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Case Report

Biogluce endovascular treatment of fusiform aneurysm rupture of the distal anterior temporal artery of the middle cerebral artery: a case report ☆,☆☆

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ABSTRACT

The treatment of a ruptured fusiform distal anterior temporal artery aneurysm is a challenge for the stroke physician, however surgical closure and coil endovascular intervention are options. A total blockage can result in memory problems as well as object-related questions. We'd like to provide the clinical example of a 56-year-old woman with many underlying medical illnesses who was admitted to the hospital with a grade 7/10 headache and a Glasgow score of 15, but no focal neurological deficits, and was diagnosed with a ruptured distal temporal artery aneurysm. The aneurysm is positioned in the distal region, making endovascular intervention difficult to perform. As a result, we used an endovascular approach to repair with biogluce. When a patient develops fusiform aneurysms of the distal temporal artery, our findings provide an additional therapy option.

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Introduction

Aneurysm rupture is a life-threatening condition requiring emergency medical treatment. Brain aneurysm occurs mostly

in the middle cerebral artery (MCA) [1]. Additionally, the aneurysm percentage in the distal branches are significantly lower than in the proximal branches [2]. In term of aetiology, distal cerebral artery aneurysm can be a complication of infection after mycotic emboli, brain trauma, and so on [3,4].

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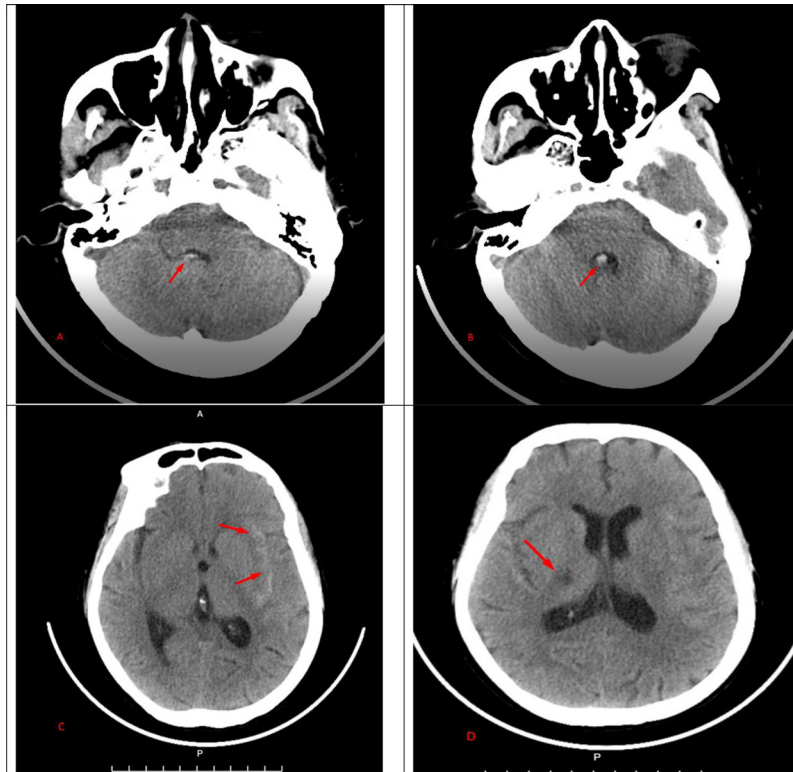


Fig. 1 – Non contrast CT scan revealed fourth intraventricular hemorrhage (arrows in A and B), subarachnoid hemorrhage between cerebral sulci and left Sylvian fissure (arrows in C), old right cerebral infarct (arrow in D).

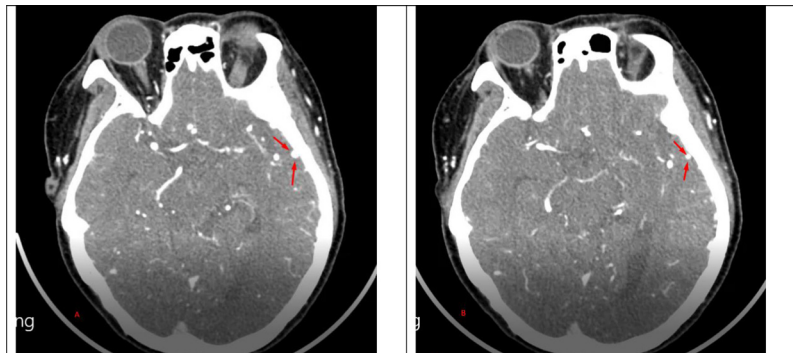


Fig. 2 – CTA revealed an aneurysm in anterior temporal artery which is a branch of left middle cerebral artery.

