# DIAGNOSIS AND MANAGEMENT OF SUPRASELLAR SPACE OCCUPYING LESIONS

Thesis

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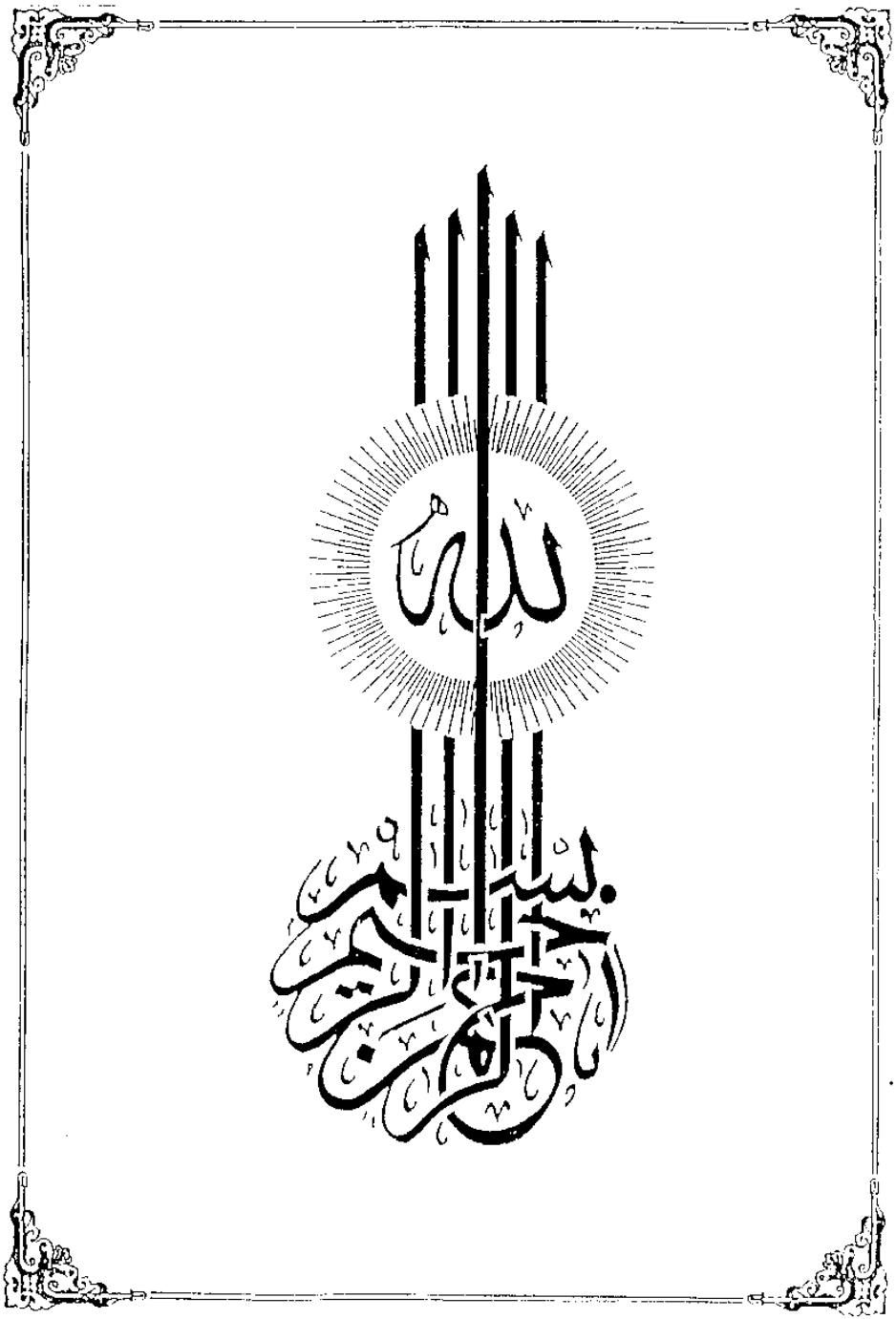

*TO THE MEMORY OF OUR PROFESSOR*

*Dr. A.Z. EL-BANHAWY*

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# INTRODUCTION

# INTRODUCTION

The suprasellar space is composed of the suprasellar cistern and the vascular and parenchymal structures within it. This space, filled with CSF, occupies the region immediately above the diaphragma sellae.

