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Unusual Location of a Shunt Tube in the Basal Subarachnoid Space

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Summary: The authors observed flow-void in a shunt tube in the basal cisterns of a 28-year-old man who had previously undergone surgery for a craniopharyngioma. They describe the appearance of a subarachnoid shunt catheter in the basal cisterns to caution against misinterpreting it as an aberrant vessel.

Index terms: Magnetic resonance, flow studies; Shunts, cerebral; Brain neoplasms, magnetic resonance

A follow-up magnetic resonance (MR) scan of a patient who had surgery for craniopharyngioma demonstrated a short, linear, low-signal structure in the basal subarachnoid cisterns. Subsequent plain radiographs revealed that this was a shunt tube. This location is unusual for a shunt and may produce diagnostic confusion. Details of the surgical technique are included.

Case Report

A 28-year-old man with a history of two previous operations for craniopharyngioma (at the ages of 9 and 13 years, respectively; operative details for both were unavailable as they were performed outside this country) was referred for an MR examination to rule out residual tumor. An unenhanced spin-echo MR examination of the sellar region was performed. This did not demonstrate any residual tumor. However, a low-signal linear structure was noted in the suprasellar cistern which closely resembled the flow-void within a vessel (Fig. 1). The anterior and posterior limits of this linear structure ended blindly within the basal (basifrontal and prepontine) subarachnoid cisterns and no communication with any vessel was identified. Plain radiographs of the skull were obtained; these demonstrated this structure to be a short shunt tube (Fig. 2).

Discussion

The accepted treatment for craniopharyngiomas is surgical removal, with or without external radiation. Sometimes, however, complete surgical removal is not possible. In these instances, or when there is a recurrence subsequent to a "complete" removal, the surgeon may sometimes insert a shunt tube within the cyst and bring it out into an external reservoir that can be repeatedly drained to decompress the cyst (1, 2). This approach has the potential advantage of avoiding repeated craniotomies and the high risk associated with a reoperation for a recurrent craniopharyngioma (2). The tube for this purpose is

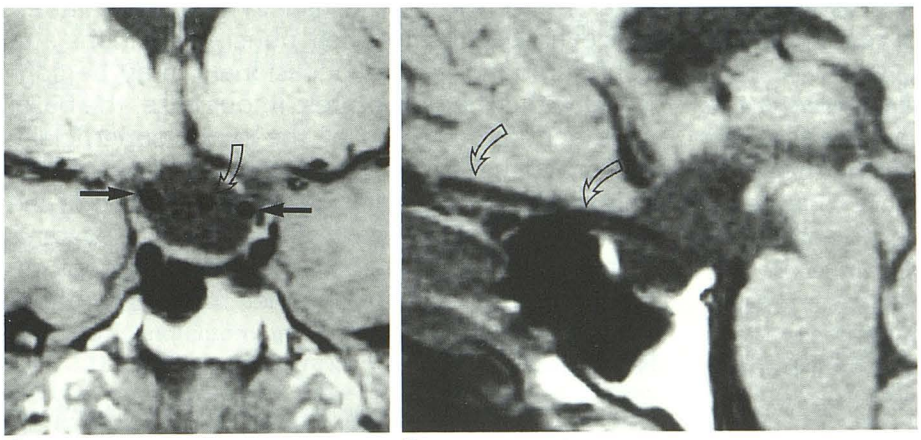

Fig. 1. *A*, Coronal unenhanced T1-weighted spin-echo MR scan (TR/TE/excitations, 483/12/4) shows a small round hypointensity within the center of the suprasellar cistern (*curved arrow*) which is similar to the flow-void within the supraclinoid ICAs (*straight arrows*).

B, Sagittal T1-weighted spin-echo MR scan (450/12/4) demonstrates the structure to be cylindrical (*arrows*) and not connected to any vessel.

