Direct surgical obliteration of a persistent trigeminal artery aneurysm

Case report

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A woman with a fusiform aneurysm of a persistent trigeminal artery sustained a subarachnoid hemorrhage and presented with hypalgesia in the distribution of the maxillary and mandibular nerves. The first successful direct operative treatment of this rare aneurysm is reported.

KEY WORDS - trigeminal artery - aneurysm - definitive surgery

While the primitive trigeminal artery is the most common vestigial anastomosis between the embryologically developing carotid and basilar arterial systems surviving into adult life, aneurysms of this artery are extremely rare.1-3,6 In addition, of the four reported cases of intracranial aneurysm of the persistent primitive trigeminal artery, none appear to have been obliterated surgically.1-3,6 This report reviews the surgical treatment of an aneurysm of the trigeminal artery.

Case Report

This healthy, 39-year-old woman suddenly developed a severe headache while singing in a church choir; the pain began in the right lower face and culminated in a generalized headache. She collapsed and was immediately taken to the Lutheran Medical Center.

Examination. She was lethargic, had a stiff neck, and was unable to discern or localize pain over the lower half of the right face. The right corneal reflex was preserved as was appreciation of pin prick over the first trigeminal division. The remainder of the neurological and the general medical examinations were within normal limits. A lumbar puncture performed soon after admission revealed an opening pressure of 340 mm H2O and grossly bloody fluid. Within two days the headache abated and the facial hypalgesia cleared. Selective pan-cerebral arteriography performed by retro-femoral vessel catheterization revealed a persistent right primitive trigeminal artery with a fusiform aneurysm dilatation just distal to its origin from the internal carotid
artery (Fig. 1 left). After a week of bed rest she was transferred to the Neurosurgical Unit at the Cleveland Metropolitan General Hospital for definitive surgery.

Operation. Under halothane anesthesia and with spinal drainage, a right temporal craniotomy was performed extending to the floor of the middle fossa, and the dura was incised. As the temporal lobe was elevated considerable venous hemorrhage was encountered in the region of the Gasserian ganglion. As a consequence it was decided to approach the ganglion and Meckel’s cave extradurally. The dura propria was incised, and palpation of the ganglion revealed an obvious arterial pulsation on its medial aspect. The ganglion was retracted laterally and the arachnoid incised, uncovering the internal carotid artery, which was surrounded by recent hematoma suggesting disruption of the carotid canal. Delicate cottonoid dissection revealed the origin of the trigeminal artery as well as its saccular dilatation (Fig. 2). In spite of reduction of arterial pressure to 80 mm Hg, there was significant bleeding during exposure of the aneurysm. All bleeding from the aneurysm was stopped by the application of a 3.5 Sundt clip graft, which was reapplied twice to assure perfusion continuity through the trigeminal artery (Fig. 2). The sixth nerve could be seen at the most medial aspect of the exposure.

Postoperative Course. Postoperatively the patient had a right ophthalmoplegia, undoubtedly related to intraoperative manipulation. She also had diminished pain perception over the right side of her face immediately following surgery. Both the ophthalmoplegia and facial hypalgesia began to resolve within a few days and had completely disappeared 2 months after the operation, except for an incomplete right sixth nerve paresis. Repeat arteriographic studies (Fig. 1 right) have demonstrated absence of the aneurysm but also complete occlusion of the trigeminal artery in spite of our efforts to
Aneurysm of persistent trigeminal artery

**Figure 2.** Artist's drawing of the location of the aneurysm of the trigeminal artery, and the origin of this primitive artery from the internal carotid artery. The magnified insert illustrates the location of the Sundt clip. The lower retractors are displacing the Gasserian ganglion laterally. The anatomical position of the 4th and 6th nerves is indicated although only the 6th nerve was visualized at surgery.

The possibility of a trigeminal artery aneurysm in this patient on the basis of the trigeminal nerve involvement and the subarachnoid hemorrhage prior to arteriography. Admittedly, we were unable to determine from the literature what was the characteristic life history of this vascular anomaly. Once we had satisfied ourselves that a trigeminal artery aneurysm was the cause of intracranial bleeding, we felt that the aneurysm was surgically approachable, utilizing the Gasserian ganglion as the key to its location. The aneurysm could have been removed from the circulation by simply clipping the vessel at its origin from the carotid. However, we felt that we should attempt to preserve the continuity of the trigeminal artery since we did not know how significant this vessel was to the patient's cerebral circulation. The Sundt clip graft appeared ideally suited for this purpose as it would reinforce the aneurysmal dilatation and thus remove this as a potential source of rebleeding while maintaining a patent arterial lumen. Unfortunately, the postoperative arteriogram demonstrated that the trigeminal artery had been occluded.

**References**


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