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Case Report

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Symptomatic Ectopic Right Common Carotid Artery Stenosis Associated with the Hyoid Bone: A Case Report

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1. Abstract

1.1. Background: Ectopic carotid artery is a rare vascular malformation in which the vast majority of patients are asymptomatic. Most cases are discovered during physical examination. Symptomatic cases of severe ectopic carotid stenosis are rarely reported. Here, we present the effective surgical treatment of a rare case of an ectopic right common carotid artery associated with the hyoid bone, which was identified by ultrasound and CT angiography.

1.2. Case Description: A 68-year-old male patient was diagnosed with a right ectopic common carotid artery with hyoid-induced high stenosis. Ectopic common carotid artery free dissection and endarterectomy without hyoidectomy were performed. Postoperative CT angiography showed that the vascular lumen was unobstructed, and the right carotid artery returned to its natural anatomical position. The patient made a full recovery after surgery.

1.3. Conclusion: Surgical preservation of the hyoid bone is optional in cases of symptomatic ectopic carotid artery stenosis caused by the hyoid bone. Long-term observation is required for further assessment of efficacy.

2. Introduction

Ectopic carotid artery is a rare vascular malformation in which the vast majority of patients are asymptomatic. Most cases are discovered during physical examination [1]. Symptomatic cases of severe ectopic carotid stenosis associated with the hyoid bone are rarely reported. We still don't know the best way to treat these diseases. Conservative treatment or partial hyoidectomy are the most prevalent therapies for the ectopic carotid artery, according to published studies [2,3]. Here, we present the effective surgical treatment of a rare case of an ectopic right common carotid artery associated with the hyoid bone, which was identified by ultrasound and CT angiography.

3. Case Report

A 68-year-old man experienced transient intermittent dizziness and discomfort several times in the past month, which improved spontaneously. He had a ten-year history of hypertension and was receiving orally administered antihypertensive drugs, with his blood pressure under normal control. Before arriving at our hospital, the patient visited a local hospital. There, he underwent an ECG examination, as well as blood-lipid and blood-glucose tests. The results were all normal. Therefore, the patient was recommended to our hospital for vascular examination. Ultrasound examination of the cervical vertebral arteries displayed significant stenosis in the terminal segment of the right carotid artery, with a peak systolic velocity of 215 cm/s at the stenotic site and an estimated stenosis extent of over 75%. On this basis, CT angiography of the head and neck was recommended, and the result revealed that the distal segment of the common carotid artery was medial and posterior to the right hyoid bone (Figure 1A and Figure 2A), and there was a short segment of significant stenosis at the distal end of the ectopic right common carotid artery adjacent to the right hyoid horn (Figure 1A). After discussing the surgical indications with the patient and consulting with the otolaryngologist, consent for the operation was obtained. Surgical exploration and carotid endarterectomy were recommended, and hyoidectomy was to be considered if necessary.

