Neurosurgical Techniques

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The Right Occipital Approach to a Pinealoma

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Although tumors of the posterior third ventricle presumed to be pinealomas have generally been treated by subtemporal decompression, ventriculocisternal shunt (Torkildsen's procedure) or ventriculooatrial shunt, it is often possible to take a biopsy for histologic verification as an aid to subsequent treatment, or to remove certain tumors completely. The following is a graphic description of the surgical approach to this region (Fig. 1) which we have used successfully in a number of patients.

Fig. 1. Anatomy of the pineal region. Relationship of the pineal body to the tentorium, the splenium of the corpus callosum, the superior portion of the cerebellum, and the aqueduct of Sylvius.
Variations in Pineal Tumors

Four common types of pineal tumor are illustrated below. A. In its usual location this tumor is above the hiatus tentorii, bulges anteriorly into the posterior third ventricle, and compresses the superior colliculus, partially occluding the aqueduct of Sylvius. B. This tumor extends posteriorly, partially obstructing the hiatus tentorii, and exerts some pressure on the cerebellum. C. This larger type of tumor extends through the hiatus tentorii and compresses the superior collicular structures and the cerebellum, completely obstructing the aqueduct of Sylvius. D. This malignant lesion invades the wall of the third ventricle and replaces the corpus callosum (Fig. 2).

Fig. 2. Common variations of pineal tumors.
Skin Incision, Bony Removal, and Reflection of Dural Flap

Below is a diagrammatic representation of the dilated lateral ventricle, showing the location of the sagittal and transverse sinuses, and the position of the incision in the scalp. A. Ordinarily a 1-inch opening is made with a trephine directly over the occipital region and just above the tentorium. B. The lower part of the trephine opening is made square with rongeurs to expose the edge of the lateral sinus. C. The dural flap is reflected toward the lateral sinus, and a ventricular needle is placed in the lateral ventricle; this is subsequently replaced by a catheter (Fig. 3).

Fig. 3. Operative procedure: skin incision, bony removal, ventricular tap, and reflection of dural flap.
Placement of Catheter and Exposure of Tumor

Fig. 4 shows the catheter placed in the right lateral ventricle. The occipital lobe has been retracted. Bridging veins going into the tentorium and into the transverse sinus have been ligated and a wedge of the tentorium is being removed to provide better exposure of the tumor and the hiatus of the tentorium. A clip placed on the tentorial edge may be necessary.

Fig. 4. Operative procedure: placement of the interventricular catheter and removal of a wedge of tentorium.
Complete Exposure of Tumor

In Fig. 5 the wedge of tentorium has been removed, and an enlarged vein can be seen on the medial surface of the tumor which is now well exposed. The fourth cranial nerve is visible near its ventral surface.

At this point a biopsy may be taken if total removal is not considered feasible, or removal by suction may be undertaken in certain tumors. If the tumor is small, it may be completely resected. If removal is not complete, a modified Torkildsen’s procedure may be carried out by placing the distal end of the ventricular catheter in the cisterna pontis. In some instances, a ventriculoatrial shunt may be useful until x-ray therapy becomes effective.

![Diagram of tumor exposure](image)

Fig. 5. Operative procedure: exposure of the tumor.