The OHSU Pituitary Unit

A Clinician's Guide to the Work-up of Pituitary Disorders

Pituitary diseases are relatively uncommon in the general population but if misdiagnosed or untreated can lead to serious complications including blindness and, ultimately, death. Yet, due to their infrequency as well as to symptomatic diversity, an initial diagnosis is frequently elusive and the subsequent management of pituitary disease can be complex.

The pituitary gland is situated within the sella turcica of the sphenoid bone and is located anterior to the hypothalamus and inferior to the optic chiasm. The anterior lobe of the pituitary makes six hormones: Prolactin, ACTH, thyroid stimulating hormone (TSH), LH, FSH and growth hormone (GH) and the posterior lobe of the pituitary releases vasopressin (ADH) and oxytocin. The maintenance of appropriate levels of these hormones constitutes a major control mechanism for virtually all physiologic activities.

Etiology:

Pituitary disease is most often caused by benign adenomas which are classified as either functioning (overproducing one or more hormones) or non-functioning. These uncommon lesions occur with an incidence of 35 cases per million per year. Pituitary disorders can also be caused by a variety of other etiologies including infiltrative, immunologic, ischemic, hypothalamic and metastatic disease as well as trauma.

Signs & Symptoms:

In addition to the relatively low frequency of pituitary disorders, patients suffering with pituitary diseases can initially present with diverse symptoms to virtually any medical specialty (Table 1). This combination renders the initial diagnosis daunting plus creates a situation in which most physicians (including many endocrinologists and neurorosurgeons) do not have the requisite experiential base to comfortably manage patients with pituitary disease. Hence, the vast majority of physicians seek to develop an ability to recognize or suspect patients with pituitary diseases and refer them to a specialty group for conclusive diagnosis, treatment and management.

Table 1 - Examples of Medical Specialties To Which Pituitary Disease Patients May Present (partial list)

- **Obstetrics and Gynecology**
  galactorrhea, menstrual irregularities, infertility, hirsutism
- **Urology**
  impotence, hypogonadism
- **Neurology**
  headache, proximal muscle weakness, carpal tunnel syndrome

- **Ophthalmology**
  blurred vision, visual field loss, diplopia
- **Dermatology**
  dry, oily, diaphoretic skin
- **Orthopedics**
  joint pain, joint/bone abnormalities
- **Family Practice/Internal medicine**
  all of the above, polyuria, fatigue, depression, hair loss

For physicians, the non-specific symptomatology of pituitary disease is a major barrier to even a preliminary diagnosis. To assist in this, a partial list of common signs and symptoms of pituitary hormone deficiency and excess are listed in Table 2. Within the context of the indicated symptoms, the following three questions can also help the clinician identify a potential pituitary disease.

First, are there signs or symptoms of deficiencies in pituitary hormones? Hormonal deficiencies can occur in isolation or in combinations.

Second, are there signs or symptoms of excess in pituitary hormones? Hormonal overproduction can also occur in isolation or in combinations and can occur in the background of other hormonal deficiencies.

Third, are there signs or symptoms of a space-occupying pituitary lesion? Clinical manifestations include headaches, visual problems (especially peripheral vision loss) and occasionally seizures or cranial nerve deficits.

Table 2 - Partial List of Signs and Symptoms of Pituitary Hormone Disregulation

Pituitary Hormone Deficiency

- **ACTH (Adrenal Insufficiency)**
  abdominal discomfort (N/V), joint aches, orthostasis
- **TSH (Hypothyroidism)**
  constipation, cold intolerance, proximal muscle weakness, dry skin, memory loss, hair loss
- **LH/FSH (Hypogonadism)**
  sexual dysfunction, hot flashes, menstrual irreg.
- **GH (Adult Growth Hormone Deficiency)**
  lack of vigor, decreased exercise tolerance, feelings of social isolation
- **ADH (Diabetes insipidus)**
  polydipsia, polyuria, nocturia

Pituitary Hormone Excess

- **Prolactin (Hyperprolactinemia)**
  galactorrhea, sexual dysfunction
- **CTH (Cushing's Disease)**
  moon face, truncal obesity, purple stria, hirsutism, HTN, DM, proximal muscle weakness
- **GH (Acromegaly)**
  enlarged hands/feet/jaw, carpal tunnel syndrome, oily skin, joint pain

Initial Workup

While a preliminary diagnosis of pituitary disease can be challenging, the initial basic work-up for pituitary disease is straightforward and can be easily initiated if pituitary disease is suspected, as described in Table 3. A head MRI should be performed if either the laboratory evaluation indicates the presence of pituitary disease or if a space-occupying lesion is suspected. The correct interpretation of the laboratory evaluation can sometimes be difficult due to the nuances of pituitary disease; assistance in this process is offered through the OHSU consultation service as described in the link: Consult with an OHSU Neuroendocrinologist. The OHSU Dynamic Endocrine Testing Unit (DETU) is available as part of the OHSU Pituitary Unit or can be consulted independently to assist referring physicians in performing dynamic endocrine testing.

Table 3 - The Basic Pituitary Disease / Pituitary Tumor Work-up

Hormones to check

- Prolactin
- 8:00 am serum cortisol(or cortrosyn stimulation test)
- TSH and Free T4
- LH and FSH
- Testosterone (men)
- IGF-1 (Insulin-like Growth Factor-1)
- 24 hour Urine Free Cortisol (for Cushing's)

Imaging (if indicated)

- Head MRI (with and without gadolinium)

A PDF file of The Basic Pituitary Disease/Pituitary Tumor Work up is available in the Resource section below.

If the work-up indicates the presence of a pituitary tumor or disease, many clinicians will seek the help of pituitary disease experts to help treat and manage the patient. Treatment typically includes a combination of medicines and surgery and may involve irradiation. However, the majority of non-prolactin secreting tumors require surgery. Pituitary disease patients should be evaluated pre- and post-operatively by an endocrinologist comfortable in managing neuroendocrine diseases.

Treatment

The most common surgical approach for the resection of pituitary tumors is through the sphenoid sinus (transsphenoidal). Please download a copy (PDF file) of the National Institutes of Health's "Understanding Transsphenoidal Surgery". Surgical outcome studies have repeatedly shown that surgeons highly experienced in this procedure obtain the highest cure rates with the lowest rates of recurrence, post-operative complications and pituitary dysfunction.

Resources:

Understanding Transsphenoidal Surgery (PDF file)

The Basic Pituitary Disease/Pituitary Tumor Work-up (PDF file)

Five-year Pituitary Surgical Outcomes Data at OHSU

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