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Video Abstract

Superficial temporal artery-superior cerebellar artery bypass and direct clipping of a large unruptured superior cerebellar artery aneurysm through subtemporal approach: Surgical video

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ABSTRACT

Background: Superior cerebellar artery (SCA) aneurysms are rare. Current treatments include: direct clipping, trapping ± bypass, and endovascular methods (coiling, stenting, or flow diversion). Due to specific characteristics (wide base, location, and shape), a major challenge while dealing with SCA aneurysms is to preserve the flow of the parent artery and perforators. This video demonstrates a revascularization procedure, and clip reconstruction of a large unruptured basilar artery (BA)/SCA aneurysm performed through the subtemporal approach.

Case Description: A 60-year-old woman presented with dizziness and headaches. Computed tomography angiography (CTA) and digital subtraction angiography showed a right unruptured large BA/SCA aneurysm. After multidisciplinary discussion, and considering gender, age, risk factors of the patient. Endovascular treatment was considered with a high risk of ischemic complications. Therefore, the patient was consented for a superficial temporal artery (STA)-SCA bypass through subtemporal approach followed by direct clipping/trapping of the aneurysm. Postoperative CTA showed occlusion of the aneurysm and patency of the parent vessels. Postoperatively, the patient experienced immediate transient left mild monoparesis and right IV nerve palsy, which recovered completely at 6-months follow-up.

Results: Surgical treatment of SCA aneurysms is decreasing due to the existence of endovascular therapies such as stents and flow diverters. However, some cases may necessitate surgical treatment and revascularization procedures to maintain the blood flow of the parent artery and to treat the previous lesion.

Conclusion: The STA-SCA bypass through the subtemporal approach is a feasible option to maintain the blood flow of the parent artery in cases of SCA requiring surgical treatment and trapping/direct clipping of the aneurysm.

Keywords: Aneurysm, Bypass, Subtemporal approach, Superficial temporal artery/superior cerebellar artery

INTRODUCTION

Superior cerebellar artery (SCA) aneurysms are rare.[7] Current treatments include: direct clipping, trapping ± bypass, and endovascular methods (coiling, stenting, or flow diversion).[1,3-5] Due to specific characteristics (wide base, location, and shape), a major challenge while dealing with SCA aneurysms is to preserve the blood flow of the parent artery and perforators. This video demonstrates a revascularization procedure and clip reconstruction of a large unruptured SCA aneurysm performed through the subtemporal approach without requiring an anterior petrosectomy.

CASE DESCRIPTION, (MULTIMEDIA 1) SURGICAL TECHNIQUE, AND OUTCOME

A 60-year-old right-handed woman presented with dizziness and headaches for approximately 2 months. Previous health history includes current smokers and hypertension. The patient underwent computed tomography angiography (CTA) and digital subtraction angiography (DSA) that showed a right unruptured SCA aneurysm measuring approximately 13 mm in maximum diameter and associated with bilateral hypoplastic P1 arteries. This aneurysm projected laterally had a wide base and it was highly positioned into the interpeduncular cistern. we offered treatment to this aneurysm, considering gender, age and risk factors of the patient (Hypertension and smoker). Endovascular treatment was considered with high risk of ischemic complications. Therefore, the patient was consented for a superficial temporal artery (STA)-SCA bypass through the subtemporal approach followed by aneurysm occlusion.

The patient is placed on the left side park-bench position. Then, a lumbar drainage is placed until obtain approximately 50–100 ml of cerebrospinal fluid (CSF) to decrease the risk of injuring the temporal lobe while mobilizing it. A straight skin incision followed the course of the parietal branch of the STA; then, it curved posteriorly above the earlobe. The main goal is to obtain approximately 7–8 cm of STA graft as donor graft. After dissecting the parietal branch of the STA, the temporal muscle is detached and retracted anteriorly and inferiorly until expose the root of the zygoma and the spine of Henle. A subtemporal craniotomy is performed, as described previously.[2,6] Additional CSF is released by opening the ambient cistern, while dissecting the arachnoid layer, the trajectory of the right P2, right IV cranial nerve (CN), and right SCA (lateral mesencephalic and anterior mesencephalic segments) are evident [Figure 1]. The tentorium is cut to increase the surgical space and to achieve proximal control toward the basilar artery (BA) for further manipulation of the aneurysm.[3] The parietal branch of the STA is anastomosed end-to-side to the right SCA (lateral mesencephalic segment) using running stitches of 9–0 nylon. Under neuromonitoring a temporary clip is placed on the BA and right P1. Then, the aneurysm sac is inspected to achieve trapping or direct clipping of it. By this stage, we could visualize a thick aneurysm wall with atherosclerosis. However, our trapping strategy in this particular case was considered at risk of injuring the perforators arising from interpeduncular zone of the SCA.

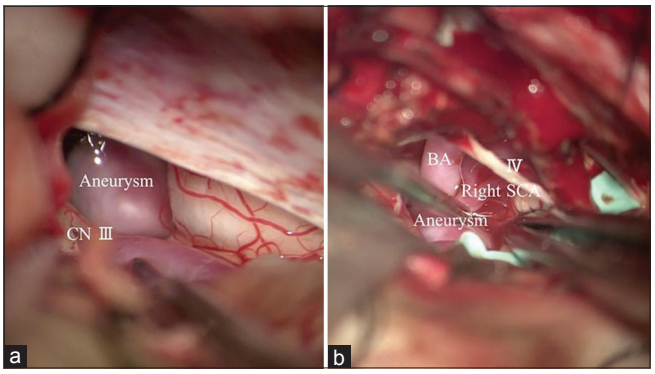

Figure 1: (a) Right subtemporal exposure showing the aneurysm sac and trajectory of the right III cranial nerve (CN). (b) Right subtemporal exposure after dividing the tentorium, showing aneurysm sac, right superior cerebellar artery, basilar artery, and trajectory of right IV CN.

Therefore, after trying to re-shaping the aneurysm with bipolar coagulation, we proceed with direct clipping using two titanium clips. Indocyanine green video angiography was used to verify the patency of the bypass graft, perforators, and exclusion of the aneurysm.

Postoperative CTA showed occlusion of the aneurysm and patency of the parent vessels. Postoperatively, the patient experienced immediate transient left mild monoparesis and right IV nerve palsy; however, magnetic resonance imaging diffusion and perfusion images did not show any signs of ischemic event. At 6-months follow-up, the patient has no neurological deficit and the IV CN palsy recovered completely. DSA at 6-months showed patency of the STA-SCA bypass and aneurysm obliteration.

CONCLUSION

Microsurgical treatment of SCA aneurysms is decreasing due to the existence of endovascular therapies such as stents and flow diverters. However, some cases may necessitate surgical treatment and revascularization procedures to maintain the blood flow of the parent artery and to treat the previous lesion. The STA-SCA bypass through the subtemporal approach remains as a feasible option to maintain the blood flow of the parent artery in cases of SCA requiring surgical treatment and trapping/direct clipping of the aneurysm.

Multimedia 1: Clipping of a right unruptured superior cerebellar artery (SCA) aneurysm and superficial temporal artery to SCA bypass through the subtemporal approach video is accessible from the portal.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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