PARA-SAGITTAL MENINGIOMA

Thesis

SUBMITTED IN PARTIAL FULFILMENT

OF THE MASTER DEGREE IN

(GENERAL SURGERY)

By

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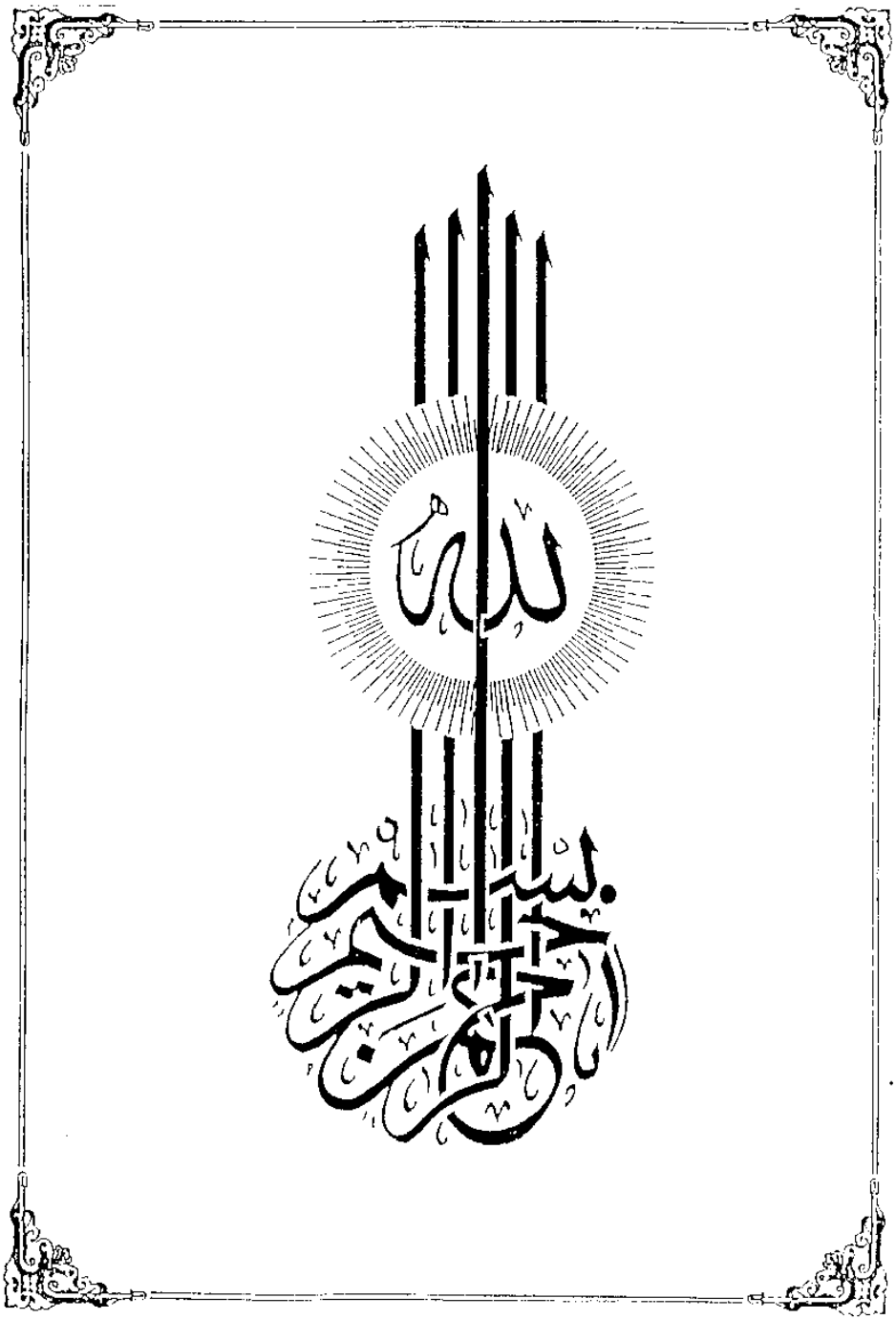

C O N T E N T S

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INTRODUCTION

AND AIM OF WORK

INTRODUCTION

The first successful operation ever on a parasagittal meningioma was performed in 1910 by Harvey Cushing. That operation turned out the critical event in his career as a neurosurgeon and made him confident about the possibilities of brain surgery.

