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CASE REPORT

Paramedian Supracerebellar Infratentorial Approach for Clipping a Ruptured Aneurysm in the Cerebellomesencephalic Segment of the Left Superior Cerebellar Artery: A Case Report

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Superior cerebellar artery (SCA) aneurysms are rare, especially for those arising from the distal portion of the SCA. In this study, we presented a case of a ruptured aneurysm arising from cerebellomesencephalic segment of the SCA. A woman with severe headache and neck stiffness had a ruptured aneurysm arising from cerebellomesencephalic segment of the left SCA. Treated successfully with left-sided paramedian supracerebellar infratentorial (SCIT) approach for clipping the aneurysm with a sitting position, discharged after 14 days without neurological deficit. SCA aneurysms can be managed by endovascular coiling or microsurgical clipping. Although both modalities pose risks of damaging the brainstem perforators, the incidence of the SCIT approach is low since it is exposure from laterally to medially and from distal to proximal along the course of SCA. In our viewpoint, the paramedian SCIT approach is a safe and effective treatment for clipping aneurysms arising from the distal portion of the SCA.

Key words: Supracerebellar infratentorial, superior cerebellar artery, aneurysm

INTRODUCTION

Superior cerebellar artery (SCA) aneurysms, which are usually grouped with aneurysms arising from posterior circulation, account for 1.8% of all intracranial aneurysms. Among them, those arising from the distal portion of the SCA are extremely rare, with a reported incidence of 0.2% of all intracranial aneurysms.[1] Because of few reported studies, the management strategy of aneurysm arising from the distal portion of the SCA is not well described. We reported one ruptured aneurysm in cerebellomesencephalic segment of the left SCA treated successfully through the paramedian supracerebellar infratentorial (SCIT) approach and microsurgical clipping.

CASE REPORT

A 65-year-old woman visited the emergency department because of a severe headache and neck stiffness. Computed tomography (CT) of the brain revealed diffuse subarachnoid hemorrhage in basal cisterns, especially left-sided ambient cistern [Figure 1]. Diagnostic cerebral angiography and magnetic resonance imaging disclosed a 3-mm saccular aneurysm in the cerebellomesencephalic segment of the left SCA [Figures 2 and 3]. As the lesion was located near the junction between the ambient and quadrigeminal cisterns, a paramedian SCIT approach was scheduled for aneurysm clipping.

The patient was placed in the sitting position with slight neck flexion. A vertical incision of 7 cm was incised equally distant from the external auditory canal and midline. After completing the soft-tissue dissection, a rectangular suboccipital craniotomy was drilled. The boundaries of the bone flap were the superior margin of the transverse sinus superiorly, foramen

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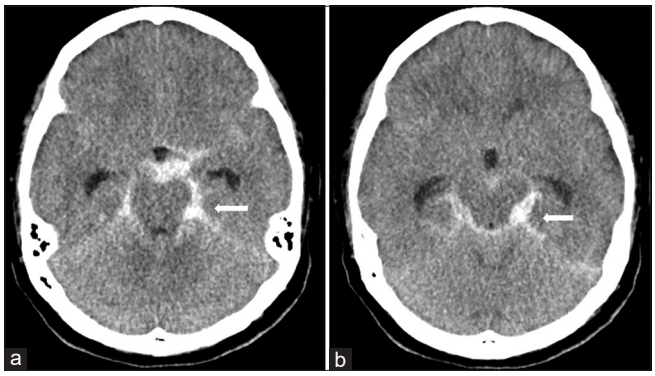

Figure 1: A noncontrast computed tomography scan of the patient's brain revealed diffuse subarachnoid hemorrhage (a) in both Sylvian fissures; the suprasellar, ambient cisterns, and cerebellopontine angle cisterns; and the 3rd and 4th ventricles, especially accumulating in the left ambient cistern (arrows) (b)