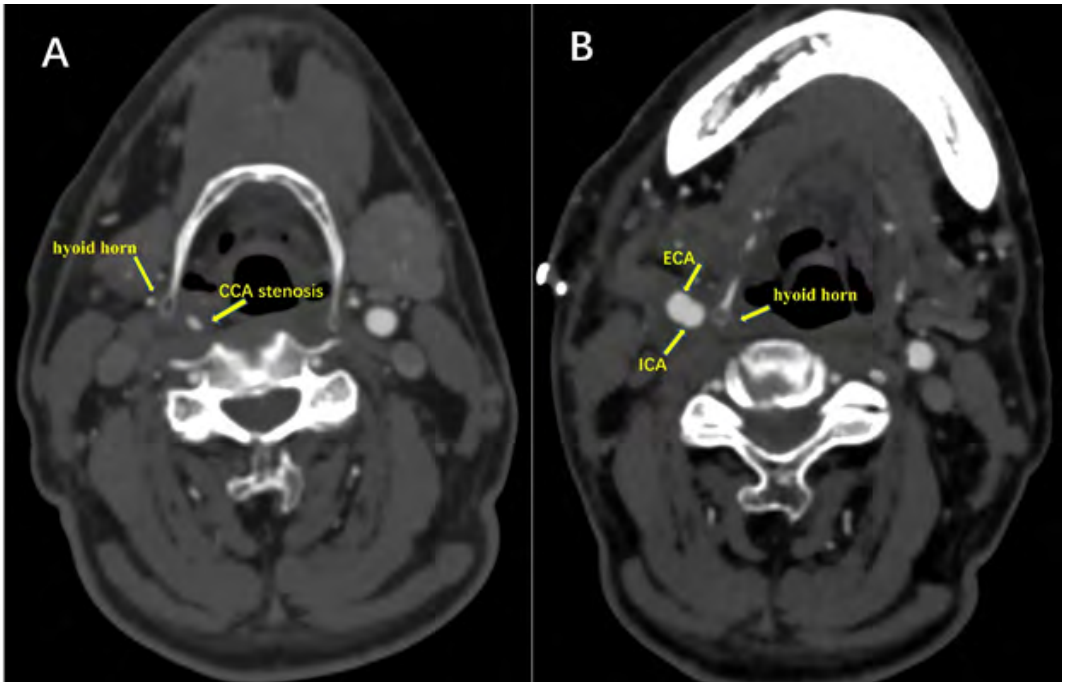

Figure 1: Preoperative and postoperative CT transverse view Changes in anatomical location between the right hyoid bone and carotid artery before (A) and after (B) surgery. (Common carotid artery, CCA; external carotid artery, ECA; Internal carotid artery, ICA).

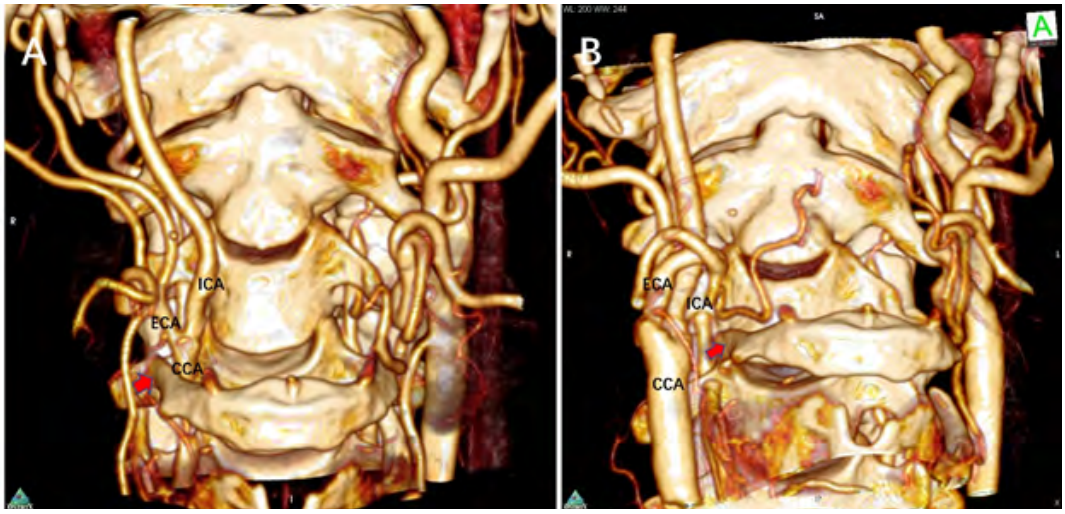

Figure 2: Preoperative and postoperative CT 3D reconstruction view Changes in anatomical location between the right hyoid bone and carotid artery before (A) and after (B) surgery. (Common carotid artery, CCA; external carotid artery, ECA; Internal carotid artery, ICA) (the red arrow points to the right greater hyoid horn).

4. Operation Procedure

Under general anesthesia, the patient was placed in the supine position, with his head tilted to the left. An 8 cm oblique incision was made at the medial margin of the right sternocleidomastoid muscle. The distal common carotid artery and carotid bulb were located medial and posterior to the right hyoid bone. A dense connection was generated between the hyoid bone and the common carotid artery at the high stenosis of the distal common carotid artery. The fibrous bands connecting the bone and surrounding vasculature were carefully dissected. Subsequently, the carotid arteries were detached from the hyoid bone. The patient's head and neck were then twisted to evaluate whether the arteries were loose and unrestrained. After consultation with an otolaryngologist, we determined that hyoidectomy was unnecessary as an alternative to carotid endarterectomy. After clamping the carotid arteries, longitudinal arteriotomy was performed, and a temporary shunt was used for endarterectomy with patch plasty (Figure 3). The patient had no postoperative complications, and his course remained uneventful during the hospitalization. Six months later, a CT scan revealed that the vascular lumen was unobstructed and that the right carotid artery had been restored to its natural anatomical position (Figure 1B, Figure 2B). There was no transient intermittent dizziness and discomfort after the operation.

