The Anterior Transcallosal Approach to a Cerebral Aqueduct Tumor: A 3-Dimensional Operative Video

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Cerebral aqueduct lesions are among the most challenging to reach surgically because of their deep location and intimate association with critical neural and vascular structures. Endoscopic approaches for a third ventriculostomy or tumor removal can be considered, but these approaches disrupt the integrity of the cortex and multiple white matter fiber systems. A microsurgical anterior transcallosal approach for tumor removal is preferable because it causes a minimal disruption that is similar in size to endoscopic approaches but limited to only the callosal fiber system. Access to the middle portion of the cerebral aqueduct through the anterior transcallosal-transforaminal approach requires a modification of the standard exposure. We used an extreme anterior location for the craniotomy, adapted to the individual venous anatomy as delineated by preoperative magnetic resonance venography, and combined with an ultrasound-guided callosal opening with a cottonoid marker. This approach allowed the optimal straight route to the middle portion of the cerebral aqueduct.

In this 3-dimensional video, we show the case of a 52-year-old man who presented with a 3-month history of progressive headache, dizziness, and gait disturbance from hydrocephalus, produced by a solid tumor in the middle portion of the cerebral aqueduct. Through a right parasagittal frontal craniotomy, we used an adapted anterior transcallosal-transforaminal approach to reach the tumor. Postoperative magnetic resonance images showed complete tumor removal and restoration of the cerebrospinal fluid circulation. The patient had an excellent recovery and remains neurologically intact 3 months after surgery.

The 3-D video can be viewed at http://bit.ly/1IDkV6k or to view the video on a mobile device, scan this QR Code to link to an anaglyph (red/green) version of this 3-D video.

Disclosure
The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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COMMENT
The authors present an outstanding illustration of a transcallosal-transforaminal approach to an aqueduct tumor. Although this approach risks fornical injury, the authors demonstrate how multimodal technique, using both the operating microscope and the endoscope and intraoperative ultrasound, can help safely guide tumor resection and achieve an outstanding result.

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