Masses in this region can remain undetected clinically until they are fairly large, since their pressure effects are dispersed within the cistern itself. The many types of tumors and tumor-like conditions occurring in the suprasellar region accounts for the different clinical syndromes that the surgeon face. Neurosurgeons are familiar with the syndrome of the suprasellar tumor in which there is an admixture of hypothalamic-hypophyseal malfunction and visual abnormality. Many lesions might be considered under this topic, but the most common four tumors are pituitary adenoma, craniopharyngioma, meningioma, and hypothalamic glioma.

Patients with clinical symptoms suggestive of lesions involving the suprasellar region may present with endocrine symptoms with distinct biochemical abnormalities. Visual defects, cranial nerve palsies, and headache may result from increased intracranial pressure or may be due to tissue destruction by compression, invasion, or vascular injury.

Discrimination between lesions of intrasellar origin, and primary suprasellar lesions may require the use of several diagnostic techniques. The radiological investigations of the suprasellar lesions had undergone rapid progress in the last several years. High resolution CT scanning has replaced invasive radiological studies such as angiography and pneumoencephalography. It can be difficult to appreciate the extent and even the origin of a suprasellar mass once it has become large enough to obliterate the suprasellar cistern. Cerebral angiography contributes significantly to presurgical evaluation in such instances, routine anterior-posterior and lateral films

of the skull are helpful for planning the surgical approach to the lesion and determine the overall size and configuration of the sella. Recently magnetic resonance imaging (MRI) is a rapidly evolving form of neuro-imaging that it may provide physiologic and possible biochemical tissue specific information as well as anatomic images.

Just as we are able to identify specific suprasellar dysfunction by the corresponding syndromes and neuroradiological investigations, we can also confirm the abnormality with specific tests of trophic or target organ hormone functions. Undoubtedly perioperative endocrinal management have affected the rate of mortality and morbidity in such operations.

Because the suprasellar region lies quite literally in the center of the head, exposure is difficult, and a wide variety of approaches have been devised to deal with mass lesions in this area subfrontal, subtemporal, transpterional, transventricular, transsphenoidal, and transethmoidal. The introduction and routine application of microsurgical techniques have improved the results of the treatment of suprasellar tumors.

The aim of this work is to discuss the different diagnostic procedures and therapeutic modalities of suprasellar space occupying lesions in 45 patients presented to the department of neurosurgery at Ain Shams University Hospitals during the last 3 years, in view of the current diagnostic and therapeutic options.

# REVIEW OF LITERATURE

# ANATOMIC CONSIDERATION

## The Suprasellar Space

The suprasellar space is composed of the suprasellar cistern and the vascular and parenchymal structures within it *(Quisling & Lotz, 1985)*.

Sometimes referred to as the cisternae infundibularis and chiasmatis. *(Sutton, 1980)*. Also known as the prechiasmatic and postchiasmatic cisterns related to the optic chiasm *(Gray's anatomy, 1973)*.

The normal suprasellar cistern is a five-or six pointed, starshaped, fluid-filled structure as demonstrated by computerized axial tomography, (Fig. 1) *(Dutton et al, 1982)*.

The suprasellar space, filled with C.S.F., occupies the region immediately above the diaphragma sellae. It is bounded anteriorly by the posteroinferior surface of the frontal lobe. It is limited laterally by the medial surface of the para-hippocampal gyri, especially their uncal portions. The subthalamus and hypothalamus form its roof; and the sphenoid bone containing the sella turcica is its floor. Posteriorly, the suprasellar cistern blends with the interpeduncular portion of the circummesencephalic cistern *(Quisling & Lotz, 1985)* (Fig. 2).