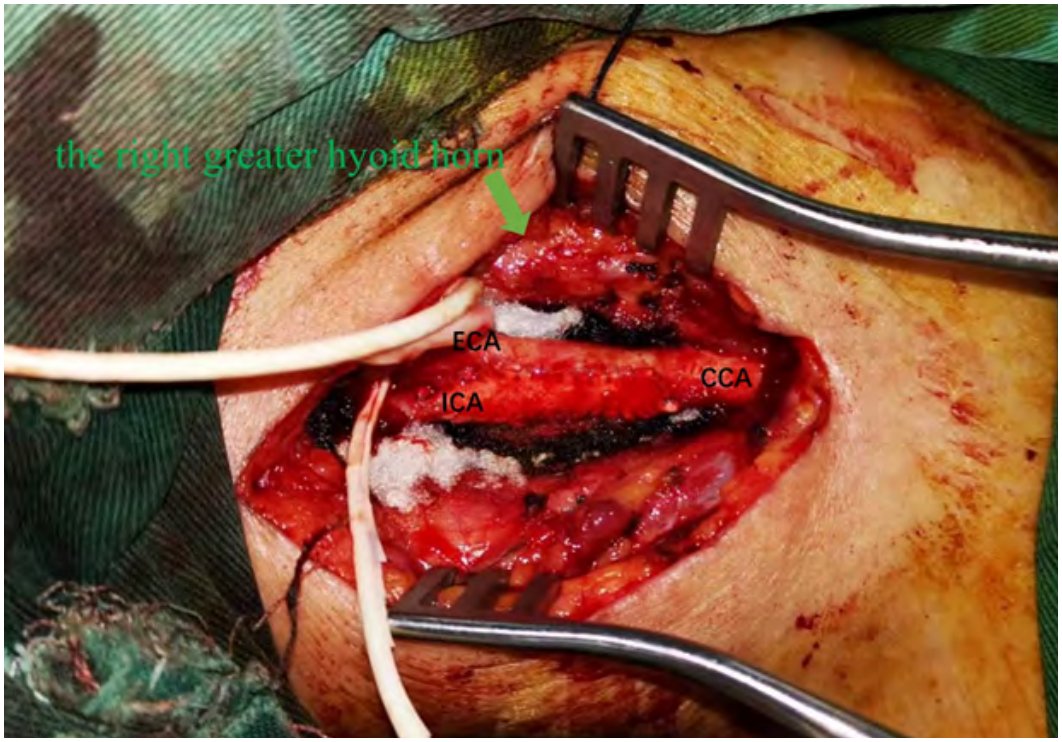

Figure 3: Intraoperative image. (Common carotid artery, CCA; external carotid artery, ECA; Internal carotid artery, ICA) (the green arrow points to the right greater hyoid horn).

5. Discussion

According to the majority of experts, atherosclerosis is the predominant cause of carotid artery stenosis. However, carotid artery stenosis related to the hyoid bone is rare. In our case, the distal carotid artery was located posteromedial to the right hyoid bone, with focal stenosis at the great horn lever. Therefore, we believe that the right hyoid bone may be the origin of carotid artery stenosis. Studies have shown that neck movement and bone structures have little influence on the carotid artery in the normal anatomical location. However, when the carotid artery is ectopic and firmly connected to the bone structure, neck movement (i.e., swallowing, twisting, bending, and stretching) can cause chronic damage by compressing the carotid artery [4,5]. Most patients with ectopic carotid arteries are asymptomatic and do not require surgical intervention. Currently, the optimal treatment for carotid stenosis caused by hyoid compression remains unclear, and few cases have been documented. Several patients with mild symptoms have been treated with medication [2], whereas those with compression [6], pseudoaneurysm [7], or stenosis [8] have undergone partial hyoidectomy. Here, high common carotid artery stenosis and transient intermittent dizziness and discomfort were clear signals for intervention. By rotating the neck, we observed that the carotid artery was not altered by the hyoid bone or the thyroid cartilage. Despite the effectiveness of this approach demonstrated by short-term postoperative evaluation and follow-up, its long-term effects must be confirmed through further observation.

6. Acknowledgment

The authors are appreciative of the patient's permission to publish this article.

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