The patient was Leonard Wood, Major General and Chief of staff of the United states Army.

On 1927 General Wood again came under the care of Dr. Cushing who decided to attempt extirpation of the recurrent tumour but General Wood died a few hours after the operation. No tragedy caused Cushing more distress than the death of General Wood, who, 7 years earlier had been on the verge of being president of the United states.

Since that time and till the present days the surgeons all over the world are faced by considerable difficulties when handling a patient with a parasagittal meningioma because of its close relationship with the superior sagittal sinus.

The decision of the surgeon is usually chalenging betw-een the incomplete removal with risk of recurrence and complete removal with risk of endangering the sinus, This situation is particularly important in tumours along the posterior third of the sinus.

Maintenance of the circulation in the sinus with complete removal of the lesions is difficult to achieve. Reviewing the work of many investigators who tried to remove the tumour invading the sinus with establishment of the sinus blood flow led to the use of autogenous venous grafts or artificial tubing system.

The aim of this work is to study the various surgical precautions during the removal of parasagittal meningiomas and their results.

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REVIEW OF LITERATURE

1. Anatomy.
2. Pathology
3. Diagnosis
4. Principles of Surgery.

A N A T O M Y

OF THE SUPERIOR SAGGITAL SINUS

The superior sagittal sinus occupies the attached, convex margin of the falx cerebri (Fig. 1).

It commences infront of the crista galli where it receives a vein from the nasal cavity or the rare occasions when the foramen caecum is patent; it runs backwards grooving the inner surface of the frontal bone, the adjacent margins of the two parietal bones, and the squamous part of the occipital bone; near the internal occipital protuberance it deviates to one or other side (usually the right) and it continues as the corresponding transverse sinus. It is triangular in cross section and gradually increases in size as it passes backwards. Its inner surface presents the openings of the superior cerebral veins, projecting arachnoid granulations, and numerous fibrous bands which cross the inferior angle of the sinus (Fig. 2).

The sinus also communicates through small openings with irregularly shaped venous lacunae, which are situated in the dura mater near the sinus. It is triangular is cross section and gradually increases in size as it passes backwards. Its inner surface presents the openings of the superior cerebral veins, projecting arachnoid granulations and numerous fibrous bands which cross the inferior angle of the sinus (Fig. 2).

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FIG.(1) :

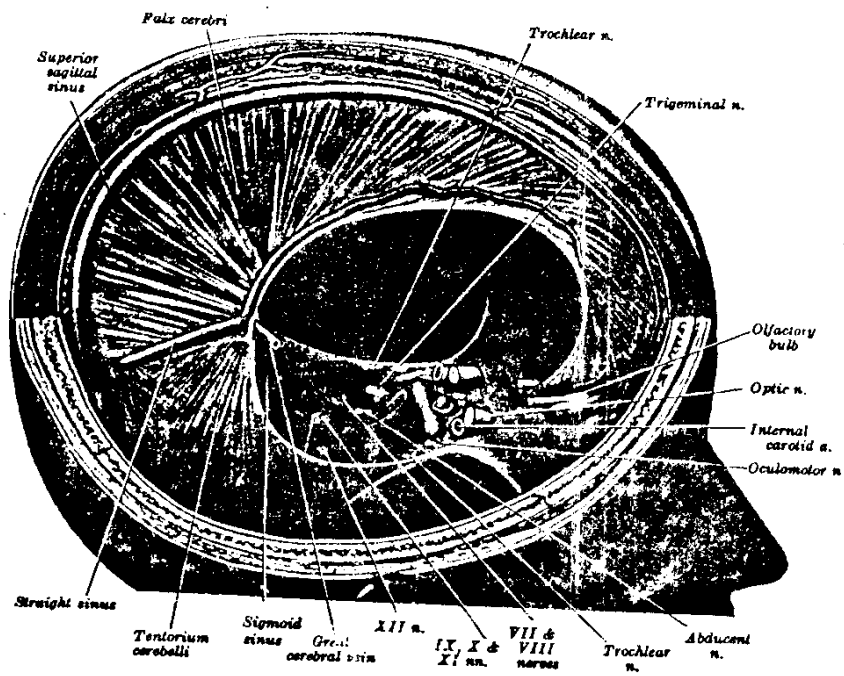

FIG.(1) :

