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**Frontal lobe implantation of craniopharyngioma
by repeated needle aspirations.**

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Frontal Lobe Implantation of Craniopharyngioma by Repeated Needle Aspirations

The typical CT and MR findings of craniopharyngioma have been described [1-4]. We present a case of an unusual intraparenchymal extension from a cystic craniopharyngioma that occurred after multiple needle aspirations.

Case Report

A suprasellar craniopharyngioma was diagnosed in a 10-year-old boy. It had been resected subtotally when the patient was 5 years

old. Because of enlargement of the tumor, the patient had undergone multiple radiation treatments and repeated punctures of the cyst via craniotomy burr holes; the aspirated material contained cholesterol. Follow-up included routine CT scans every 6 months, which had not changed for the past 2 years. Approximately 9 months before admission, a routine CT without contrast enhancement (Fig. 1A) showed a new well-defined mass with minimal edema and calcification in the right frontal lobe. No significant change was seen in the contrast-enhanced CT. This mass had a slightly higher density than the

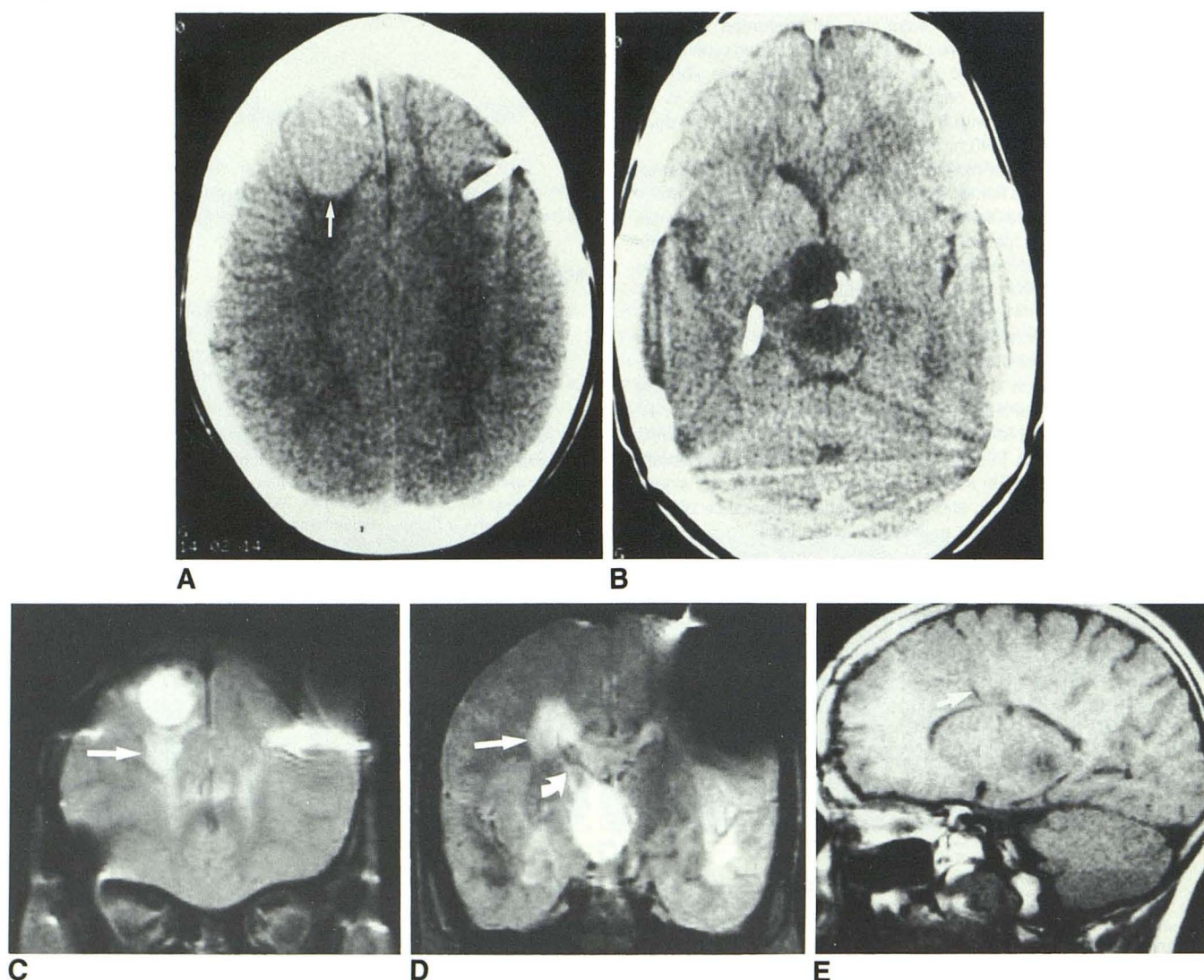


Fig. 1.—Craniopharyngioma in a 10-year-old boy.

