Anterior temporal artery (ATA)

The anterior temporal artery is usually a branch of the M1 segment of the middle cerebral artery (MCA) that curves out of the Sylvian fissure and runs over the temporal lobe to supply the anterior third of the superior temporal gyrus, middle temporal gyrus and inferior temporal gyrus.

According to cadaveric studies, the ATA arises from the proximal M1 in a common trunk shared with the temporopolar artery approximately 79% of the times and could have a variable course [1].

In the past, the ATA has been utilized for bypassing complex MCA bifurcation aneurysms [2], and has been successfully embolized for the treatment of skull base meningiomas [3].

Functional studies have demonstrated that strokes in the ATA or temporal-polar artery could produce semantic errors in auditory comprehension and object naming tasks [4].

The anterior temporal artery (ATA) is an appealing donor artery for intra intracranial bypass surgery procedures. However, its identification may be difficult. Current literature lacks useful landmarks to help identify the ATA at the surface of the sylvian fissure.

The temporopolar artery (TPA), ATA, and middle temporal artery (MTA) were examined in 16 cadaveric specimens. The topographic anatomy and key landmarks of the arteries at the sylvian fissure were recorded. The distance between the point of emergence from the sylvian fissure to the lesser sphenoid wing and anterior tip of the temporal lobe was measured. The features of the inferior frontal gyrus relative to each of the arteries at the sylvian fissure were also recorded.

The average distances from the lesser sphenoid wing to the TPA, ATA, and MTA were 3.7 mm, 21.2 mm, and 37 mm. The mean distances from the temporal pole were TPA, 14.7 mm; ATA, 32.0 mm; and MTA, 45.4 mm. The differences between the average distances were statistically significant ($P < 0.0001$). The ATA most frequently faced pars triangularis, whereas the TPA always faced pars orbitalis. The MTA was always found posterior to the junction of pars triangularis and pars opercularis.

The article of Meybodi et al. provides topographic evidence for efficient identification of the ATA in the parasylvian space. The key relationship and landmarks identified in this study may increase efficiency and safety when harvesting the ATA for intracranial-intracranial bypass [5].

Variant anatomy

The temporopolar artery, which supplies the temporal pole, usually arises separately from the M1 segment of MCA, however, it may arise as a branch from the anterior temporal artery.

see Prominent anterior temporal artery.

see Anterior temporal artery aneurysm

1)
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Bederson JB, Spetzler RF. Anastomosis of the anterior temporal artery to a secondary trunk of the middle cerebral artery for treatment of a giant M1 segment aneurysm. Case report. J Neurosurg. 1992 May;76(5):863-6. PubMed PMID: 1564547.
3)
Waldron JS, Sughrue ME, Hetts SW, Wilson SP, Mills SA, McDermott MW, Dowd CF, Parsa AT. Embolization of skull base meningiomas and feeding vessels arising from the internal carotid circulation. Neurosurgery. 2011 Jan;68(1):162-9; discussion 169. doi: 10.1227/NEU.0b013e3181fe2de9. PubMed PMID: 21150761.
4)
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5)
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