## Boundaries of the Suprasellar Space

Its upper boundary is formed by the hypothalamus, subthalamus, including the optic and infundibular recesses of the third ventricle, and the optic tracts. *(Quisling & Lotz, 1985)*. Anteriorly by the gyrus rectus of the paraolfactory region, at the posteroinferior surface of the frontal lobe; and part of the planum sphenoidal of the sphenoid bone *(Sutton, 1980)*. The sphenoid bone, containing the sella turcica

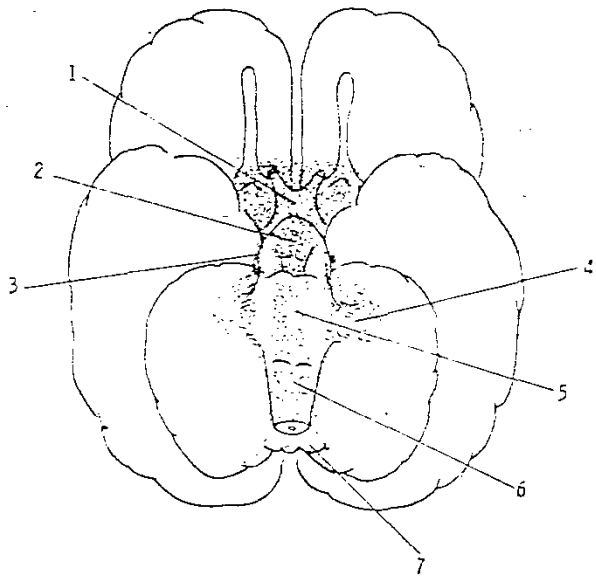



**Fig. 3.** Extensions of the suprasellar space.

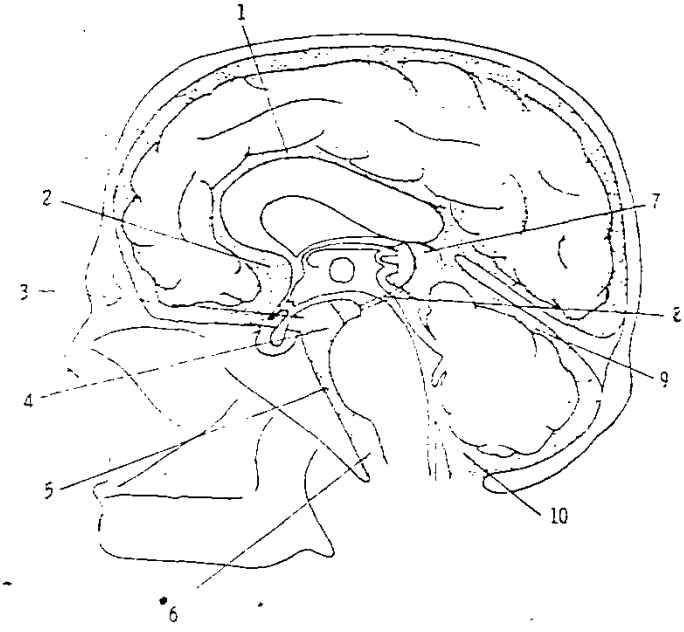
1. Chiasmatic cistern
2. Interpeduncular cistern
3. Crural cistern
4. Cerebellopontine-angle cistern
5. Pontine cistern.
6. Medullary cistern
7. Great cistern (cisterna magna)

*(Wilson, 1972)*

**Fig. 4.** Sagittal section

1. Pericallosal cistern
2. Cistern of the lamina terminalis
3. Chiasmatic cistern
4. Interpeduncular cistern
5. Pontine cistern
6. Medullary cistern
7. Quadrigeminal cistern
8. Abient cistern
9. Superior cerebellar cistern
10. Great cistern

*(Wilson, 1972)*



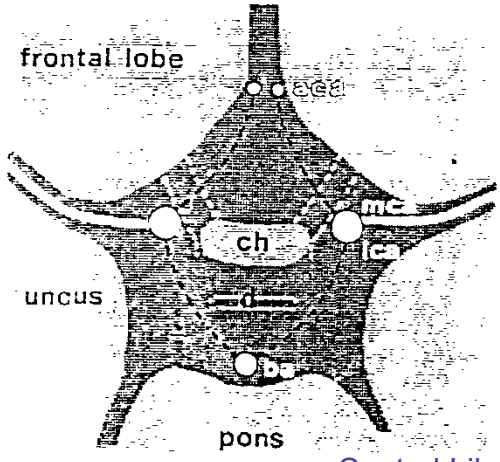




**Fig. 5.** Content of suprasellar cistern *(Landolt & Wilson, 1982*

Fig. 1. Suprasellar space as shown by CT scan *(Quisling & Lotz, 1985)*.

