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Micromorphological features of the M1 segment of the middle cerebral artery

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The middle cerebral artery (MCA), vascularizes most of the lateral sides of the cerebral cortex, as well as the internal capsule and basal ganglia, except the upper part of the parietal lobe and the lower part of the temporal and occipital lobes. MCA is divided into four segments: sphenoidal (M1), insular (M2), opercular (M3) and cortical (M4). M1: is the part that extends from the beginning of MCA to its bifurcation/trifurcation (limen insulae). The M1 segment is directed laterally of chiasma opticum, rostrally of the optic tract, and temporally of the trigonum olfactorium. Dorsally of M1 segment is the outer part of the anterior perforated substance, the prepiriform part of the cerebral cortex and stria olfactoria lateralis, while rostrally is the posterior margin of the greater wing of the sphenoid bone. On the ventromedial aspect of the insular cortex, the M1 segment usually (75% to 80% of cases) bifurcates into

superior and inferior trunks. The M1 segment perforates the brain with lenticulostriate arteries, which supply the basal ganglia. The diameter of M1 segment is about 2.3-4.9 mm, on average 2.8-4.1 mm. The length ranges from 11.9-17.02 mm, on average 15.6 mm. Hypoplasia of the M1 segment rarely is described, in about 0.3% of hemispheres. Segmentation of the M1 segment is also very rarely in 0.3% of cases. The duplication of the M1 is an interesting feature for this artery, present in 0.3% of hemispheres.

Conclusion: The occlusion of M1 arterial branches leads to various syndromes of cerebrovascular diseases. Detailed knowledge of the morphologic and topographic ratio of the M1 segment of MCA is very important for the success of cerebrovascular surgery to resolve many clinical cases of brain tumors as well as vascular aneurysms.

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