Occluding the anterior temporal artery (ATA) might not have any clinical neurological deficit, and it can be utilized as a potential donor in the intracranial-intracranial bypass procedure [5]. However, recent studies show that acute stroke in the ATA is able to damage auditory comprehension and object naming tasks [6]. Fusiform distal anterior temporal artery aneurysm case reports and study are relatively uncommon. As a result, we present the following scenario.

Case report

A 56-year-old woman has a history of a completely recovered stroke 20 days ago, lupus systemic erythematosus, osteoporosis, and hypertension. Her medication history includes Medrol 4 mg x 1 capsule per day and Betaloc 50 mg x 1 capsule per day. At 2:30 PM on November 26, 2021, the patient suddenly experienced a severe headache, nausea, and vomiting. She was

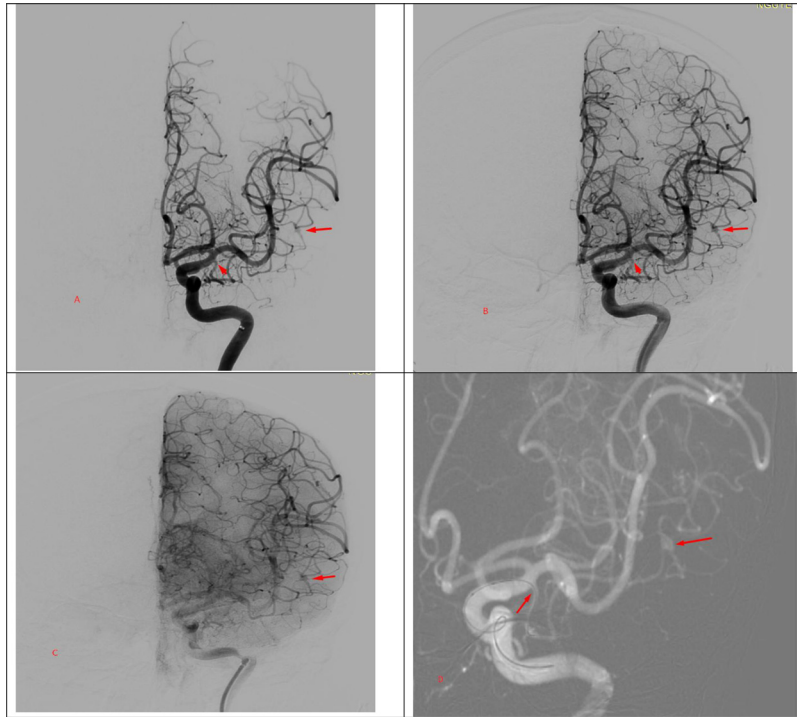


Fig. 3 – Fusiform aneurysm and left anterior temporal artery on AP image (A, B, C) and lateral image (D).

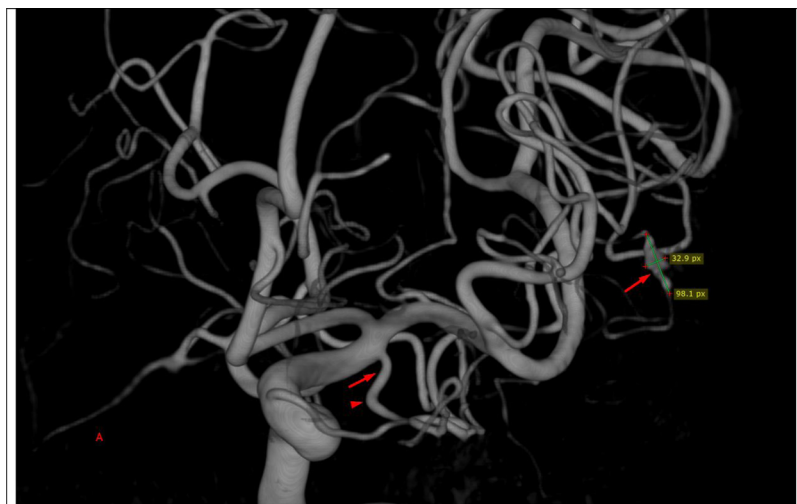


Fig. 4 – 3D DSA of left internal carotid artery (LICA) determined the size of aneurysm. DSA, digital subtraction angiography.

