Aims: Neck clipping remains a valuable treatment option for basilar apex aneurysms, especially in those with complex morphology, such as incorporation of branching vessels or large size, and young patient age. Even though aneurysm morphology influences the choice of surgical approach, most aneurysms can be exposed utilizing different approaches. In this systematic literature review we aim to compare the outcome and complications of all major surgical approaches used to access basilar apex aneurysms so far.

Methods: A systematic literature review was performed on PubMed. Articles with at least 5 patients, data on neurologic outcome and procedure associated complications were included for the following approaches: pterional or orbitozygomatic transsylvian, subtemporal (with or without zygomatic osteotomy), pretemporal (with or without transcavernous extension) and transpetrous. N-Weighted average values for clinical outcome, aneurysm occlusion rates, morbidity, mortality and aneurysm morphology were analyzed and compared.

Results: Thirty four articles were included with a total of 2041 patients, 722 with ruptured aneurysms. The n- weighted average value for good neurologic outcome, surgical morbidity, surgical mortality and complete occlusion rates were: pretemporal approaches (n=241) 85%/10%/1%/94%, subtemporal approaches (n=375) 81%/34%/1%/86%, transsylvian approaches (n=1131) 81%,14%,4%,95%, transpetrous approaches (n=17) 58%,53%,0%,75%;

Conclusion: Pretemporal and transsylvian approaches might be associated with favorable neurologic outcomes. These two approaches and their variants, respectively the orbitozygomatic/ transsylvian and pretemporal transcavernous approaches revealed to be particularly useful in aneurysms with complex morphology with respect to the parent artery.

Range of aneurysm neck to posterior clinoid process (PCP) distance by approach. The red line indicates average values.

Overview of major surgical approaches. A subtemporal, B pretemporal/transcavernous, C transsylvian, D orbitozygomatic. A1 segment 1 of the anterior cerebral artery, BAA basilar apex aneurysm, Cav cavernous sinus, CNII optic nerve, CN III occulomotor nerve, ICA internal carotid artery, M1 segment 1 of the middle cerebral artery, Pcom posterior communicating artery, PCA posterior cerebral arterym PCP posterior clinoid process, SCA superior cerebellar artery, Temp temporal lobe, Tent tentorium.