Middle Cerebral Artery Branches

Branches vary widely, 10 common ones:

1. medial (3–6 per side) and lateral lenticulostriate artery

2. anterior temporal artery

3. posterior temporal artery

4. lateral orbitofrontal

5. ascending frontal (candelabra)

6. precentral artery (prerolandic)

7. central artery (rolandic)

8. anterior parietal (postrolandic)

9. posterior parietal

10. angular artery

Awareness of anatomical variations in branching patterns is important in neurovascular procedures. As very few Anatomical studies on MCA are there in the literature, this type of research work should be done by a number of scientists from a different region of the world in large scale [1)].

Precentral artery

Central artery

Postcentral artery

Parietal artery

Anterior temporal artery

Middle temporal artery

Temporo-occipital artery

Angular artery

Lateral striate artery.

The branches (ramus) of the MCA can be described by the areas that they irrigate.

Frontal lobe

Lateral frontobasal (orbitiofrontal): This artery branches out anteriorly, superiorly and laterally to vascularize the inferior frontal gyrus. It “competes” in size with the frontal polar branch of the anterior cerebral artery

Prefrontal arteries: These arteries fan out over the insula and exit to the cortex via the medial surface of the frontal operculum. The arteries fan superiorly over the pars triangularis and vascularize the inferior and middle frontal gyrus. Near the superior frontal gyrus these arteries anastamose with branches from the pericallosal artery of the anterior cerebral artery.

Pre-Rolandic artery (precentral): The artery extends out on the medial surface of the operculum and supplies the posterior parts of the middle and inferior frontal gyri as well as the lower parts of the pre-central gyrus. This artery branches once or twice and is relatively invariant across anatomies.

Rolandic arteries (central): The artery extends out and exits from the central portion of the operculum then passes inside the central sulcus. This artery bifurcates in 72% of individuals and irrigates the posterior pre-central gyrus and the inferior portion of the post-central gyrus.

Parietal lobe

Anterior parietal: This artery usually originates from the anterior or middle MCA trunk. In some cases it branches from the rolandic artery or from the posterior parietal artery. It extends the length of interparietal sulcus and descends slightly posteriorly.

Posterior parietal: Emerges from the posterior end of the Sylvian fissure and extends first posteriorly, and then anteriorly along the posterior of the parietal lobe. It also branches to the supramarginal gyrus. Angular: The angular artery is a significant terminal branch of the anterior or middle trunk of the MCA. It emerges from the Sylvian fissure and passes over the anterior transverse temporal gyrus and usually divides into two branches. One of the branches supplies the angular gyrus while the other supplies the supramarginal gyrus, posterior superior temporal gyrus, and the parietooccipital arcus (sulcus).

Temporooccipital: The longest cortical artery, it runs posteriorly opposite to the center of the operculum. Upon its exit from the Sylvian fissure, it runs parallel to the superior temporal sulcus and supplies the superior and inferior occipital gyri. This vessel anastamoses with the posterior cerebral artery and may exist as one or two arteries, 67% or 33% of the time, respectively.

Temporal lobe

Temporopolar: The artery extends from the sphenoidal segment of the MCA via the inferior surface of the operculum and supplies the polar and anterior lateral portions of the temporal lobe. The vessel can be identified in 52% of normal angiograms

Anterior temporal: This artery extends in the similar fashion as the temporopolar artery and vascularizes the same regions.

Middle temporal: This artery extends from the Sylvian fissure opposite to the inferior frontal gyrus and supplies superior and middle portions of the middle temporal lobe. It can be identified in 79% of angiograms.

Posterior temporal: This artery extends out and away from the operculum and turns in a step-wise manner first inferiorly then posteriorly into the superior temporal sulcus then to the middle temporal sulcus. This vessel supplies posterior portion of the temporal lobe and is the origin of several perforating arteries that irrigate the insula. It is readily identifiable in most radiograms.

M1

medial lenticulostriate penetrating arteries lateral lenticulostriate penetrating arteries anterior temporal artery polar temporal artery uncal artery (which may branch from the anterior choroidal artery).

M2

Division of the MCA is variable after the horizontal segment, although most commonly, it divides into two trunks, superior and inferior:

78% bifurcate into superior and inferior divisions 12% trifucate into superior, middle and inferior divisions 10% branch into many smaller branches.

Superior terminal branch

lateral frontobasal artery

prefrontal sulcal artery

pre-Rolandic (precentral) and Rolandic (central) sulcal arteries.

Inferior terminal branch

three temporal branches (anterior, middle, posterior)

branch to the angular gyrus

two parietal branches (anterior, posterior)

1)
Gunnal SA, Farooqui MS, Wabale RN. Study of Middle Cerebral Artery in Human Cadaveric Brain. Ann Indian Acad Neurol. 2019 Apr-Jun;22(2):187-194. doi: 10.4103/0972-2327.144289. PubMed PMID: 31007431; PubMed Central PMCID: PMC6472224.