Reduced incidence of CSF leak following complete calvarial reconstruction of craniectomies

TO THE EDITOR: We read with keen interest the article by Eseonu et al.: Reduced CSF leak in complete calvarial reconstructions of microvascular decompression craniectomies using calcium phosphate cement. J Neurosurg 123:1476–1479, December 2015) regarding the reduced incidence of CSF leaks following complete calvarial reconstruction of craniectomies done for microvascular decompression (MVD) using calcium phosphate cement.

MVD is a very fruitful surgery and provides symptomatic relief in up to 95% of patients with trigeminal neuralgia. CSF leakage following MVD can be devastating. We commend the innovative idea of the authors in their efforts to reduce the incidence of CSF leaks following retrosigmoid craniectomy for MVD. The authors report on 221 patients who underwent retrosigmoid craniectomy for MVD to treat trigeminal neuralgia. Of 221 patients, 116 consecutive patients received polyethylene titanium mesh incomplete cranioplasty and the subsequent 105 patients received calcium phosphate for complete cranioplasty. They reported a statistically significant higher incidence of CSF leaks in the incomplete-cranioplasty group and no leaks in the calcium phosphate group. We would like to bring few important points in this article to the kind attention of the readers.

Dural closure was augmented with a collagen dural substitute, which was sutured to the dura and reinforced with collagen matrix and fibrin sealant. However, the article did not mention the number of patients in whom dural substitute was required for dural closure (in patients in whom primary dural closure was not possible) in each group, and this could be a cause of bias. Other causes of poor wound healing like diabetes, steroid use, and malnutrition were not evaluated and can be a very important cause of bias and need to be accounted for. Moreover, the rate of CSF leak reported in one of the largest series of MVD was 1.5%. There might be some other factors responsible for a high CSF leakage rate in the patients who received polyethylene titanium mesh–augmented incomplete cranioplasty (CSF leakage rate 4.5%). Hence, a randomized study to remove the confounding factors would be ideal to determine the superiority of one method of cranioplasty over other.

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References

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The authors report no conflict of interest.

Response
No response was received from the authors of the original article.
Endoscopic endonasal approach for clip ligation of cerebral aneurysms

TO THE EDITOR: We read with interest the article by Szentirmai et al.9 (Szentirmai O, Hong Y, Mascarenhas L, et al: Endoscopic endonasal clip ligation of cerebral aneurysms: an anatomical feasibility study and future directions. J Neurosurg 124:463–468, February 2016). The authors performed a cadaveric study on 9 specimens to study the vascular anatomy through the endoscopic endonasal approach. They also aimed to assess the possible maneuverability of anterior and posterior circulation vessels through the endoscopic approach to simulate the surgical treatment of aneurysms through the nose. They calculated the “maximal surgical corridor” areas and assessed the visibility of adjacent vessels and perforator anatomy. We would like to congratulate the authors for the selection of this interesting topic and performing this study and add several comments.

The authors calculated the maximal surgical corridor to approach different anatomical regions. It is not clear how they define the maximal surgical corridor. Although the anterior circulation vessels can be exposed through the transtubercular approach,2,5,10 we believe the area of exposure needs to be defined specifically for different surgical targets (i.e., aneurysm locations). Such definition should include clear anatomical landmarks as boundaries. Therefore, considering internal carotid artery (ICA) and anterior communicating artery (ACoA) aneurysms in a single surgical area seems an oversimplification. Exposure of the clinoidal segment of the ICA and the ophthalmic artery complex requires a different trajectory from that of the ACoA complex.43 This is exceptionally important in endoscopic endonasal approaches (EEAs), where the area of exposure needs to be as large as necessary and as small as possible to minimize the risks of a CSF leak while providing optimal results.

In the Results section, the authors state that “…anterosuperiorly projecting aneurysm dome would offer the most favorable access…best visualization of the aneurysm neck…perforators…and minimal risk of sac rupture.” We agree with the authors that anterosuperiorly projecting aneurysms of the ACoA complex would be good candidates for clip ligation through an EEA. An EEA provides ample midline exposure along the tuberculum sellae and does allow control of adjacent structures like the optic chiasm. Also, there may be no need to resect the gyrus rectus to expose the aneurysm, as there may be in open surgery.12 However, we cannot see the link between the methods and results of the study and such an interpretation of the results. The effect of expected anatomical variations, such as the pre-fixed optic chiasm and midline position of the anterior bend of the ICA (known as kissing carotids), may be decisive in defining the capabilities of the EEA in treating aneurysms. We believe that these anatomical features need to be included when assessing the role of the EEA in cerebrovascular surgery. It is important to note that in a cadaveric study, one cannot assess the risk of the sac rupture because there isn’t a method to provide such evidence yet.

We believe that the exposure of an artery does not necessarily mean ample exposure of the aneurysm. For example, the authors mention that for ophthalmic artery aneurysms, an ophthalmic artery with medial origin can be exposed through an endoscopic endonasal corridor. However, one cannot be certain that an aneurysm is safely exposed through this route. While we agree with the authors that “patient series are needed to clarify the safety of endoscopic endonasal corridor” for aneurysm surgery, we think that multiple cadaveric studies are needed to define the advantages and disadvantages of this approach for every possible aneurysm location. Such studies need to compare the classic transcranial approach(es) used for each specific aneurysm with the tailored alternative EEA in terms of instrument maneuverability, perforator exposure, extent of proximal and distal vessel control, and possible risks to the neural structures. Without these investigations, it seems too unsafe to proceed with case series in which the EEA is used for aneurysm clipping, because there is little scientific evidence to base the indications for the use of the EEA for each particular aneurysm. Such studies have been performed to compare different transcranial approaches3,6,11 and are also in evolution for the comparison of the EEA with transcranial approaches to address specific pathologies in specific locations. There are also several studies that evaluate the role of EEAs in cerebrovascular surgery.2,7,8,10 We think that more work still needs to be done to further delineate this role, especially as compared to the classic transcranial routes.

The authors stated that the EEA exposures gave them sufficient space to deploy 2–3 clips in different vascular areas. We agree that the ability to place a clip (temporary or permanent) is very important in aneurysm surgery, especially when it is done through an endoscopic endonasal route, but we strongly believe that the fact that the surgeon is able to apply a clip does not mean that exposure is satisfactory for aneurysm clipping. The distance of the vessel “exposed” needs to be compared to the distance between the proximal and distal locations of the clips that can be safely applied to evaluate the surgeon’s ability to maneuver through that specific corridor. In our opinion the safety of clip application (i.e., one with adequate visualization of the target vessel, surrounding perforators, and clip tongs during placement) is as important as the ability to apply it. An EEA offers good visibility; however, we still do not know how much we can exactly do through that approach for different targets. In addition, the implicit limitation of the cadaveric model does not allow the placement of clips simulating a real-life scenario, as the absence of the aneurysm leads to overestimation of the results. In our opinion, targeted cadaveric studies on each aneurysm location and feature are required before reaching conclusions on the feasibility or role of the EEA in cerebrovascular surgery.

The authors propose that angled endoscopes provide “a special opportunity for visualizing perforating arteries.” We agree completely with this statement. However, regarding the endonasal approaches, it needs to be clarified that better visualization does not always equal better maneuverability. Although angled endoscopes allow the surgeon to see through steep corridors and corners, the current endoscopic instrumentation is limited in terms of maneuverability around the corners of the surgical corridor.