then admitted to a provincial general hospital. Upon examination, the patient had a Glasgow coma score of 15 (GCS), no extremity paralysis or dysphasia, and sphincter muscle weakening. However, she got a 7/10 on the Visual Analogue Scale (VAS) score, nausea, and stiff neck. Her blood pressure was 180/110 mmHg. Her pulse rate and oxygen saturation were within the normal range. There was no crackle in her lungs. In the investigation, her results of blood tests, liver and kidney function tests, and basic coagulation tests were normal. The cerebral vascular Multislice Computer Tomography (MSCT) revealed an aneurysm in the left anterior temporal artery, temporal lobe

subarachnoid hemorrhage, interpenduncular cistern hemorrhage, and a fourth intraventricular hemorrhage (Fisher IV) (Figs. 1 and 2).

The patient was diagnosed with subarachnoid hemorrhage due to aneurysm Fisher 4 and transferred to Bach Mai hospital at 9:39 PM on the same day. After getting consultation from the Radiology Center, the patient got digital subtraction angiography. Afterward, we decided to treat the patient with Onyx to occlude the aneurysm (Figs. 3 and 4). Because the aneurysm was at risk of rebleeding, we decided to access the super selective aneurysm by microcatheter SONIC 1.2f with the sup-

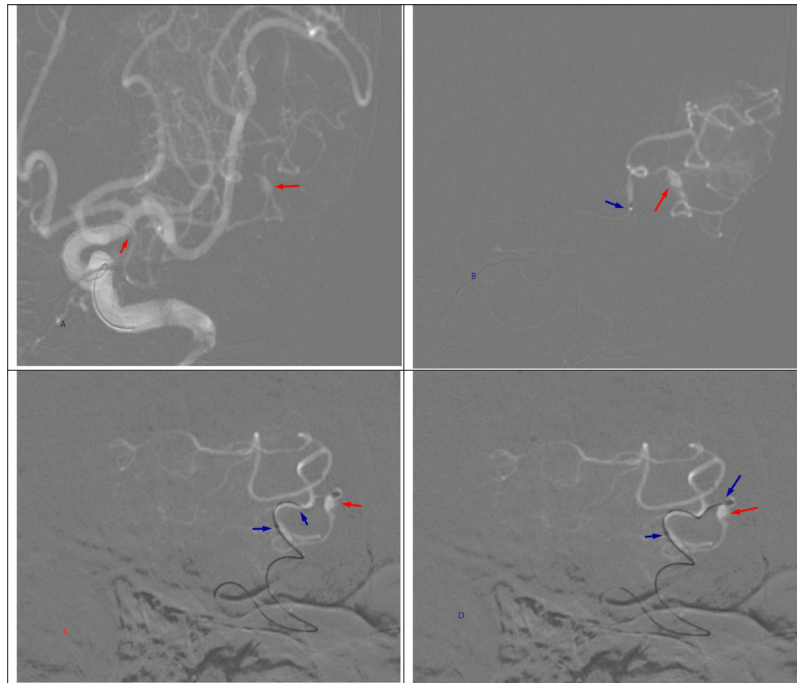


Fig. 5 – Super selective approach to the aneurysm by microcatheter SONIC and Wire (A, move the wire through the catheter. B: blue arrows point to microcatheter, red arrow points to aneurysm. C and D: approach to the parent branch selectively).

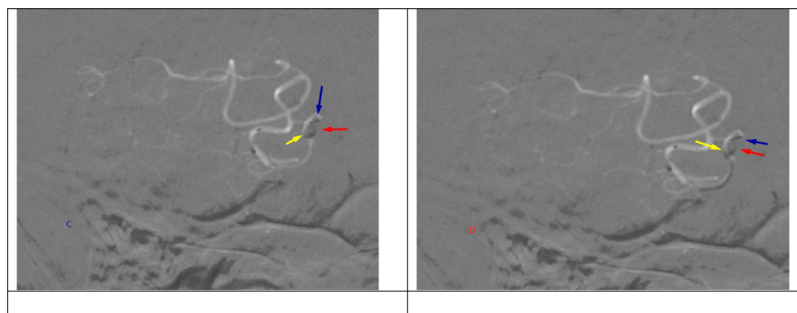


Fig. 6 – Pumping biogluce to the aneurysm (C: red arrows point to aneurysm, blue arrows point to microcatheter, yellow arrows point to biogluce). D show there is a part of reflexed biogluce.