THE DURA MATER AND ITS PROCESS EXPOSED BY REMOVING PART OF THE RIGHT HALF OF THE SKULL AND THE BRAIN.

(AFTER DAVIES,1972)[25]

There are usually three lacunae on each side of the sinus : a small frontal, a large parietal, and an occipital which is intermediate in size between the other two.

FIG.(2)

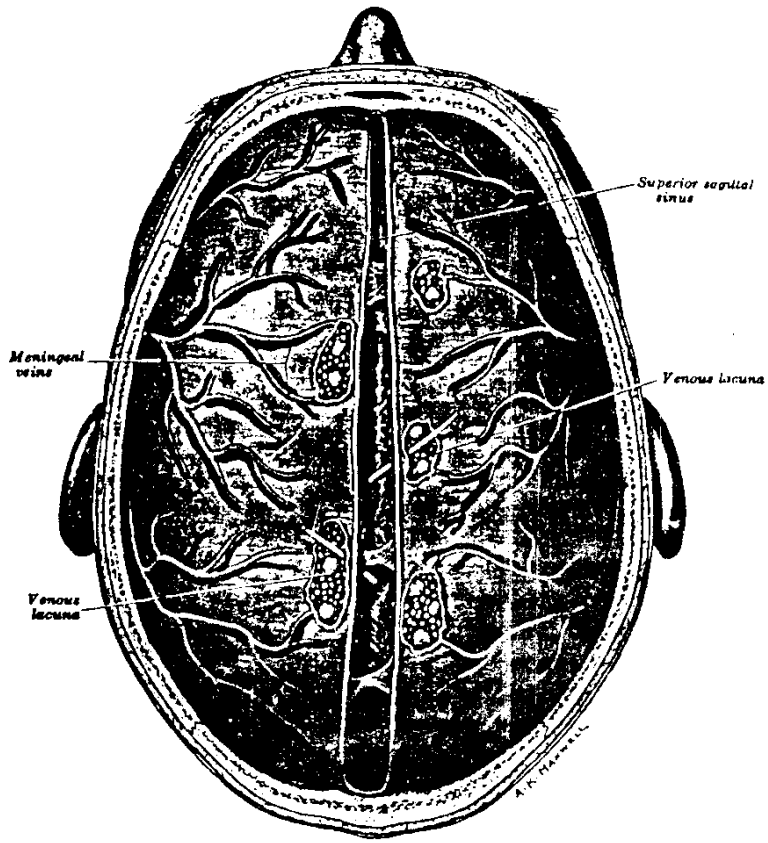

FIG.(2)

THE SUPERIOR SAGITTAL SINUS LAID OPEN AFTER THE REMOVAL OF THE SKULL CAP. SOME OF THE FIBROUS BANDS WHICH CROSS THE SINUS ARE CLEARLY SEEN ; FROM TWO OF THE LACUNAE BRISTLES ARE PASSED INTO THE SINUS (FROM A YOUNG SUBJECT).

(AFTER DAVIES, 1972)(25)

In elderly subjects these laucnae tend to become continuous with one another as one elongated lacunae that is present on each side. Many fine fibrous bands cross the lacunae an. numerous arachnoid granulations project into them from below.

The superior sagittal sinus receives the superior cerebral veins (Fig. 3), and near the posterior extremity of the sagittal suture, veins from the pericaranium which pass through the parietal foramina; the venous lacunae receive the diploic and meningeal veins.

According to LeGros Clark, the lacunae[25] should be described as a complicated meshwork of veins into which the diploic veins and the superior terminations of the meningeal veins open.

