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Case Report

Treatment of a patient with carotid blowout syndrome with a new deconstructive embolization technique ☆,☆☆

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ABSTRACT

Carotid blowout syndrome is a rare clinical conditions with a high mortality rate, especially in patients with head and neck tumors who have received radiotherapy and chemotherapy. We present our patient who had hemangioendothelioma of the neck for 5 years and therefore received radiotherapy, fistulized to the skin on the neck and active bleeding out of the fistula area. In the radiological imaging of the patient, vessel wall irregularities in the common carotid artery (CCA) and accompanying pseudoaneurysm with a diameter of 3 cm were detected, and endovascular treatment was performed. After the patient passed the balloon occlusion test, first the proximal internal carotid artery was closed with coils. Then, the balloon was inflated proximal to the CCA and a 10% diluted glue-lipiodol mixture was injected into the entire diseased CCA bed. Closure of the distal with coil and proximal with balloon prevented the risk of off-target embolization of the glue.

Introduction

Carotid blowout syndrome (CBS) is one of the serious life-threatening complications seen in 3%-4% of head and neck cancers [1]. It usually occurs by forming erosion in the head and neck vessels of patients with advanced cancer who have received radiotherapy [2]. Mortality rates have been reported to be over 50% [2,3]. There are different treatment approaches such as open surgical ligation, endovascular treatment techniques, and extracranial/intracranial vascular bypass [2,3]. It has been reported that endovascular treatment options give better clinical results in this patient group [3–5]. Endovascular treatment consists of two different approaches as deconstructive and reconstructive techniques [3–5]. No superiority was found between these two different endovascular treatment approaches in terms of patient survival [3,6]. In this patient, we aimed to demonstrate our successful treatment method with a different reconstructive endovascular technique, which is not available in the literature.

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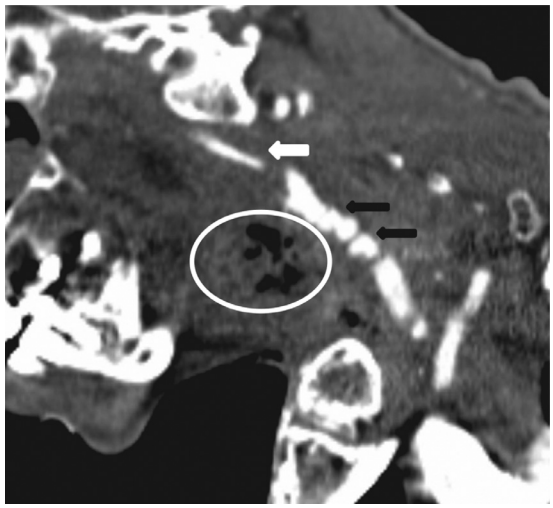

Fig. 1 – CT image of vessel wall irregularities (black arrows) in CCA, luminal narrowing (white arrow) in ICA and air bubbles (white round) which indicating skin fistula development.

Fig. 2 – DSA image of vessel wall irregularity (black arrow) and 3 cm diameter pseudoaneurysm (white arrow) in CCA, as well as severe luminal narrowing proximal to the ICA (black circle).

Fig. 3 – Comparison of cortical veins showing equal time venous return from both cerebral hemispheres in balloon occlusion test (black circles).

Case report

A 50-year-old male patient who was admitted to our emergency department, bleeding from a fistulized wound on the right half of his neck. He was diagnosed with hemangioendothelioma tumor in the right half of the neck 5 years ago. Immediately after his diagnosis, he received 65 Gy radiotherapy and 3 cure of chemotherapy. He received a second 25Gy radiotherapy 6 months ago, but radiotherapy was ceased because he could not tolerate it. In the last 3 months, a fistula wound has formed on the skin in the area of the tumor, and small bleedings occasionally occur in this area. His last bleeding was changing positionally and was severe. His hemoglobin value was 7 when he applied to our emergency department, and his hemoglobin value was 8 inspite of 3 units of erythrocyte infusion. Contrast-enhanced neck computed tomography (CT) performed in our emergency department revealed vessel wall irregularities and pseudoaneurysm images in the right common carotid artery (CCA) and internal carotid artery (ICA) (Fig. 1). After discussion with vascular surgeons, it was decided on endovascular treatment.

The endovascular procedure was performed under local anesthesia through the right and left femoral artery. A 90 cm balloon guiding catheter (Merci ballon, stryker) was placed proximal to the right CCA. Digital subtraction angiograms (DSA) showed wall irregularities in the right CCA and a pseudoaneurysm with a diameter of 3 cm, as well as significant luminal narrowing in the proximal ICA (Fig. 2). We performed the balloon occlusion test (BOT) in the right CCA. The patient tolerated a 20-minute occlusion test (Fig. 3). First, we advanced a microcatheter (Excelsior; Stryker Neuroendovascular) into the proximal portion of the right İCA. We placed 2 platinum coils (Target; Stryker Neuroendovascular) in the proximal İCA to prevent the distal flow from the İCA. We then retracted the microcatheter in the proximal ICA to the proximal CCA. We inflated the balloon guiding proximal to the CCA and sent a 1/10 mixture of NBCA/lipiodol (NBCA; Braun, Lipiodol; Guerbet) through the microcatheter under a controlled fluoroscopy view (Video). We injected 4 cc of NBCA/lipiodol mixture in 43 seconds. The entire diseased vascular wall and pseudoaneurysm proximal to the CCA and ICA were filled with the NBCA/lipiodol mixture (Fig. 4). Control angiograms were performed after the balloon was deflated and no filling was