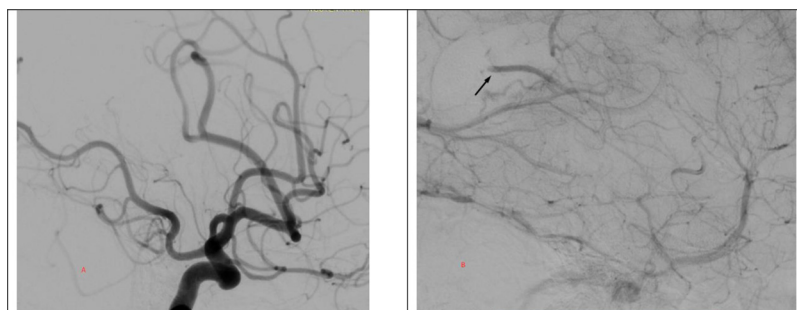


Fig. 7 – The angiography show the occlusion at the left terminal branch M4 (A, B). The black arrow in B points to thrombosis at the left terminal branch M4.

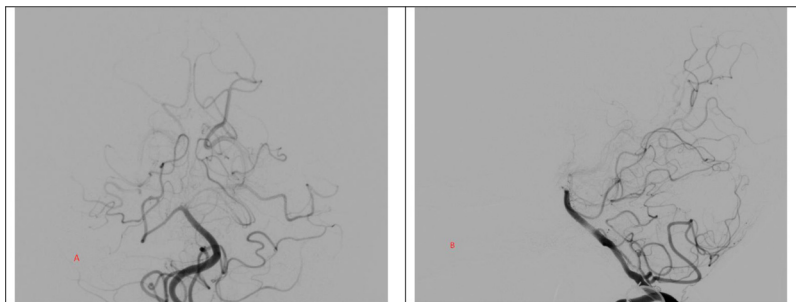


Fig. 8 – Taking the angiography to check vertebral and basal arteries.

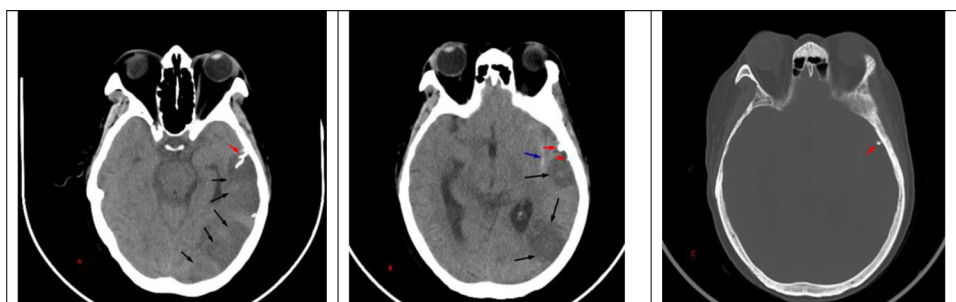


Fig. 9 – Non contrast CT scan (A, B, C: red arrows point to aneurysm occluded completely by biogluce, black arrows point to old cerebral infarct, blue arrows point to the reduction of hemorrhage between cerebral sulcus and Sylvian fissure).

port of wire to approach the parent artery of the aneurysm (Fig. 5), then occlude both the parent artery and aneurysm by biogluce at a 1:3 rate. During pumping, there was a little reflection that occluded the remaining branches (Fig. 6). Upon examination after that, the patient was conscious and had a GCS of 15. There was no paralysis, no dysarthria, no weak sphincter muscles. Left internal carotid angiography after the procedure showed that the aneurysm and the terminal branch were completely occluded with thrombosis in the left terminal branch M4 (Fig. 7). Vertebral arteries were perfused well in the angiography (Fig. 8). Three days later, an MSCT for the skull vessel was taken and showed complete occlusion of the aneurysm, infarction in the anterior and posterior temporal areas, and left parietal-occipital area (Fig. 9). The clinical examination found nothing abnormally: 15 points on GCS, no paralysis, no language dysfunction, no sphincter muscle disorder. She was discharged in the next 2 days.