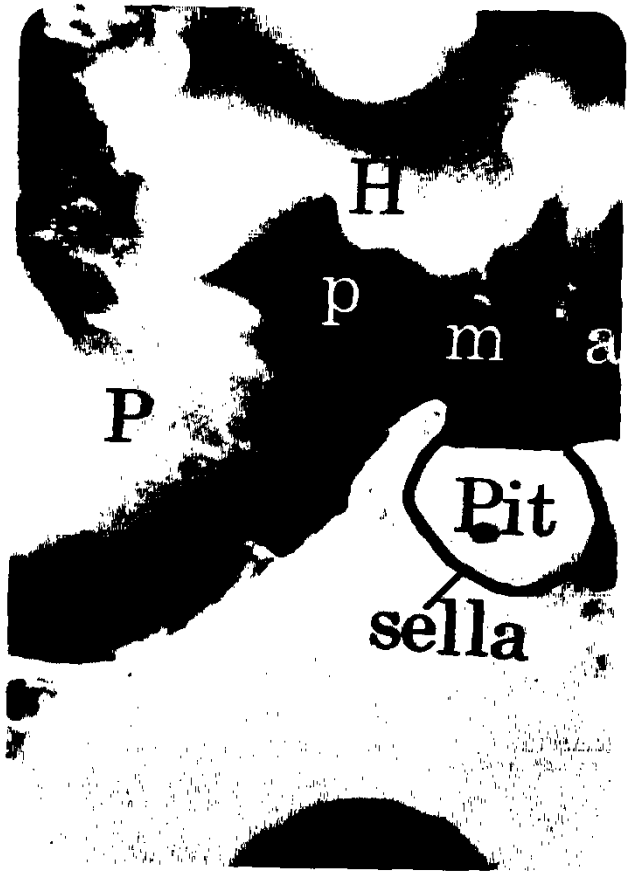



Fig. 2. The suprasellar space in sagittal view demonstrating its boundaries and subdivision into anterior, middle and posterior suprasellar spaces *(Quisling & Lotz, 1985)*.

and the diaphragma sellae is its floor. Laterally limited by the medial surface of the parahippocampal gyri of the temporal lobe; especially their uncal parts, and the supraclinoid carotid artery. Posteriorly, it blends with the interpeduncular portion of the circummesencephalic cistern *(Quisling & Lotz, 1985)*.

## Extensions of the Suprasellar Cistern

Varies fissures extend from the suprasellar cistern. These include the proximal of the anterior hemispheric fissure and the cistern of lamina terminalis anterosuperiorly; the proximal segment of Sylvian fissure anterolaterally; the choroidal fissure posterolaterally; and the interpeduncular fossa and crural cisterns posteriorly*(Quisling & Lotz, 1985)* (Fig. 3).

There is no clear line of demarcation between the interpeduncular cistern and the suprasellar cistern with which it merges anteriorly above the sella turcica. *(Wilson, 1972)* (Fig. 4).

## Contents of the Suprasellar Cistern

Structures within the suprasellar space can be identified easily by C.T. especially with the use of a non-ionic water-soluble contrast agent in the suprasellar subarachnoid space *(Quisling & Lotz, 1985)*.

The content of the suprasellar space includes the optic nerves and the optic chiasm; also the infundibulum of the pituitary gland. The circle of Willis is situated in the cistern. The anterior and posterior clinoid processes and the upper most part of the dorsum sellae often project into the suprasellar cistern (Fig. 5) *(Leads & Naidich, 1977; Naidich et al., 1976; Weissberg et al., 1978; Wiggli & Benz, 1978)*.

