Disorders of Posterior Pituitary Hormones

AVP and oxytocin are the two hormones that are produced in the hypothalamus and stored in and released from the posterior pituitary.

DIABETES INSIPIDUS

Definition

Diabetes insipidus (DI) is characterized by AVP deficiency and excretion of large volumes of dilute urine.

Pathology

Central DI can be familial due to an autosomal dominant mutation in the vasopressin gene that affects the functioning of the AVP-producing neurons. It can also be acquired secondary to intrasellar and suprasellar tumors, infiltration of the hypothalamus and posterior pituitary, infection, trauma or surgery, or as part of an autoimmune condition. Table 62-5 gives a more extensive list of causes of diabetes insipidus.

Clinical Presentation

Polyuria (defined as excretion of more than 3 L of urine per day) and polydipsia are the clinical hallmarks of DI.

Diagnosis and Differential Diagnosis

DI can be central, caused by AVP deficiency, or nephrogenic, caused by resistance to AVP. As long as access to free water is maintained and the thirst mechanism is intact, patients with DI are usually able to maintain normal serum sodium levels and osmolality. The water deprivation test is the primary test used to make the diagnosis and to differentiate the cause of DI. In patients with DI, the serum sodium level and osmolality increase in response to water deprivation. The response to a synthetic analogue of vasopressin is analyzed if the normal rise in urine osmolality and decrease in urine volume are not seen. Patients with central DI respond to the synthetic analogue by increasing urine osmolality and decreasing urine volume. In contrast, patients with nephrogenic DI do not respond to the synthetic vasopressin. Patients with partial central DI may have a limited response.

Primary polydipsia is characterized by increased water intake without a deficiency or resistance to AVP. Patients with primary polydipsia concentrate their urine without the need for synthetic vasopressin.

TABLE 62-5 CAUSES OF DIABETES INSIPIDUS

CENTRAL DIABETES INSIPIDUS
Idiopathic
Familial
Hypophysectomy
Infiltration of hypothalamus and posterior pituitary
Langerhans cell histiocytosis
Granulomas
Infection
Tumors (intrasellar and suprasellar)
Autoimmune
NEPHROGENIC DIABETES INSIPIDUS
Idiopathic
Familial
V_2 receptor gene mutation
Aquaporin-2 gene mutation
Chronic renal disease (e.g., chronic pyelonephritis, polycystic kidney disease, or medullary cystic disease)
Hypokalemia
Hypercalcemia
Sickle cell anemia
Drugs
Lithium
Fluoride
Demeclocycline
Colchicine

Treatment

Replacement therapy with desmopressin (DDAVP), an analogue of AVP, is available in oral, parenteral, and intranasal forms. Aqueous vasopressin is a shorter-acting analogue of AVP that can be given subcutaneously in the immediate postoperative period. Additional AVP analogues include DDAVP, which is available in subcutaneous, intranasal, and intravenous forms, and desmopressin, the only tablet form. Because of the transient nature of DI and a possible shift to a transient syndrome of inappropriate secretion of antidiuretic hormone (SIADH) phase in the patient who has undergone pituitary surgery, AVP is given cautiously and not as a scheduled medication to avoid hyponatremia.

SYNDROME OF INAPPROPRIATE SECRETION OF ANTIDIURETIC HORMONE

SIADH is covered in the discussion of hyponatremia in Chapter 27.

SUGGESTED READINGS

Biller BM, Grossman AB, Stewart PM, et al: Treatment of adrenocorticotropin-dependent Cushing's syndrome: a consensus statement, J Clin Endocrinol Metab 93:2454–2462, 2008.

Fleseriu M, Petersenn S: Medical management of Cushing's disease: what is the future? Pituitary 15:330–341, 2012.

Freda P, Beckers A, Katznelson L, et al: Pituitary incidentaloma: an Endocrine Society clinical practice guideline, J Clin Endocrinol Metab 96:894–904, 2011.

Melmed S: Medical progress: acromegaly, N Engl J Med 355:2558–2573, 2006.

Melmed S, Casanueva F, Hoffman A, et al: Diagnosis and treatment of hyperprolactinemia: an Endocrine Society clinical practice guideline, J Clin Endocrinol Metab 96:273–288, 2011.

Melmed S, Colao A, Barkan A, et al: Guidelines for acromegaly management: an update, J Clin Endocrinol Metab 94:1509–1517, 2009.

Nieman L, Biller B, Findling J, et al: The diagnosis of Cushing's syndrome: an Endocrine Society clinical practice guideline, J Clin Endocrinol Metab 93:1526–1540, 2008.

Swearingen B, Biller B: Diagnosis and management of pituitary disorders, New York, 2008, Humana Press.