A temporal approach to anterior communicating artery aneurysms

Technical note

CHARLES E. POLETTI, M.D.
Neurosurgical Service, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts

As an alternative to approaching anterior communicating artery (ACoA) aneurysms through the frontal fossa, either parasagittally or laterally (pterional, gyrus rectus approach), this report describes an approach to ACoA aneurysms through the temporal fossa. The main advantages of this temporal technique are that it requires less brain retraction, gives better surgical orientation, gains control of both A1 segments before disturbing the aneurysm, and involves minimal resection of brain tissue. This temporal approach has recently been used by the author in 20 consecutive operations for ACoA aneurysms in preference to the gyrus rectus approach.

KEY WORDS cerebral aneurysm □ anterior communicating artery □ temporal approach □ subarachnoid hemorrhage □ surgical approach

After approaching anterior communicating artery (ACoA) aneurysms along the frontal side of the sphenoid wing, many neurosurgeons may rotate the microscope to view the ACoA complex from the temporal side of the sphenoid wing. This report describes an approach to ACoA aneurysms through the temporal fossa; this technique has not been previously described in the literature.2-5,8-11

Operative Technique

Each aneurysm is approached from the side expected to give the most direct view of the aneurysm neck and the A1 and A2 segments of the anterior cerebral artery. Since the temporal approach first exposes the A1 segments on both sides, except in rare cases, surgery may proceed from the side opposite to a dominant A1 segment.

For a right-sided approach the head is rotated 60° to the left, laterally tilted toward the left shoulder, and rotated clockwise around a vertical axis (Fig. 1). The surgeon sits next to the patient's right shoulder. With the patient in this position the optic nerve and chiasm run approximately transversely in the microscope field with the temporal lobe below and the frontal lobe above. The same skin incision and initial frontolateral craniotomy are performed as for the gyrus rectus approach described by Kempe,3 with the addition of an anterior temporal craniectomy. The dural incision begins at the anterior limit of the middle fossa over the middle temporal gyrus and extends back and up to reach the sylvian fissure about 3 cm behind the sphenoid wing. It is then curved anteriorly into the frontal fossa, reaching the anteromedial corner of the craniotomy.

The superolateral aspect of the temporal lobe is retracted inferiorly and the inferior aspect of the sphenoid wing is followed to the anterior clinoid and internal carotid artery. Once cerebrospinal fluid is drained, the temporal retractor, angled upward and backward, is inserted to the superolateral edge of the chiasm (Figs. 2 to 5). A second narrow retractor is placed subfrontally along the temporal retractor. Both retractors are moved posteriorly to draw the frontotemporal junction away from the sphenoid wing. Usually there is no need to sacrifice temporal bridging veins or to split the sylvian fissure.

The retractor opposite to the temporal retractor is advanced by separating the arachnoid planes, and lifts the subfrontal cortex (including the gyrus rectus) about 3 mm off the chiasm in order to expose the ipsilateral A1 segment. The ipsilateral A1 segment is followed over the lamina terminalis to the midline where, in almost
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all cases, the opposite A₁ segment is either already in view or is exposed by dissecting the lamina terminalis. Both A₁ segments are then followed, usually upward, to each side of the ACoA. To expose the aneurysm neck and the origins of the A₂ segments, it may be necessary to remove a small amount of brain tissue.

Operative Results

This temporal approach has been used for exposure and clipping in the author’s last 20 consecutive cases of ACoA aneurysm. In 11 cases a small amount of brain tissue was resected, in nine cases none. For clipping, the amount of retraction above the chiasm required in this series has ranged from 4 to 12 mm. In two patients sharp dissection was needed to separate perforating vessels off posteriorly directed aneurysm domes, and both exhibited new postoperative deficits. Now, more than 1 year after surgery, their recent memory function has not yet completely returned to preoperative levels.

Discussion

The approaches to ACoA aneurysms described in the literature are through the frontal fossa: transcallosal, parasagittal, bilateral anterior subfrontal, unilateral subfrontal, or lateral subfrontal (pterional-gyrus rectus) techniques. However, the three-dimensional anatomy of the frontotemporal region and the ACoA complex in almost all patients seems to favor the temporal approach described in this report.

Compared to the frontolateral gyrus rectus approach, the advantages of this temporal approach include the following: there is less retraction, dissection, and resection of brain tissues; the initial exposure of first one A₁

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FIG. 5. Relationship of the temporal approach to adjacent structures. With the exception of the superolateral temporal lobe, this straight-line approach (arrow), angled as shown in Figs. 2 to 4, only passes through normal tissue planes to reach the anterior communicating artery.

segment then the other gives the surgeon orientation and control before approaching the aneurysm; the temporal approach is shorter (4.8 cm) than the frontolateral (6.6 cm) or the anterior frontal (7.3 cm) approach. For aneurysms pointing anteriorly or superiorly, the temporal approach usually provides direct access to the aneurysm neck without disturbing the dome. For aneurysms pointing posteriorly and laterally which have bled into one gyrus rectus, a contralateral temporal approach minimizes the occurrence of bilateral gyrus rectus lesions. For aneurysms pointing posteriorly, the more lateral and inferior temporal approach usually requires less retraction of the aneurysm dome to facilitate visualization and dissection of perforating vessels; the recurrent artery of Heubner is also less frequently disturbed. Because of these advantages, this temporal approach is now preferred on our neurosurgical service.

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References


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