General Pituitary Disorders

Sheila Pinkson, MPAS, BS, PA-C[a,b,*]

KEYWORDS

• Pituitary disorder • Hormone • Glands • Neurologic condition

KEY POINTS

- Pituitary disorders can cause hormonal abnormalities that affect the functions of other glands and neurologic conditions.
- Rarely are these disorders life threatening.
- The importance is for early recognition of signs and symptoms of hypersecretion, hyposecretion, and/or mass effects.

PRINCIPLES OF PITUITARY GLAND STRUCTURE AND FUNCTION

The pituitary gland plays a fundamental role in the regulation of many endocrine functions. Often called the master gland, the pituitary hormones influence the secretion of most endocrine glands. Housed in the base of the skull in the area of the sphenoid bone called the sella turcica, the pituitary gland consists of 2 lobes: the anterior and posterior pituitary lobes. Although these 2 lobes are united they are functionally as well as embryologically different. In early development the anterior gland, the adenohypophysis, is derived from the Rathke pouch, a portion of the ectoderm growing superiorly from the roof of the mouth.[1] Most of the pituitary gland is made up of the anterior lobe, which is controlled by hypothalamic hormones that enter the portal veins via the hypophyseal portal system into the anterior lobe.

The posterior lobe, also known as the neurohypophysis, consists of neuronal axons (hypothalamic tract) that originate from the hypothalamus and terminate in the posterior lobe to store hormones. Posterior lobe tissue develops from a protrusion of ectodermal tissue arising from the diencephalon of the developing brain.[1,2] An extension from the hypothalamus, the neural stalk, connects the base hypothalamus to the anterior pituitary gland. **Fig. 1**A shows the basic anatomy of the pituitary gland and **Fig. 1**B shows the embryologic development of the pituitary gland.

The adenohypophysis produces and secretes follicle-stimulating hormone (FSH), luteinizing hormone (LH), adrenocorticotropic hormone (ACTH), melanocyte-stimulating hormone (MSH), thyroid-stimulating hormone (TSH), prolactin (PRL), and growth hormone (GH). The anterior pituitary lobe histologically is categorized into 5

[a] Endocrine, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA;
[b] South Texas Veterans Health Care System, San Antonio, TX, USA
* 7400 Merton Minter Blvd, MC 111, San Antonio, TX 78229.
E-mail address: sheila.pinkson@va.gov

Physician Assist Clin 2 (2017) 107–122
http://dx.doi.org/10.1016/j.cpha.2016.08.009 **physicianassistant.theclinics.com**
2405-7991/17/Published by Elsevier Inc.

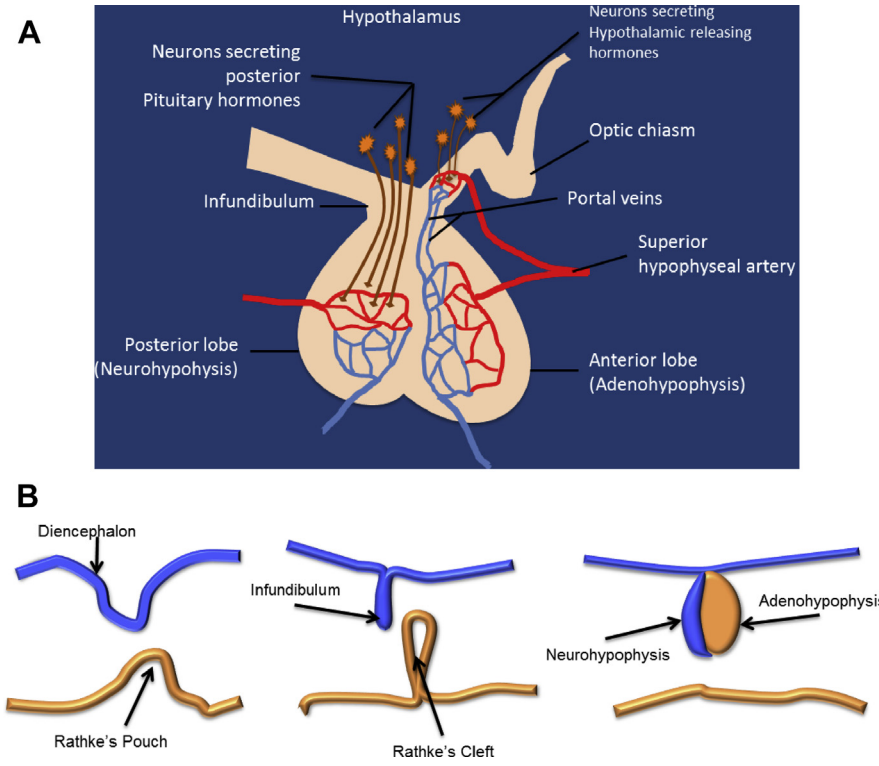

Fig. 1. (*A*) Basic pituitary anatomy. (*B*) Embryologic development of the pituitary gland.

cell types that secrete the corresponding hormone: gonadotrophs (FSH/LH), corticotrophs (ACTH/MSH), thyrotrophs (TSH), lactotrophs (PRL), and somatotrophs (GH).[3]

Hypothalamic nuclei such as the paraventricular, periventricular, and arcuate nuclei control the anterior pituitary hormone secretion by manufacturing the associated releasing and/or inhibiting hormones. The axons from the hypothalamic nuclei converge into the tuberoinfundibular tract and terminate on the superior hypophyseal artery. The adenohypophysis contains a network of capillaries and connects to the hypothalamus via the hypothalamic-hypophyseal portal system.

Hypothalamic-releasing hormones stimulate the anterior pituitary cell types to discharge hormone into the systemic blood system to reach their target organs. **Table 1** lists the regulating hypothalamic hormones and anterior pituitary hormones classified by cell type, major target organ, and general function. Target organs are generally glandular and, once stimulated by hypothalamic hormones, secrete hormones that can inhibit the release of the tropic in the anterior pituitary and/or inhibit the corresponding hypothalamic-releasing hormone. This process is commonly known as the negative feedback loop. **Fig. 2** shows a simple feedback loop for cortisol.

The neurohypophysis contains axons from the supraoptic and paraventricular hypothalamic nuclei, which form the hypothalamoneurohypophyseal tract. These hypothalamic nuclei produce oxytocin and arginine vasopressin (AVP), also known as antidiuretic hormone (ADH), which is stored for release in the axons housed in the posterior pituitary gland. Neural stimuli cause the release of hormones into circulation. As an example, during lactation, feeding babies activate the hypothalamus to release