Discussion

The MCA is the largest branch with the most complicated structure compared to the other two intracranial arteries. The MCA is divided into four segments: M1 segment extends from the ending of the internal carotid artery; M2 segment travels to the Sylvian fissure, and their branches end in the cerebral cortex; M3 segment is from the insula into the cortex; and M4 segments extend from the Sylvian fissure to the cortex [7]. The M1 segment includes small penetrating branches which supply gray nuclei in the medial anterior-superior area

while the ATA usually goes to the anterior-inferior surface. According to research, the ATA originates from the distal part of the M1 segment in a common trunk and gives a branch with the temporo-occipital artery as well as sub branches in 79% of cases [8]. The ATA was previously used as a donor for bypass treatment in M1 segment aneurysms, as well as completely occluded for bleeding control prior to meningioma surgery [5]. Recently, ATA infraction or donating ATA for surgery has been linked to disruptions in comprehension and object naming tasks [6].

Using cutting-edge imaging techniques such as MRI and MSCT, we can get the best view of the cerebral arteries. Additionally, we can assess the pathophysiology, clinical symptoms and signs, and imaging characteristics of fusiform aneurysm treatment. Our patient had a variety of historical diseases: lupus systemic erythematosus was treated with medications for a long time, prior to the cerebral infarction, which recovered completely. A research result showed that 3%-20% of patients with lupus systemic erythematosus could acquire lesions related to intracranial arteries such as cerebral infarction, cerebral venous thrombosis, or aneurysm rupture [9].

Intracranial fusiform aneurysms without any symptoms can damage the midea layer and the endothelium. There is no treatment guideline for fusiform aneurysms from the anterior circulation. Patients can have symptoms of cerebral infarction, intracranial hemorrhage, or venous thrombosis [10,11]. One of the etiologies for fusiform aneurysm is vasculitis disease in patients with Systemic Lupus Erythematosus (SLE) [12]. Vasculitis is a trigger factor that causes vascular dissection and hemorrhage between the middle layer and endothe-

lium. This leads to symptoms of infarction or hemorrhage. At the moment, there is no guideline for management following treatment for fusiform aneurysm in the anterior circulation. However, there are some case reports about treatment methods, including follow-up for a long time, surgery (vascular clamping), and endovascular treatment (stent, balloon-assisted coils, parent artery occlusion). A case was reported of treating an anterior temporal aneurysm by coils [13]. Until now, we can not find any case in which an anterior temporal aneurysm was treated with bioglu. Our patient was a middle-aged woman with a history of SLE who presented with a ruptured fusiform aneurysm. After carefully consulting her condition, we decided to use endovascular treatment with bioglu.

With the advancement in endovascular intervention recently, using biomaterials such as coils, bioglu, or stents gives doctors more options to treat cerebral aneurysms and limit invasion minimally. Therefore, we can limit brain tissue damage and infection issues that might occur in an open craniotomy. Besides, using a balloon to occlude the parent artery for fusiform aneurysm in the internal carotid artery was reported [14]. However, in our case, the aneurysm was located in the distal part of the body, where catheters to drop coils, stents, or balloons were difficult to approach. Hence, combining microcatheter and guidewire 0.08 was the only way to access the aneurysm and pump bioglu.

Conclusion

We report a case of fusiform anterior temporal artery aneurysm from the middle cerebral artery that was successfully treated by endovascular technique with bioglu. The aneurysm was located in the distal part of the body where other endovascular techniques barely approached. After the intervention, the patient recovered completely without local neurological signs and the hemorrhage condition was controlled. Treatment for fusiform anterior temporal aneurysm should be sufficiently assessed by long-term research.

Author contribution

All authors read and approved the final manuscript.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Patient consent

Written informed consent was obtained from the patient for publication of the case details. Patient and her family members accepted to use her figures in our report.

Data availability statement

All data generated or analysed during this study are included in this article [and/or] its supplementary material files. Further enquiries can be directed to the corresponding author.

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