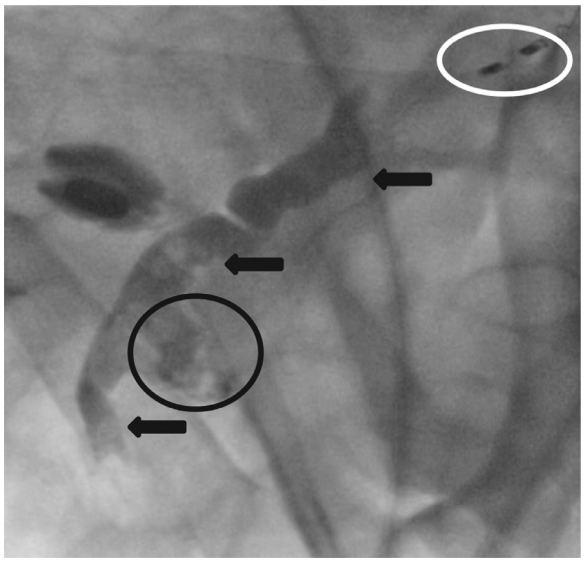

Fig. 4 – Coils placed proximal to ICA to prevent glue escape (white circle). Fluoroscopic image (black arrows) of the glue-lipiodol mixture filling the entire bed in CCA. Filling the pseudoaneurysm of the Glue-lipiodol mixture (black circle).

observed in CCA and ICA. There were no procedure-related complications, and the patient's postoperative course was uneventful. During the 8 month follow-up, no hemorrhagic event was observed.

Discussion

Carotid blowout syndrome is a life-threatening clinical condition that affects extra cranial carotid artery or branches, usually seen in patients who have received radiotherapy for head and neck tumors [2,3]. We thought to demonstrate a different deconstructive endovascular treatment technique and its successful outcome in the patient we presented here.

Carotid blowout syndrome is classified as threatened, impending and acute [1,6,7]. Threatened carotid blowout (Type 1) is defined as physical examination or imaging findings indicating carotid exposure without evidence of active bleeding. Impending (type II) carotid blowout is defined as transient hemorrhage that resolves spontaneously or with simple packing or pressure. Vascular wall irregularities and pseudoaneurysms are the most common imaging findings. In the acute type (type 3), there is complete rupture of the vessel wall and excessive hemorrhage is present. If not intervened quickly, it is fatal at high rates. A recent meta-analysis of 559 patients with CBS showed that 287 patients (51.3%) presented with acute type, 272 patients (48.7%) had threatened and impending type [3]. The patient we presented had vessel wall irregularities and pseudoaneurysm on CT and DSA, and it was thought to be compatible with type 2. In addition, recent occasional bleeding and positional changes in the amount of bleeding suggest type 2 clinically.

Open surgical techniques such as arterial repair and ligation have now been replaced by endovascular treatment techniques [8,9]. Endovascular treatment is based on two different approaches, deconstructive and reconstructive. Reconstructive treatments are performed using covered stents and allow the preservation of blood flow through the carotid artery. Thus, it artificially strengthens the vessel wall and reduces the risk of ischemic complications [3,10,11]. However, stent thrombosis, the need for long antiplatelet therapy, open wound stent infections and increased rebleeding rates are undesirable causes of reconstructive therapy [3]. Embolization therapy, which is a deconstructive treatment technique, is recommended for patients who pass the balloon occlusion test [3,9]. However, it should be considered that 15%-20% of patients who pass the balloon occlusion test develop delayed cerebral ischemia. In studies comparing deconstructive and reconstructive endovascular treatment techniques, no significant difference was found between technical success, perioperative complications and outcomes [3,6]. The authors suggested that outcomes were predicted by clinical severity at presentation, not by treatment type.

While coils are mostly used as embolizing agents in endovascular embolization, the use of NBCA is very rare [3,9]. It has been rarely reported that the coils can be opened into the oral cavity due to radiotherapy induced soft tissue failure and the fragility of media and intima layers of pseudoaneurysm [12,13]. In addition, it may not be a cost effective treatment due to the use of a large number of coils. There is an in vitro study showing that the polymerization time increases as the NBCA/Lipiodol mixture ratio increases from 1/1 to 1/9 [14]. There is a study reporting that diluted NBCA/Lipiodol injection was made for an average of 367 seconds and the catheter tip was easily retracted without sticking despite 1 cm of reflux [15]. In this case report, we embolized the diseased vessel wall by slowly injecting a 1/10 ratio of NBCA/Lipiodol mixture for 43 seconds, filling the entire CCA and ICA proximal. However, before injecting this mixture, we filled the distal ICA with coils and inflated the balloon proximal to the CCA to prevent off-target embolization.

Conclusion

Injection of diluted NBCA can be used safely and effectively as endovascular deconstructive therapy in patients with carotid blowout syndrome.

Patient consent

Patient consent has been obtained.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2021.10.054.

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