Perforators of the anterior communicating artery

In terms of postoperative morbidity and mortality, preservation of the perforating arteries branching from the anterior communicating artery (ACoA) during clipping is particularly imperative in patients with anterior communicating artery aneurysms.

The mortality and morbidity associated with damage to the perforators can be reduced by approaching the patient from the dominant A1 segment of the anterior cerebral artery side and pursuing the perforators primarily at the anteroinferior part of the aneurysm neck in the aneurysms with superior and posterior projections [1].

3DRA can be used to visualize perforating branches of the AComA in vivo. Since damage to these perforators may result in neurologic deficits, visualization of these vessels prior to surgery or endovascular aneurysm treatment could help in the planning of therapeutic interventions. Further refinement of current imaging techniques will be necessary, however, to increase the reliability of small vessel angiography [2]

The anterior communicating artery (ACoA) frequently gave rise to perforating arteries which terminated in the superior surface of the optic chiasm and above the chiasm in the anterior hypothalamus. This finding contrasts with previous reports that no perforating branches arise from the communicating artery. The proximal half of the A=1 segment was a richer source of perforating arteries than the distal half. The A-1 branches most commonly terminated in the anterior perforated substance, the optic chiasm, and the region of the optic tract. The ACoA increased in size as the difference in the diameter between the right and left A-1 segments increased. Frequent variants such as double or triple ACoA's, triple A-2 segments, and duplication of the A-1 segments were encountered. The clinical consequences of occlusion of the recurrent artery and of the perforators from the ACoA and medial and lateral segment of A-1 are reviewed [3].

Camuscu et al., describe the microanatomy of the perforating arteries arising from the anterior communicating artery complex (5 mm distal of the anterior cerebral artery, the anterior communicating artery, and 5 mm proximal of the distal anterior cerebral artery). Thirteen unfixed human brains were used in this study. The origin and number of perforators are described, as is the site of brain penetration, and results are correlated with previous studies. The hemodynamics of blood flow in relation to the formation of an anterior communicating artery aneurysm and different surgical approaches are mentioned. The neuropsychological outcome after aneurysm clipping with regards to the pattern of blood supply from the anterior cerebral artery complex is also discussed [4].

1)
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2)

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3)

Perlmutter D, Rhoton AL Jr. Microsurgical anatomy of the anterior cerebral-anterior communicating-recurrent artery complex. J Neurosurg. 1976 Sep;45(3):259-72. PubMed PMID: 948013.
4)

Camuscu H, Dujovny M, Abd el-Bary T, Beristain X, Viñas FC. Microanatomy of the perforators of the anterior communicating artery complex. Neurol Res. 1997 Dec;19(6):577-87. PubMed PMID: 9427956.