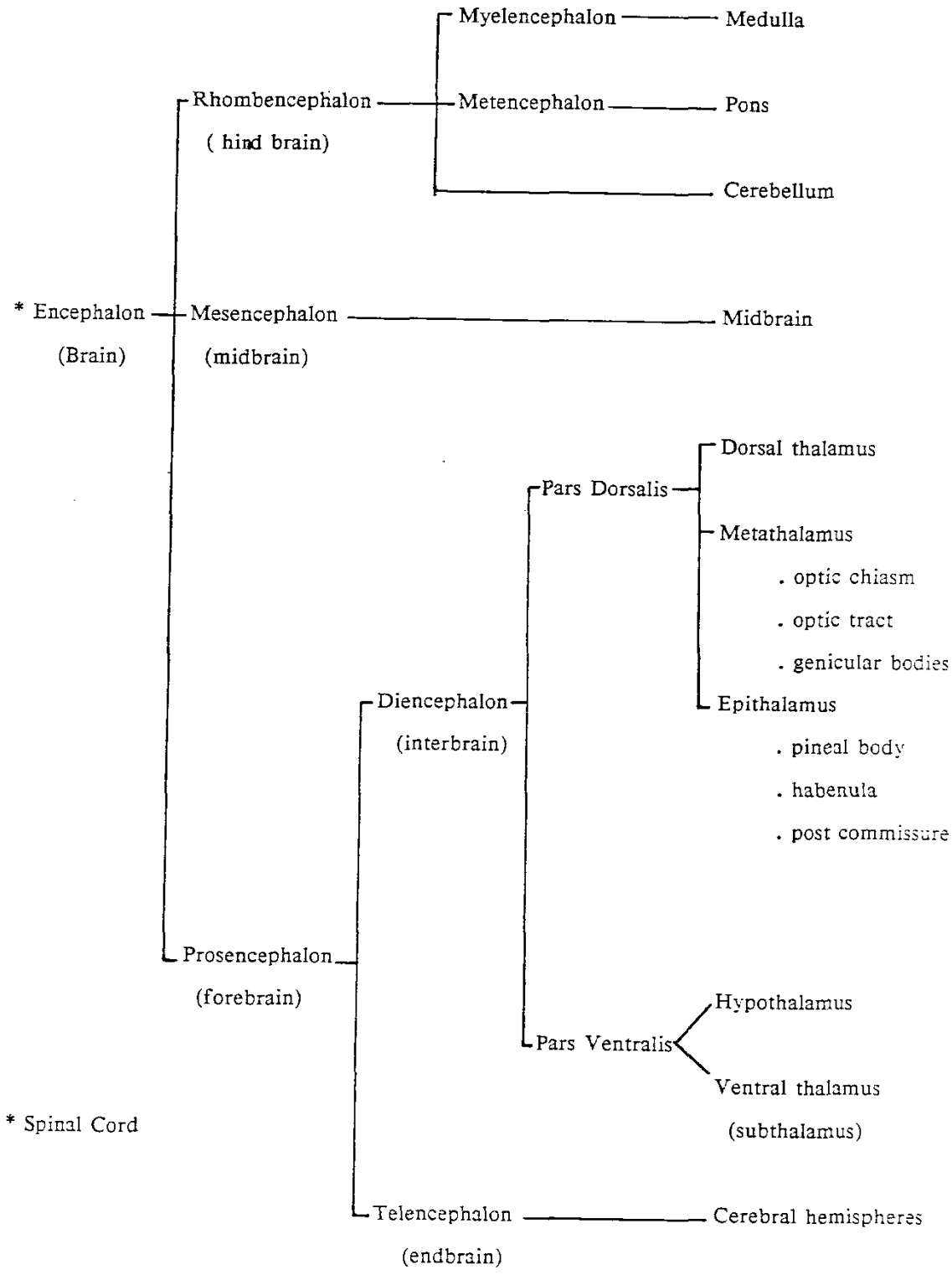



Fig. 7. Divisions of the CNS *(Gray's Anat., 1973)*.