A and B, Head CT scans without contrast enhancement. A shows well-defined high-density mass in right frontal lobe with minimal calcification (arrow) and slightly greater density than adjacent gray matter. B shows low-density suprasellar craniopharyngioma with calcification at lower level than A.

C and D, T2-weighted coronal MR images (TR = 2000 msec, TE = 120 msec). C shows well-defined, rounded mass with minimal edema in upper frontal lobe. Needle track with surrounding edema or encephalomalacia (arrow), which is of lower signal intensity than intraparenchymal craniopharyngioma, is shown inferior to tumor. Note metallic artifact. D shows hyperintense mass in suprasellar area at level of third ventricle with signal intensity similar to that of mass in frontal lobe. Ill-defined area (arrow) with a lesser degree of high signal intensity is shown adjacent to right lateral ventricle and represents either postoperative changes or edema. Note needle track (curved arrow).

E, Right parasagittal T1-weighted MR image (TR = 550 msec, TE = 26 msec) shows poorly defined area of decreased signal intensity near convexity of frontal lobe. Linear needle track (arrow) extends inferiorly from mass in frontal lobe toward suprasellar craniopharyngioma.

adjacent gray matter (Fig. 1A) and a much higher density than the suprasellar craniopharyngioma (Fig. 1B). Three consecutive follow-up scans showed gradual enlargement of the frontal mass. On the basis of the CT, a frontal lobe glioma was suggested. MR images were obtained before biopsy for further delineation of the lesion. A T2-weighted coronal image (Fig. 1C) showed a well-defined, rounded, parenchymal mass in the frontal lobe. The mass had an extremely high signal intensity and minimal adjacent edema. More posteriorly, at the level of the third ventricle (Fig. 1D), the suprasellar craniopharyngioma showed an extremely high signal intensity similar to that of the frontal lobe mass. Areas of less high signal intensity between the mass in the frontal lobe and the suprasellar craniopharyngioma may be the result of postoperative changes or edema. A parasagittal T1-weighted scan (Fig. 1E) showed a needle track that extended from the craniopharyngioma toward the mass in the frontal lobe. Because of the course of the track and the similarity in signal intensity on T2-weighted images of the mass in the frontal lobe and the suprasellar mass, a diagnosis of intraparenchymal craniopharyngioma that seeded from the suprasellar craniopharyngioma via the needle track was strongly suggested. Needle biopsies of the intraparenchymal mass were performed via burr holes. All biopsied material contained epithelial cells and cholesterol crystals representing craniopharyngioma.

Discussion

Craniopharyngiomas are epithelial neoplasms that arise from the suprasellar region and account for 2–3% of all intracranial neoplasms. Although most craniopharyngiomas remain confined to the suprasellar area, they occasionally may extend anteriorly to the anterior fossa (2–5%), posteriorly to the posterior fossa (1–4%), and laterally to the middle fossa [5, 6].

CT of craniopharyngioma typically shows a complex mass in the suprasellar region with variable cystic and solid components that frequently calcify. Focal areas of contrast enhancement usually are seen. Differentiation between a hyperdense intraparenchymal craniopharyngioma and a glioma can be difficult on CT, especially in patients who have received multiple radiation treatments.

Craniopharyngiomas imaged by MR are slightly hypointense on T1-weighted scans, hyperintense on spin-density-weighted scans, and markedly hyperintense (greater than CSF) on T2-weighted scans. The inability to image calcification does not significantly affect the

potential of MR for characterizing the tumor mass [3, 4].

Recurrent craniopharyngioma is common because of the difficulty of total resection. Residual epithelial cells from incomplete resection account for tumor recurrence [7]. Seeding of epithelial cells into the brain substance along the needle track may have provided a mechanism for distant intraparenchymal growth in our patient.

MR was useful in our case for evaluating atypical craniopharyngioma with unusual extension from the suprasellar region. T2-weighted MR in several planes clearly showed extremely high signal intensities for both the suprasellar craniopharyngioma and the intraparenchymal mass and suggested the preoperative diagnosis of craniopharyngioma within the frontal lobe. Further, within the frontal lobe, MR suggested the mechanism of spread of the craniopharyngioma from the suprasellar region to the frontal lobe by showing a needle track. The surrounding edema or encephalomalacia caused by surgery and radiation showed a lesser degree of high signal intensity than the craniopharyngioma and therefore could be differentiated by MR.

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