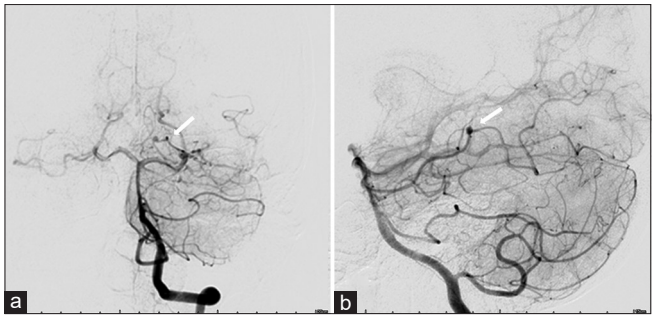

Figure 2: Antero-posterior (a) and lateral (b) preoperative digital subtraction angiography images disclosed a 3-mm aneurysmal dilatation in the cerebellomesencephalic segment of the left superior cerebellar artery (arrows)

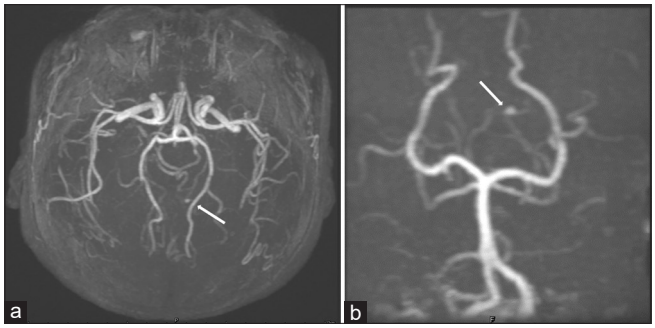

Figure 3: Axial (a) and coronal (b) magnetic resonance angiography images depicting an aneurysmal dilatation in the cerebellomesencephalic segment of the left superior cerebellar artery (arrows)

magnum inferiorly, and keeping the width as wide as possible bilaterally. The dura was opened and reflected superiorly as a single curved flap based on the transverse sinus. After that, the cisterna magna was opened to allow cerebrospinal fluid drainage while entering the SCIT space, the bridging vein were coagulated and cut for downward mobilizing the cerebellum and establishing a sufficient working space. Further dissection along the SCIT space led to the incisural space. Next, the cerebellomesencephalic fissure was opened for exposing the hidden neurovascular structures. Importantly, choosing the direction of dissection, from laterally to medially, permitted early exposure of the cerebellomesencephalic segment of the SCA and proximal control of the ruptured aneurysm. Further dissection along the course of SCA led to identifying the proximal and distal neck of aneurysm, and the aneurysm was clipped using one titanium clip.

After surgery, the patient experienced transient short-term memory loss, which diminished approximately 2 weeks later. Postoperative CT angiography revealed no residual aneurysm in the cerebellomesencephalic segment of the left SCA [Figure 4].

DISCUSSION

The natural history of SCA aneurysm is more aggressive than other cerebral aneurysms. It has a higher rupture rate than other cerebral aneurysms of similar size, and the mean size of ruptured SCA aneurysm is 4.6 mm. Hence, it can be inferred that SCA aneurysms rupture earlier in the disease course.[1,2]

The SCA can be divided into four segments: the anterior pontomesencephalic (S1), lateral pontomesencephalic (S2), cerebellomesencephalic (S3), and cerebellar cortical (S4) segments, belonging to the interpeduncular, crural, ambient, and quadrigeminal cisterns, respectively. Determining the optimal approach for clipping the SCA aneurysm is dependent on the location of the lesion. In our case, the SCA aneurysm was located in the junction between the ambient cistern and the quadrigeminal cistern. Surgical approaches commonly used for the pathogen in the ambient cistern include the subtemporal, transtemporal–transchoroidal, occipital interhemispheric, and SCIT approaches.[3] The SCIT approach is used for aneurysms located in the distal portion of the SCA, and it provides wider infratentorial exposure than other transcranial approaches.[3,4] The sitting position combined with a SCIT approach promotes cerebellar relaxation and sagging. The maneuver provides minimal brain traction in reaching the incisural space. However, this approach increases the risks of air embolisms and surgeon arm fatigue, and may require an extensive intraoperative monitoring, such as transesophageal echocardiography, compared with other approaches.[5] SCIT approach with microsurgical clipping of the SCA aneurysms is a safe procedure once performed under the experienced hand of the neurosurgeon.