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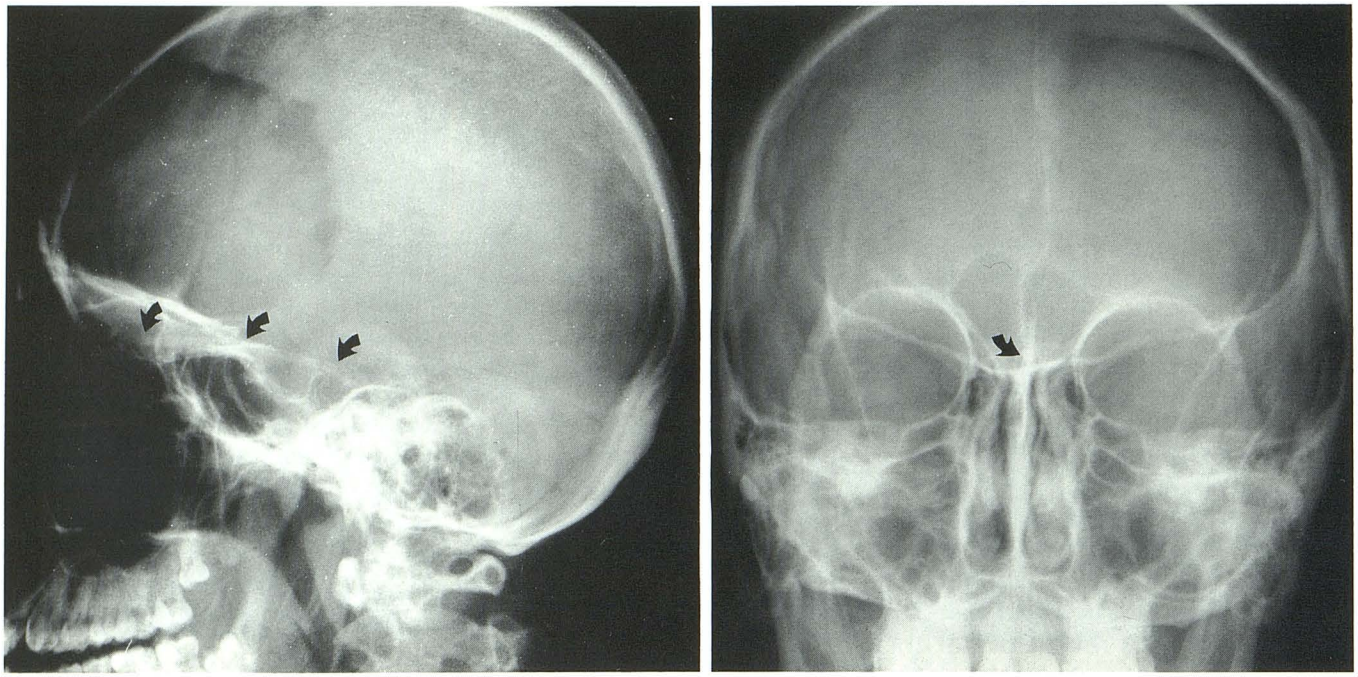

Fig. 2. Lateral (*A*) and frontal (*B*) radiographs of the skull demonstrating the shunt tube (*arrows*). Note that the tube terminates blindly within the basifrontal subarachnoid space anteriorly. Note also the previous frontal craniotomy.

frequently inserted in the subfrontal region (2). A tube thus placed has also been used for insertion of radioactive material directly into the cyst (2). In our patient, the tube was apparently never brought out externally and was presumably placed to facilitate drainage of the fluid contents of the tumor into the subarachnoid space. (This explanation is based on the patient's recollections since the surgeon and the surgical records could not be located.)

Because of its resemblance to a flow-void, the low signal within the shunt tube could potentially be misinterpreted as a vascular structure. The supraclinoid internal carotid artery (ICA) is occasionally aberrant. It may swerve towards the midline and give a similar appearance in the suprasellar cistern to that demonstrated here. That this was not the case in this patient is evident from the visualization of both ICAs in their normal position (Fig. 1A).

The cause of the low signal within the shunt tube is unexplained. Since both ends of the tube are within the subarachnoid space, flow or turbulence of cerebrospinal fluid within it may lead to the production of a low signal resembling the flow-void observed within vessels. This is a well-known phenomenon within shunt tubes (3); tubes that are blocked at one or both ends, on the other hand, typically are not as dark due to lack of flow (3). Another possibility to be considered is that the lumen of the tube is so small that the observer sees only the low signal of the tube material.

The recognition of intracranial cerebrospinal fluid shunts with MR is usually a simple matter. However, because of their unusual positions and configurations, shunts occasionally may be confused with other structures. In our case, the basal subarachnoid location of the shunt superficially mimicked a vessel. Close attention to the MR features, especially lack of communication of the low signal with any part of the vascular system, helped in defining it to be a nonvascular structure. Plain radiographs were obtained for confirmation.

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