The superior cerebral veins never open into the lacunae, but pass beneath them and open directly into the superior sagittal sinus.

The confluence of the sinuses is the term applied to the dilated posterior extremity of the superior sagittal sinus. It is lodged on one side (generally the right) of the internal occipital protuberance, and from it the transverse sinus of the same side is derived. It receives

also the blood from the occipital sinus and is connected by a channel with the commencement of the opposite transverse sinus.

The communications which take place between the superior sagittal sinus and veins of the nose, scalp and diploe, cause it to be at times the "seat" of infective thrombosis from suppurative processes in these parts.

Fig. (3) :

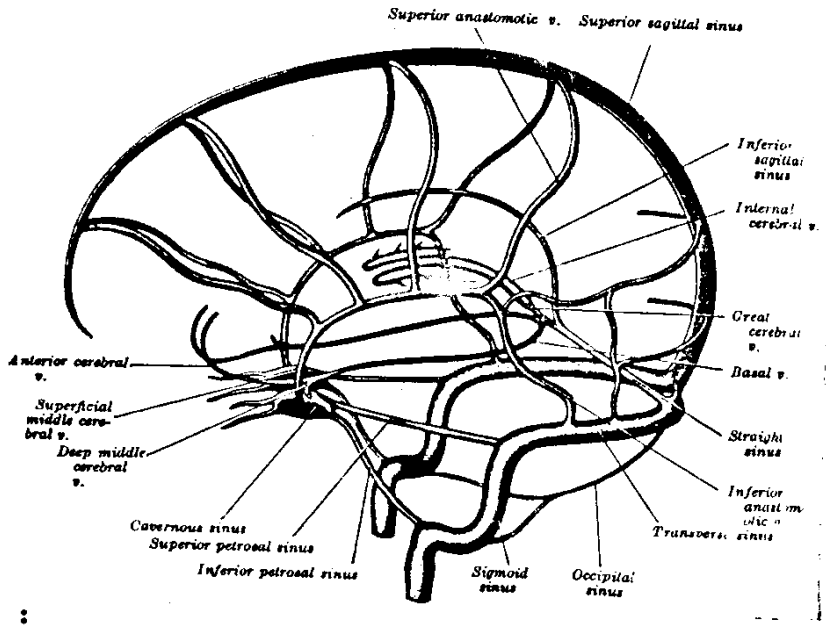

FIG.(3) :

A SCHEMA TO SHOW THE PLAN OF THE VENOUS SINUSES OF THE DURA MATER AND THEIR CONNECTIONS WITH THE CEREBRAL VEINS.

(AFTER DAVIES,1972)[25]

The Arachnoid Granulations :

These are small, fleshy-looking elevations, usually collected in clusters, which are present in the vicinity of the superior sagittal sinus as well as other sinuses. When the sagittal sinus and the venous lacunae on each side of it are opened, granulations will be found protruding into their interior (Fig. 2).

On close inspection they may be seen at the age of eighteen months, and at the age of three they are disseminated over a considerable area; they increase in number and size as age advances. They cause absorption of the bone and so produce the pits or depressions on the inner aspect of the skull cap. Arachnoid granulations are macroscopic enlargements, or distensions of minute projections of the arachnoid mater, termed arachnoid villi, which are normally present in great numbers in young subjects.

Structure :

The growth and structure of the arachnoid villi and granulations have been described by LeGrosclark. Histologically each villus appears as a diverticulum of the subarachnoid space, penetrating into the interstices

of the dura mater, and covered by a layer of flattened cells containing large oval nuclei and hightly staining protoplasm.

In the subarachnoid space there is a reticulum of fine fibrous tissue, the density of which is as a rule greater at the periphery than at the centre of the granulation; in advanced age it frequently contains calcareous nodules.

At the summit of the villus the mesothelial cells proliferate and form a cap which penetrates the surrounding dura mater, and fuses with the endothelial lining of one of the intradural venous sinuses (Fig. 4a, 4b).

In doing so it pulls out a little stalk of arachnoid containing a diverticulum of the subarachnoid space.

FIG. (4A) :