On the other hand, endovascular coiling is also a feasible treatment for SCA aneurysms. In this case, the neck of the aneurysm could not be defined easily. Such undefinable or wide neck, typical expression of aneurysm arising from the distal portion of the SCA, is not amenable to endovascular treatment.[6]

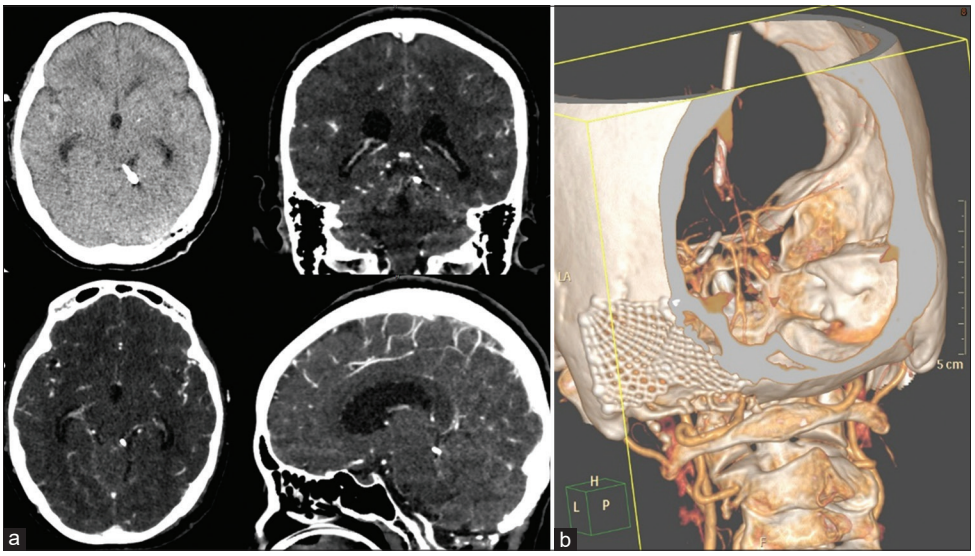

Figure 4: Postoperative computed tomography angiography (a) and 3D reconstruction (b) revealed the clip retention with no residual aneurysm in the cerebellomesencephalic segment of the left superior cerebellar artery, with preservation of the parent artery and vermian branch

The course of SCA is related to the oculomotor, trochlear, and trigeminal nerves, and it contains several perforators to the brainstem, especially the lateral pontomesencephalic and cerebellomesencephalic segments. Periprocedural perforator infarction and brainstem stroke may be induced when a wire and catheter are guided through these segments.[7,8]

Ischemic complications in the cerebellum and vermis region appear unlikely because of ample collateral flow between the SCA and the anterior inferior and posterior inferior cerebellar arteries.[9] Hence, microsurgical clipping the SCA aneurysms is a safe procedure to perform. When such clipping is not possible, as with fusiform aneurysms, simultaneous clipping of the aneurysm and the parent artery can be considered. The outcome is usually satisfactory because of the abundant collateral blood flow restricting the extent of ischemia.[10] In conclusion, we think that the paramedian SCIT approach is a safe approach for clipping the aneurysms in the cerebellomesencephalic segment of the SCA.

CONCLUSION

SCA aneurysms can be managed by endovascular coiling or microsurgical clipping. Although both modalities pose risks of damaging the brainstem perforators, the SCIT approach has relatively low incidence due to its direction of vessel dissection, from laterally to medially along the course of SCA. It rarely irritates the perforator to the brainstem. In our viewpoint, the paramedian SCIT approach is a safe and effective treatment for clipping aneurysms arising from the distal portion of the SCA.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

Data availability statement

The data that support the findings of this study are available from the corresponding author, Dr. Lin, upon reasonable request.

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Nil.

Conflicts of interest

Dr. Dueng-Yuan Hueng, an editorial board member at *Journal of Medical Sciences*, had no role in the peer review process of or decision to publish this article. The other authors declared no conflicts of interest in writing this paper.

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