytocin and antidiuretic hormone.

Pituitary tumors are classified according to the type of hormone they secrete. There are prolactin-secreting adenomas, growth hormone-secreting adenomas, corticotrophin-secreting pituitary adenomas, gonadotropin-secreting adenomas, thyrotropin-secreting pituitary adenomas, and null-cell adenomas.

Manifestation, diagnostic tests, and treatment of different types of pituitary tumors

Manifestations of pituitary tumors are related to the excessive hormone secreted by the tumors, the mass effects of the tumor, or dysfunction of the pituitary gland.

Mass effect of the tumor

The enlarged pituitary adenoma compresses on the pituitary stalk and/or the portal vessel, which interferes with the delivery of hypothalamic hormones to the pituitary gland and disrupts the circulation to the anterior lobe of the pituitary.

Enlarged adenomas may extend laterally into the cavernous sinus, which compresses and injures cranial nerves III, IV, and VI and results in diplopia, complete internal/external ophthalmoplegia on one side, and a marked decreased vision in one eye. If the facial nerve (cranial nerve V) is affected, facial nerve symptoms include: ptosis, facial numbness, decreased sensation to sharp stimuli over one side of the face and an absent corneal reflex on one eye may occur.

Excessive hormone secretion

Manifestations of pituitary tumors are dependent on the type of hormone secreted excessively by the tumor. The two most common types of pituitary adenomas are prolactinomas and growth hormone secreting adenomas.

Prolactinomas (Prolactin-secreting pituitary tumor)

Prolactinomas occur in 40–45% of all pituitary tumors. They are more frequent in females than males with a 10:1 ratio. The highest incidence occurs in 20 to 30 year olds.

Presentations of prolactinomas in women include: hyperprolactinemia, oligomenorrhea or amenorrhea, and galactorrhea. Common presentations of prolactinomas in men include impotence and diminished libido.

Growth hormone-secreting adenomas

Growth hormone (somatotropin) secreting adenomas (GHSA) account for 20% of all pituitary tumors. Adult patients with GHSA usually present with acromegaly and children will present with gigantism. The peak incidence of GHSA is between 40 and 50 years of age.

Other manifestations of pituitary tumors

Headache is a major manifestation of pituitary tumors (69%); characteristics of headache include throbbing, pressure, dull, sharp, and burning. The location of the headache could be frontal, orbital, or retroorbital.

Diagnostic Tests

In addition to patients’ history and clinical presentation, diagnosis of pituitary tumors includes both serum blood tests and radiodiagnostic tests.

Radiodiagnostic tests

The most commonly used radiodiagnostic tests for pituitary tumors include CT scan and MRI. MRI is more commonly used because it is able to show soft tissue in greater detail. The bony structures of the sella turcica and the surrounding structure may affect the clarity of the pituitary gland in the CT scan images.

Laboratory Tests

Serum pituitary hormone levels are evaluated to identify different types of secreting pituitary adenomas. If the fasting serum prolactin level is above 200ng/mL (>200µg/L), a prolactinoma is suspected. If fasting growth hormone is >10ng/mL (>10µg/L), or post glucose loading growth hormone is >5ng/mL (>5µg/L), a growth hormone releasing adenoma is suspected.

Treatment options

Most of the pituitary adenomas are asymptomatic and no treatment is required. There are several treatment options for pituitary tumors, which include surgery, radiotherapy, and medical management. Occasionally, combined therapies may be required.
Surgery

Transsphenoidal surgical adenomectomy is the first line of treatment for most pituitary tumors. Microsurgical assisted surgery has been used for many decades. It can be either a transnasal or sublabial approach. In the sublabial approach, an incision is made below the upper lip above the gingiva. The instrument is then advanced through the nasal septum into the sphenoid sinus.

The newer surgical intervention is an endoscopic assisted transnasal approach. An endoscope is advanced into the tumor site via one nostril. It provides illumination and vision for the surgical site. The operation instrument is advanced to the tumor via another nostril. Endoscopic assisted transnasal approach provides a minimally invasive treatment and reduces the risk of a CSF leak.

After the pituitary tumor is removed, a small fat graft (usually harvested from the abdomen), Gelfoam, or Surgicel will be used to seal the sphenoid floor. This is to prevent a CSF leak from the surgical site.

Common complications of surgery include diabetes insipidus, infection, CSF leak, infarction or hemorrhage of the pituitary gland, fluid and electrolyte imbalance, cranial nerves palsies, and olfactory changes.

Medical management

The first line of treatment for prolactinomas is medical therapy. Dopamine agonists such as Bromocriptine (Parlodol) and Cabergoline (Dostinex) have been used in controlling the growth of the tumor and lowering the secretion of prolactin.

Medical therapy for acromegaly is used if the disease is not cured after surgery or if the tumor recurs. Somatostatin analogues such as Octreotide and Lanreotide have been used to decrease growth hormone secretion and control the growth of somatotroph cells.

Radiotherapy

Radiation therapy has been used as an adjuvant therapy with other treatment for patients with residual tumors after surgery or for those who fail to benefit from medical management. Stereotactic conformal radiotherapy has been used to reduce the damage to the healthy tissue around the pituitary tumor.

Nursing Implications

Patients should be monitored for urine output and urine specific gravity (SG) done hourly post pituitary tumor removal. If the urine output is >250ml/hour for two consecutive hours AND the urine SG is <1.005, these indicate the patient has possibly developed Diabetes Insipidus (DI) and the nurse should notify the physician immediately. DDAVP (Desmopressin or 1-desamino-8-D-arginine vasopressin) is the most commonly used agent to treat DI.

Monitor for any signs and symptoms of a CSF leak. Patient may have nasal drainage (test for Halo sign) or post nasal drip (salty taste) especially changing from a supine to an upright position.

Patients who have the sublabial approach may develop pain and numbness of the gingiva and should use warm saline water to rinse their mouth instead of brushing their teeth for the first two weeks.

Advise patients to wipe their nose if there is any drainage. Patients should not blow their nose for at least a week after surgery. The mucosal lining of the nostril is usually edematous, the sphenoid sinuses and surgical site of the septum contain lots of crusting. Nasal rinsing with warm saline water may be ordered by some physicians.

Post-operative evaluation of hormone levels is essential. Alterations of hormone production may be temporary or permanent. Long term follow up with endocrinology for hormone replacement may be required.

Reference


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