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The aneurysm close to the skull base was wiped off by bone subtraction on 3D CTA images **FREE**

Ling He; Zhonghua Li 



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The Aneurysm Close to the Skull Base was Wiped Off by Bone Subtraction on 3D CTA Images

Ling He¹ and Zhonghua Li^{2, a)}

¹*Department of Neurology, Qiannan People's Hospital, Duyun 558000, China*

²*Department of Neurosurgery, the Third Affiliated Hospital of Guizhou Medical University, Duyun 558000, China*

^{a)}Corresponding author: 80682749@qq.com

Abstract: An old woman presented with a hematoma in the right frontal gyrus rectus, hematocele in ventricles and subarachnoid space on Computed tomography imagings(CT). Three-dimensional bone subtraction computed tomography (3DBSCTA) was performed with a 16 slices multidetector-row CT scanner applying the volume rendering technique and a saccular aneurysm located on the A2 segment of the right cerebral anterior artery was revealed. The aneurysm was clipped with a right pterional craniotomy. Another fusiform aneurysm of the right orbital frontal artery was found accidentally in surgery. The aneurysm was not shown on the three-dimensional computed tomography (3DCTA) imagings with bone subtraction. The case merits attention, because missed diagnosis of the aneurysm close to the skull base was attributed to bone subtraction on 3D CTA images, which has not been reported.

INTRODUCTION

3DBSCTA is widely used as the first-line method for detection of intracranial aneurysms, especially in acute patients with subarachnoid hemorrhage [1-4]. However, the conviction that conventional CTA without bone subtraction shows better diagnostic accuracy for the detection of intracranial aneurysms as compared to 3D CTA without bone subtraction [4-8]. The aim of this case report is not to ignore the vital function of conventional CTA without bone subtraction in detection of aneurysms which is close the skull base.

CASE PRESENTATION

A 60-year-old woman presented with a severe headache and vomit. Physical examination was negative. Hunt and Hess grading scale was II. Computed tomography imagings (CT) demonstrated a hematoma in the right frontal gyrus rectus, hematocele in ventricles and subarachnoid space. An anterior circulation aneurysm was considered, and three-dimensional bone subtraction computed tomography (3DBSCTA) was performed with a 16 slices multidetector-row CT scanner applying the volume rendering technique.

DIAGNOSIS

A2 Segment aneurysm of the anterior cerebral artery.

TREATMENT

A right pterional craniotomy was performed, and the aneurysm was clipped with a Yasargil titanium clip. Fortunately, another fusiform aneurysm of orbital frontal artery was found by accident. Some of the aneurysm wall was stained yellow, which means the aneurysm had ruptured before. The aneurysm was not shown on the three-dimensional computed tomography (3D CTA) imagings with bone subtraction. Finally, the aneurysm was also clipped.

OUTCOME AND FOLLOW UP

The 60-year-old woman is doing well after a 9-month follow-up visit. Retrospective study the clinical data of a case which has two intracranial aneurysms. And one of them, close to the skull base, was wiped off by bone subtraction on 3D CTA images. And review literature. Missed diagnosis of the aneurysm close to the skull base was attributed to bone subtraction on 3D CTA images, but not on conventional CTA imagings. Should mention Figure 1.

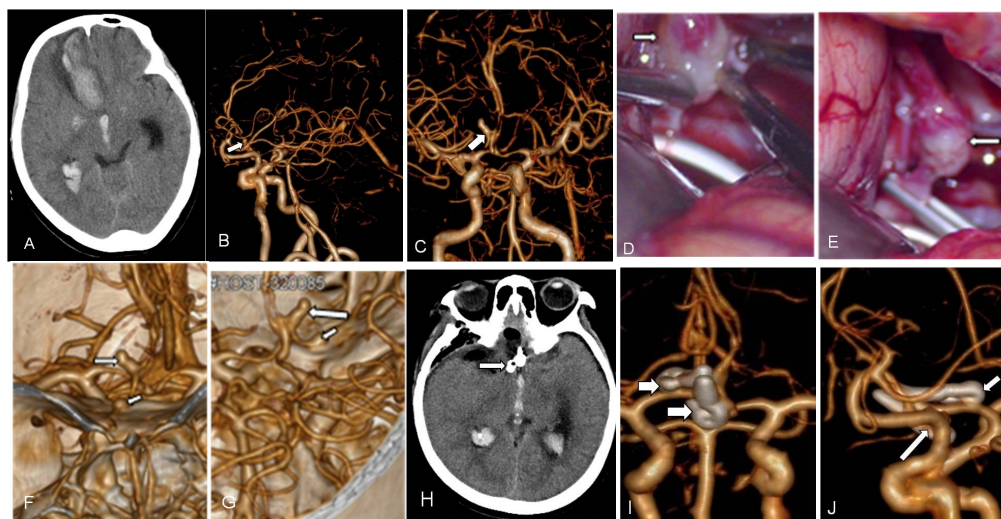


FIGURE 1. [A] Preoperative CT scan reveals a hematoma in the right frontal gyrus rectus, hematocoele in ventricles and subarachnoid space. On preoperative 3D CTA with bone subtraction imagings, anteroposterior; [B] and lateral [C] there is a saccular aneurysm located on the A2 segment of the right cerebral anterior artery (arrows). Intraoperative photographs; [D] and [E] demonstrate a fusiform aneurysm of orbital frontal artery and yellow arachnoid membrane on the aneurysm wall (arrows). On preoperative 3D CTA without bone subtraction imagings, anteroposterior; [F] and lateral [G] there are two aneurysms (arrows); [H] Postoperative CT scan shows the position of the two clips(arrow). On postoperative 3D CTA with bone subtraction imagings, anteroposterior; [I] and lateral [J] there are two clips (arrows) and no aneurysms were shown.

DISCUSSION

It is reported that the annual rate of intracranial aneurysm rupture is about 0.5-2% [9]. Thus, in these cases, making an accurate diagnosis is life-saving. Although DSA is still regarded as the gold standard, CTA has become significantly important to detect intracranial aneurysms in recent years. CTA is popularly used as an efficient imaging technique for examination of intracranial aneurysms in emergency cases. However, on the contrary, Kallmes *et al.* [10] quoted a false negative rate about 10%, leading to an additional 2.5 death per 100 patients with intracranial aneurysms because of re-hemorrhage from undetected aneurysms. To improve the sensitivity and specificity for detection of intracranial aneurysms, many methods, such as bone subtraction, was applied. At present, 3DBSCTA has been increasingly applied as the first diagnostic technique to detect intracranial aneurysms because of the disadvantages of digital subtraction angiography (DSA) and has demonstrated significantly better diagnostic accuracy as compared to conventional 3D CTA [11]. Many previous studies advocated the limitation of conventional non-bone subtraction in detecting and characterizing intracranial aneurysms at the level of the skull base [12-15]. However, the case we present points out the limitation of 3DBSCTA which made a missed diagnosis of a fusiform aneurysm of the right orbital frontal artery.

Our case merits attention, because missed diagnosis of the aneurysm close to the skull base was attributed to bone subtraction on 3D CTA images, but not on conventional CTA imagings, which has not been reported. Maybe the reason is that the characterization of the intracranial aneurysm is fusiform and close to the skull base.

CONCLUSIONS

Conventional CTA without bone subtraction has its own unique function, especially for fusiform aneurysms at the level of the skull base. To improve the accuracy of detection of intracranial aneurysms, organic combination of the two, three-dimensional bone subtraction computed tomography and conventional CTA without bone subtraction, should be further assessment.

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