

Minimally Invasive Transpalpebral “Eyelid” Approach to Complex Middle Cerebral Artery Aneurysms.

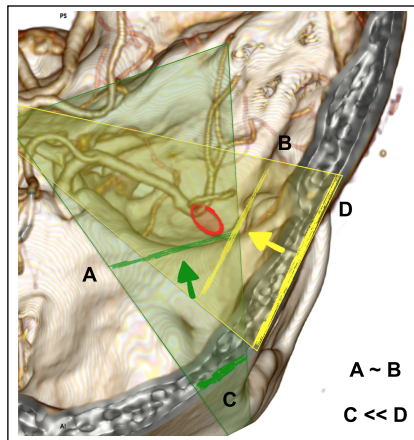
Mauricio Mandel MD, PhD; Eberval G. Figueiredo MD, PhD; Rafael Tutihashi MD PhD; Manoel Jacobsen Teixeira

Hospital das Clínicas of University of São Paulo Medical School

contact: mauricio.mandel@hc.fm.usp.br

INTRODUCTION

The optimal treatment for complex middle cerebral artery (MCA) aneurysms is controversial. Although recent technological advances have led to successful endovascular treatment, MCA aneurysms have been considered more conducive to surgery. As minimally invasive options are limited and possess lots of drawbacks, a new transpalpebral approach for is proposed and described.

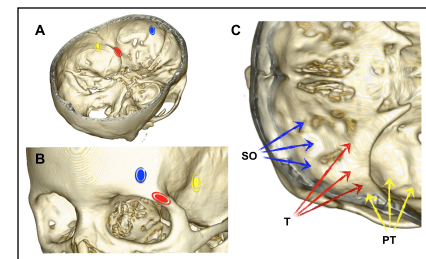


A ~ B
C << D

Fronto-lateral (transpalpebral, green triangle) versus lateral approaches (pterional, yellow triangle). Both approaches provide an adequate working area (A and B). However, the transpalpebral approach (C) offers a better angle of attack (green arrow) to MCA bifurcation aneurysms (typical orientation of an MCA aneurysm shown as red circle). In the pterional craniotomy (D), a short distance to the working area allows a limited overview (yellow arrow); therefore, it must be proportionally larger than the mini-fronto-orbital transpalpebral craniotomy. In contrast, a long surgical corridor to deep-seated surgical field often provides a good monitoring of the surgical dissection.

RESULTS

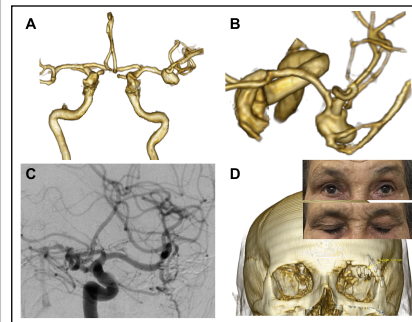
All procedures were successfully performed in a standardized way, and no major complications related to the new approach were observed. All patients underwent postoperative angiographic control that showed no significant residual neck. Three-month follow-up was sufficient to shown no visible scars with excellent cosmetic results.



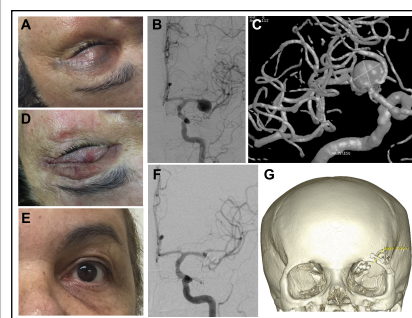
Comparisons between different approaches to MCA aneurysms. 3D bone reconstruction on CT scan in posterolateral (A), frontolateral (B), and superior (C) overviews. The transpalpebral approach (T, red) is a frontolateral approach. The miniaturization of this approach can only be accomplished because the lesser wing of the sphenoid bone is extensively drilled. The supraorbital craniotomy (SO, blue) is almost always an anterior subfrontal approach. The pterional or mini-pterional (PT, yellow) is a lateral approach.

METHODS

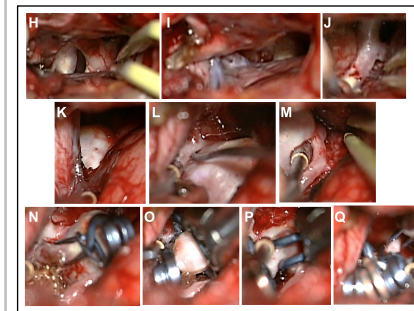
The objective was to describe and assess the surgical results of the Minimally Invasive Transpalpebral Approach in MCA aneurysms. From 2013 to 2015 the data of 20 patients with unruptured complex MCA aneurysms were included into a prospective database. Large and/or broad-based aneurysms, calcifications, and inclusion of the M1 or M2 segment into the aneurysm base were defined as complex.



A 65-year-old heavy smoker woman presented with a sudden headache, and she underwent brain imaging that revealed a right complex MCA bifurcation aneurysm, involving both temporal and frontal branches (A and B). No subarachnoid hemorrhage was found on the CT scan or CSF. Postoperative angiogram showed no neck remnant (C). As a moderate cardiovascular risk patient, she was discharged home only 72 hours later with a normal neurological examination. Complex MCA aneurysms did not require larger craniotomies in our series (D).



(A) A 63-year-old woman complained about worsening chronic headaches. A left, unruptured MCA bifurcation aneurysm was demonstrated by CT scan. Incision marking on the upper lid crease.



Conventional and 3D angiogram showed (B and C) a wide-necked 10-mm MCA bifurcation aneurysm with a 8-mm neck that involved both of the bifurcation branches. Immediate post operative photo demonstrating skin edema (D). Final excellent cosmetic result (E). Final angiogram (F) showed a complete aneurysm occlusion. The patient was discharged home 24 h after with a normal neurological examination. The CT scan 3D reconstruction (G) shows the 1.3 cm craniotomy. No enophthalmos was observed despite partial orbital roof removal. Intraoperative Images. After CSF drainage it is possible to see the carotid artery (left) and the optic nerve (right) (H). The Sylvian fissure is exposed, whereas the carotid artery can be seen on the background (I). After Sylvian fissure dissection, the MCA is the new proximal control (J). Because the surgical field is very limited, it is always necessary to change the microscopy position. Here, we can see the aneurysm domes inside the Sylvian fissure (K). Temporal and frontal branches of the MCA are dissected (L and M). Then we applied the first (N), second fenestrated (O), third (P), and fourth aneurysm clips (Q).



The coverage of the incision by the overlying lid fold allows an excellent cosmetic result. The scar can only be seen when the patients close their eyes. Printed with permission from Hospital das Clínicas of University of São Paulo Medical School.

CONCLUSIONS

Endovascular treatment of MCA aneurysms continues to be the future. In this sense, the transpalpebral approach comes as a resolute, minimally invasive, safe and cosmetically adequate solution for complex MCA aneurysms of the present.

LEARNING OBJETIVES

The Transpalpebral Approach can be considered an minimally invasive alternative for complex MCA aneurysms.