Surgical Experiences with Craniopharyngiomas

HENDRIK J. SVIEN, M.D.
Section of Neurologic Surgery, Mayo Clinic and Mayo Foundation, Rochester, Minnesota

During the 12-year period, 1951 through 1962, the author performed operations for craniopharyngiomas in 20 cases. These cases are reviewed here primarily from the standpoint of the various approaches to the tumor which were utilized; the symptoms, ocular findings, and endocrinologic aspects will not be considered in this paper.

In this series 12 of the patients were female and 8 male. Seven patients were 15 years of age or less, the youngest being 3 years of age; the oldest was 58 years old.

Direction of Growth

Carmichael demonstrated that the masses of epithelial cell rests from which craniopharyngiomas develop are present along the pituitary stalk and upper aspect of the pituitary gland (Fig. 1). As these tumors increase in size, growth may take a variety of directions, as demonstrated by findings at operation and from air studies in the cases in this series.

There were several cases in which the sella was enlarged.

1. The tumor may grow into the sella, enlarge it, and remain confined to the sella and the immediate suprasellar region. In 4 of the cases in this series the tumor was limited to the enlarged sella except for some growth upward against the optic apparatus immediately overlying the confines of the enlarged sella (Fig. 2A).

2. The tumor may grow into the sella, enlarge it, and also grow beneath and occasionally over the optic chiasm and behind the dorsum sellae, eroding it in some instances, and extending into the interpeduncular fossa elevating the floor of the third ventricle (Fig. 2B). There were 2 such instances in this series.

3. The tumor may grow into the sella, enlarge it and stay confined there. There was one such case in this series.

There were 13 cases in which the sella was normal in size.

4. The sella may be normal in size with the tumor confined entirely to the suprasellar space between the optic nerves. There were 3 such cases in this series (Fig. 3A).

5. The sella may be normal in size with the tumor presenting between the optic nerves and extending into the anterior fossa between the frontal lobes. In the one case of this type in this series the tumor presented essentially as a midline anterior fossa tumor (Fig. 3B).

6. The sella may be normal in size with the tumor growing up between the optic nerves, under and occasionally over the chiasm, and backward into the interpeduncular cistern, elevating the floor of the third ventricle (Fig. 4). In cases of this type, the dorsum of the sella is frequently eroded. There were 3 such cases of this type in this series.

7. The sella may be normal in size with the tumor lying entirely behind the optic chiasm in the interpeduncular fossa elevating the floor of the third ventricle (Fig. 5A). The dorsum of the sella may or may not be eroded.
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FIG. 2. Enlarged sella. (a) Pneumoencephalogram showing enlarged sella with tumor projecting only slightly into the immediate suprasellar region. (b) Postmortem specimen in another case (no operation) showing tumor filling enlarged sella, extending into space between the two optic nerves, and also extending behind chiasm into interpeduncular space.

(Fig. 3B). There were 6 such cases in this series.

Another indication of the location and extent of the tumor is provided by calcification in the tumor which in some patients is evident in roentgenograms of the skull. This finding was present in 6 of these 20 cases, and in each instance indicated rather precisely the position of the tumor.

Thus in 7 instances the tumor was limited to the space between the optic nerves and chiasm (determined by the location of calcification when present, evidence from air studies and findings at operation). In all of these cases the tumor was cystic and contained from 5 to 35 cc. of characteristic fluid.

Avenues of Attack on the Tumor

In all but 1 of the 20 cases a unilateral transfrontal craniotomy was carried out. The tumor was removed through a subfrontal approach to the optic nerves and chiasm in

FIG. 3. Pneumoencephalograms showing normal-sized sella. (a) Tumor extending upward into the immediate suprasellar space. (b) Indentation of floor of anterior horn of lateral ventricle by a large tumor growing into the anterior fossa.