The three most common pituitary tumors are pituitary adenomas, craniopharyngiomas, and meningo mas. The most common pituitary tumors in children are craniopharyngiomas.

Pituitary apoplexy is a surgical emergency that results from parasellar compression of the cavernous sinus and cortical brain secondary to infarction or hemorrhage of a pituitary adenoma. Prompt surgical decompression is required.

Endoscopic transsphenoidal hypophysectomy is preferred over the traditional transseptal approach since it results in less postoperative epistaxis, lower rates of lip anesthesia and septal perforation. It also has been shown to allow for shorter postoperative hospitalization.

Endoscopic transsphenoidal hypophysectomy with hydroscopy allows for visualization of the tumor bed and completeness of the resection.

Absolute contraindications in performing an endoscopic transsphenoidal hypophysectomy include inadequate surgical training and lack of proper instrumentation.

Interest in pituitary surgery began in 1893 when Caton and Paul operated on an acromegalic patient via a temporal approach; that tumor was never reached and the patient subsequently died. Between 1904 and 1906, Horsley operated on ten patients using a combination of subfrontal and middle cranial fossa approaches with a 20% mortality rate. A transfacial approach via transglabellar incision with excision of the frontal sinuses and the superior nose was described in 1897. This laid the framework for Schloff er in 1907 to perform the first transsphenoidal approach via a superior rhinectomy incision. In 1909, Kocher added resection of the septum submucosally; while Kana vel described an inferior nasal approach reflecting the external nose superiorly. In 1910, Hirsch described his classic endonasal transseptal approach. Hirsch’s approach avoided a lateral rhinotomy incision, but his visualization was limited by the diameter of the external nares. Finally in 1910, Halstead added a sublabial incision to Hirsch’s transseptal approach. This avoided external scarring, while improving the breadth of the operative field. Cushing, utilizing a combination of these transsphenoidal techniques between 1910 and 1925, had a mortality rate of 5.6% in 231 cases. With morbidity usually from infection, Cushing began developing and using more transcranial approaches in order to reduce infectious complications, and by 1931 he had abandoned the transsphenoidal approach. This resulted in a dominance of frontal approaches for pituitary tumors during the 1930s to 1960s [2, 4, 7].

In 1956, Dott (one of Cushing’s understudies) performed 80 consecutive transseptal transsphenoidal
operations with no mortality. Dott introduced this technique to Guiot in 1956. Guiot improved the surgical access to the sella by utilizing radiofluoroscopic control, while also advocating the use of postoperative radiation to achieve the best results. As a fellow under Guiot, Hardy learned the transsphenoidal approaches and in 1967 introduced the use of the operating microscope to this procedure. This allowed for brighter lighting and improved sellar visualization, resulting in more aggressive resection of pituitary and parasellar lesions. These technical advances along with the development of antibiotics in the 1950s lowered the mortality rates to well below the reported rates for transcranial approaches at the time [2, 4, 7]. The sublabial transseptal transsphenoidal approach is still utilized in many medical practices today.

Endoscopic assistance in transsphenoidal surgery was described by Bushe and Halves in 1978, but it was not until otolaryngologists had gained significant experience using the endoscope for management of inflammatory sinus disease that it gained acceptance in management of pituitary tumors. In 1996, Carrau et al. [3] reported a series of 50 patients who underwent endoscopic endonasal transsphenoidal pituitary surgery. This landmark paper became a springboard for further advances in minimally invasive endoscopic transsphenoidal hypophysectomy. Endoscopic transsphenoidal hypophysectomy (also known as minimally invasive pituitary surgery, MIPS) offers several advantages over transseptal approaches and is becoming the procedure of choice for many otolaryngologists and neurosurgeons for management of pituitary adenoma.

Pituitary Gland Anatomy

The pituitary gland is a reddish-gray body, measuring approximately 10 mm in diameter, attached to the brain through the infundibulum and resting in the sella turcica. The gland is composed of two lobes. The anterior lobe derives from the ectoderm, and starts developing around the fourth week of gestation when an evagination of the stomodeum enlarges dorsally, forming Rathke’s pouch. This then gradually becomes sealed off from the aerodigestive tract, forming a cyst that is then invaded by mesodermal tissue to form the anterior lobe of the pituitary. A diverticulum arising from the floor of the third ventricle then abuts this lobe and eventually develops into the infundibulum and posterior lobe of the pituitary [8, 10, 11].

The anterior lobe of the pituitary is composed of epithelial cells surrounded by vascular sinusoids. Three distinct cell types are identified on hematoxylin and eosin staining. Acidophils include somatotropes (growth hormone) and lactotropes (prolactin); basophils include thyrotropes (thyroid-stimulating hormone), gonadotropes (luteinizing hormone and follicle stimulating hormone), and corticotropes (adrenocorticotrophic hormone); while chromophobes are essentially nonsecretory. The posterior lobe is composed largely of nonmyelinated axons whose cell bodies are located in hypothalamic nuclei. These neurons secrete antidiuretic hormone and oxytocin [8, 10, 11].

Proper knowledge of this anatomy is therefore essential during these approaches.

Sphenoid Sinus and Sinonasal Anatomy

The sphenoid sinus starts developing at about the 12th week of gestation. The sinus is not present at birth, with pneumatization beginning at about 5–7 years of age, while the adult size is usually reached by 15–18 years. [8]

The sphenoid sinus is variably pneumatized into the sphenoid bone. Three types of sphenoid sinuses are described according to the degree of pneumatization in relation to the sella:

1. Conchal sphenoid is one which has pneumatized only to a small degree with thick bone still over the face of the sella.