Anterior inferior cerebellar artery (AICA)

Artery in the brain that supplies part of the cerebellum.

The AICA lies near the surface of a vestibular schwannoma.

It arises from the lower part of the basilar artery at the level of the junction between the medulla oblongata and the pons in the brainstem.

Often gives off a loop that runs into the IAC and gives off the labyrinthine artery and then emerges to supply the anterolateral inferior cerebellum and then anastomoses with PICA.

It passes backward to be distributed to the anterior part of the undersurface of the cerebellum, anastomosing with the posterior inferior cerebellar branch of the vertebral artery.

Segments

Anterior inferior cerebellar artery segments.

Branches

Anterior inferior cerebellar artery branches.
The anterior inferior cerebellar artery gives rise to the labyrinthine arteries which supply the vestibulocochlear and facial nerves. The anterior inferior cerebellar artery also supplies the lower lateral pons, the choroid plexus of the lateral ventricle, the middle cerebellar peduncle and the inferior anterior area of the cerebellum.
Variants

In about 99% of patients, the anterior inferior cerebellar artery arises from the basilar artery with about 75% of cases originating from the lower third. It may also stem from the vertebrobasilar junction as seen in about 9% of cases. The anterior inferior cerebellar artery has also been cited to give rise to the labyrinthine artery in about 90% of individuals. The most common variation noted is the presence no anterior inferior cerebellar artery, with its absence more common on the left side. In this variation, the anterior inferior cerebellar artery will either originate from a common trunk of the vertebral artery or the posterior inferior cerebellar arteries directly. Duplication of the anterior inferior cerebellar artery has also been noted but is rare. The double origin anterior inferior cerebellar artery has also been pointed out in the right anterior inferior cerebellar artery in which one branch originates from the basilar artery and the other from the vertebral artery. Some anastomoses have also been noted between the rostral part of the anterior inferior cerebellar artery and the superior cerebellar artery (SCA) and between the caudal part of the anterior inferior cerebellar artery and the posterior inferior cerebellar arteries. Other common variations that occur in the branches of the basilar artery that may affect the anterior inferior cerebellar artery are the agenesis of the right posterior inferior cerebellar arteries or the left posterior inferior cerebellar arteries. The agenesis of the posterior inferior cerebellar arteries may create an inverse relationship between the anterior inferior cerebellar artery and posterior inferior cerebellar arteries. In this case of the agenesis of the posterior inferior cerebellar arteries, there will be a well-developed anterior inferior cerebellar artery with the posterior inferior cerebellar arteries arising from an anterior inferior cerebellar artery/posterior inferior cerebellar arteries common trunk. The prevalence of this variation as reported in the literature is about 20% to 24% \(^1\).

Anomalies

Anomaly in which a segment of the anteroinferior cerebellar artery (AICA) is embedded in the dura or bone surrounding the subarcuate fossa, a small depression in the bone posterior to the internal acoustic meatus (IAM), through which the subarcuate artery enters the bone. This anomaly places the artery at risk in removing the posterior wall of the IAM.

An anomalous AICA having a segment that was embedded in the dura covering on the bone surrounding the subarcuate fossa was found during a microsurgical dissection course. The senior author (ALR) has observed this anomaly in four patients during surgery for acoustic neuromas and in three specimens in microsurgery dissection courses. To define the microsurgical anatomy of the anomalous artery further, the latex-injected specimen was dissected in a stepwise manner using x3 to x40 magnification.

The anomalous AICA described in this report bifurcated into a rostral trunk and a caudal trunk near the facial-vestibulocochlear nerve complex. The caudal trunk formed a sharp lateral loop that was embedded in the dura covering the subarcuate fossa. The involved trunk continued to supply the suboccipital area normally supplied by the posteroinferior cerebellar artery, which was hypoplastic. The dura surrounding the anomalous loop was opened, and the adjacent bone was removed to free the anomalous loop from the subarcuate fossa so that the artery could be displaced medially to remove the posterior wall of the IAM. Although it has been reported that the AICA may occasionally be adherent to the dura over the subarcuate fossa, this study is the first to demonstrate an AICA that is embedded in the dura and bone of the subarcuate fossa.

Mobilizing the AICA loop that is embedded in the subarcuate fossa posterior to the IAM places the involved AICA at significant risk in exposing the contents of the IAM \(^2\).
The anterior inferior cerebellar artery-posterior inferior cerebellar artery (AICA-PICA) common trunk anomaly is reportedly one of the most common vessel variants in the posterior circulation, but reports of hemifacial spasm (HFS) associated with AICA-PICA common trunk are very rare. In the present study, we describe methods of microvascular decompression (MVD) for HFS caused by AICA-PICA common trunk compression.

Among 159 patients who underwent MVD for HFS, 16 patients had compression of the root exit zone by the AICA-PICA common trunk anomaly. The types of compression were classified into 2 groups: common trunk artery compression group and branching vessel compression group.

The common trunk artery compression group consisted of 11 patients (69%), and the branching vessel compression group consisted of 5 patients (31%). The rostral branch (feeding the original AICA territory) coursed between the seventh and eighth cranial nerves in 5 patients, and in 13 patients (87.5%) required interposition of the common trunk or the branching vessel, and in 2 patients, decompression was completed by the transposition method. Fifteen patients experienced sufficient results, and 1 had severe residual spasm. Transient facial palsy developed in 2 patients. No patients encountered recurrence.

Reports concerning decompression methods of AICA-PICA common trunk anomaly are very rare. The tortuosity of the common trunk and perforators from the offending vessel make the usual repositioning of the offending artery much more difficult, and adequate decompression techniques are required for successful MVD.

AICA syndrome

see Lateral pontine syndrome.

Anterior inferior cerebellar artery aneurysm

Anterior inferior cerebellar artery aneurysm

References
