A majority of intracranial aneurysms occur on the arteries that form the circle of Willis or on their main branches. Aneurysms of the intracranial portion of the anterior ethmoidal artery are extremely rare. To our knowledge, only one such case has been reported, this in a patient with hemodynamic stress factors leading to rich, anastomotic blood flow through the patient’s ophthalmic arteries. We report an unusual case of a giant aneurysm on the anterior ethmoidal artery in a nonhypertensive patient who had no hemodynamic stress factors and presented with intracranial hemorrhage.

Case Report

This forty-five-year-old woman presented with a history suggestive of an intracranial hemorrhage. Clinical examination indicated mild right pyramidal signs and neck stiffness. Computerized tomography demonstrated contrast enhancement in the region of a left frontal intraparenchymal hematoma with an adjacent subdural hematoma. Angiography revealed the presence of a giant aneurysm on the left anterior ethmoidal artery. Surgical evacuation of the hematoma with excision of the aneurysm and coagulation of the feeding artery was achieved. Postoperative recovery was uneventful. Vascular lesions of the anterior ethmoidal artery and the rarity of a giant aneurysm at this site are discussed.

Key Words • anterior ethmoidal artery • giant aneurysm

A 45-year-old woman presented with sudden holocranial headache followed by loss of consciousness that lasted for 2 hours 1 day prior to admission. Afterward, she experienced altered sensory perception and urinary incontinence. There was no previous history of a similar episode and no history of fever or trauma. She was not known to be a diabetic or to be hypertensive.

Examination. On examination, the patient’s blood pressure was 110/70 mm Hg. She opened her eyes on command; pupils were 3 mm in size and reacted briskly to light. She moved all four limbs spontaneously and verbalized coherently. However, left unattended, she drifted to sleep. She had an upper motor neuron facial palsy on the right side and minimal hemiparesis of the right upper and lower limbs. There was significant neck stiffness and Kernig’s sign was positive. A hemogram of the patient was normal.

Computerized tomography revealed an intraparenchymal hematoma in the left frontal polar region with an adjacent subdural hematoma (Fig. 1 left and center). Studies using contrast material showed an increase in the density in the left orbitofrontal region that suggested a vascular lesion (Fig. 1 right). A left carotid angiogram revealed a giant aneurysm on the left anterior ethmoidal artery (Figs. 2 to 4).

Operation and Postoperative Course. Emergency surgery was performed, and the left subdural and frontal polar hematomas were evacuated through a left frontal craniotomy. The aneurysmal sac was identified and excised completely after coagulating the anterior ethmoidal artery near the cribiform plate. Biopsy of the aneurysmal sac revealed no inflammation. The patient had an uneventful postoperative recovery and experienced no neurological deficit.
Giant aneurysm of the anterior ethmoidal artery

Discussion

The anterior ethmoidal artery is an orbital branch of the ophthalmic artery that runs through the anterior ethmoidal foramen in the ethmoid sinus and the nasal cavity. It enters the cranial cavity near the cribriform plate to supply the dura mater of the anterior cranial fossa and the anterior part of falx cerebri. Although carotidophthalmic aneurysms account for approximately 5% of intracranial aneurysms,2 aneurysms arising from intraorbital ophthalmic arteries are rare.4

Aneurysms arising from the branches of the ophthalmic artery are even more rare. To our knowledge, only one case of saccular aneurysm arising from the anterior ethmoidal artery has been reported.6 In that patient, the cause of the anterior ethmoidal artery aneurysm was presumed to be abnormal hemodynamic stress. That patient had occlusion both of the internal carotid arteries and one vertebral artery, that resulted in a rich, anastomotic flow through both external carotid and ophthalmic arteries.6 In addition, there have been reports of anterior cranial fossa dural arteriovenous malformations being supplied mainly by the anterior ethmoidal artery.3,5,8 The anterior ethmoidal artery has also been found to supply a purely intracerebral arteriovenous malformation.7 Enomoto, et al.,1 described an interesting case of a cerebral aneurysm at the anastomotic site between the fronto-orbital artery and the anterior ethmoidal artery that presented with an intracranial hemorrhage. Interestingly, there was no other abnormality of either intracranial blood vessels or the carotid arteries in that case.

Our case is unique in that there was no anomalous

Fig. 1. Computerized tomography scans demonstrating an intraparenchymal hematoma. Precontrast-enhanced axial view of the left frontal hematoma (left) and the left frontal subdural hematoma extending posteriorly to the temporal region (center). Postcontrast-enhanced view showing the contrast material within the left frontal intraparenchymal hematoma (right).

Fig. 2. Left carotid angiogram, anteroposterior view, demonstrating cross compression and showing the bilateral normal carotid circulation and a giant aneurysm.

Fig. 3. Left: Left carotid angiogram, lateral view, showing that the giant aneurysm is supplied by the anterior ethmoidal branch of ophthalmic artery. Right: Diagram of the same view given at left showing the aneurysm. I.C.A. = internal carotid artery; O.A. = ophthalmic artery; A.E.A. = anterior ethmoidal artery; P.E.A. = posterior ethmoidal artery; R.O.O. = roof of orbit; C.P. = cribriform plate; F.S. = frontal sinus; Aneu. = aneurysm.

Fig. 4. Left: Left carotid angiogram, right oblique view, showing the aneurysm and the feeding vessel. Right: Diagram of the same view given at left showing the aneurysm arising from the anterior ethmoidal artery. I.C.A. = internal carotid artery; A.C.A. = anterior cerebral artery; M.C.A. = middle cerebral artery; O.A. = ophthalmic artery; A.E.A. = anterior ethmoidal artery; P.S. = planum sphenoidale; Aneu. = aneurysm.
connection of the anterior ethmoidal artery or the aneurysm to any other vessel, and there was no apparent hemodynamic stress that might have led to the origin or growth of the aneurysm. In addition, our patient did not have systemic hypertension. In view of the normal internal carotid arteries, an abnormal hemodynamic stress cannot be postulated. There was no history of trauma or infection. Furthermore, the aneurysmal wall did not reveal any evidence of inflammation, excluding a mycotic aneurysm.

References


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