ORIGINAL ARTICLE

Transarterial endovascular treatment in the management of life-threatening carotid blowout syndrome in head and neck cancer patients: Review of the literature

Traitement endovasculaire des ruptures carotidiennes chez les patients présentant une tumeur des voies aérodigestives supérieures : revue de la littérature

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Summary

Objectives. — Carotid blowout syndrome is a rare but devastating complication in patients with head and neck malignancy, and is associated with high morbidity and mortality. Bleeding from the carotid artery or its branches is a well-recognized complication following treatment or recurrence of head and neck cancer. It is an emergency situation, and the classical approach to save the patient’s life is to ligate the carotid artery. But the surgical treatment is often technically difficult. Endovascular therapies were recently reported as good alternatives to surgical ligation.

Methods. — Retrospective review of three cases of acute or threatened carotid hemorrhage managed by endovascular therapies.

Results. — Two patients presented with acute carotid blowout, and one patient with a sentinel bleed. Two patients had previously been treated with surgery and chemo radiation. One patient was treated by chemo radiation. Two had developed pharyngocutaneous fistulas, and one had an open necrosis filled wound that surrounded the carotid artery. In two patients, stent placement resolved the acute hemorrhage. In one patient, superselective embolization was done. Mean duration follow-up was 10.2 months. No patient had residual sequelae of stenting or embolization.

Conclusion. — Management of carotid blow syndrome is very critical and difficult. A multidisciplinary approach is very important in the management of carotid blow syndrome. Correct and

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Introduction

Carotid blowout syndrome is a rare but devastating complication in patients with head and neck malignancy, and is associated with high morbidity and mortality [1]. Bleeding from the carotid artery or its branches is a well-recognized complication following treatment or recurrence of head and neck cancer [2]. Carotid blowout syndrome also occurs due to postoperative complications such as infections, wound dehiscence, flap necrosis, and pharyngocutaneous fistulas. It is an emergency situation, and the classical approach to save the patient’s life is to ligate the carotid artery. But the surgical treatment is often technically difficult because repairing the artery is almost impossible and suturing of the vessel wall in a previously irradiated and/or infected yield is very difficult.

Endovascular therapies were recently reported as good alternatives to surgical ligation.

Methods

We have retrospectively reviewed the last three consecutive patients who have had treatment for cancer of the head and neck and in whom carotid blowout syndrome had occurred.

Results

Two patients presented with acute carotid blowout, and one patient with a sentinel bleed. Two patients have previously been treated with surgery and chemo-radiation. One patient was treated by chemo-radiation. Two had developed pharyngocutaneous fistulas, and one had an open wound filled by necrosis that surrounded the carotid artery. In two patients, stent placement resolved the acute hemorrhage (Figs. 1 and 2). In one patient, superselective embolization was done. Mean duration follow-up was 10.2 months. No patient had residual sequelae of stenting or embolization.

Discussion

Carotid blowout syndrome, or rupture of the carotid artery is an important and life threatening complication in head and neck surgical practice. The reported mortality (40%) and neurologic morbidity (25%) rates for carotid rupture remain unacceptably high [3]. Carotid blowout syndrome (CBS) can take on variable clinical incarnations depending on the degree of the carotid rupture, ranging from acute hemorrhage to partial exposure of the artery. Half of the CBS patients presented sentinel bleeding, but 60% of the patients will develop a life-threatening hemorrhage requiring emergent intervention [4].

CBS is classified into three grades. Grade I carotid blowout (threatened) is characterized by physical and radiological findings suggestive of inevitable hemorrhage. Grade II carotid blowout (impending) is characterized by a transcervical or transoral short-term hemorrhage, which usually resolves spontaneously or with surgical packing. Grade III carotid blowout (acute) is characterized by abundant hemorrhage, which is neither self-limiting nor controlled with surgical packing [5].

Risk factors and the etiology can be summarized as flap necrosis, surgical wound dehiscence, pharyngocutaneous fistulas, iatrogenic mechanical vascular injury or, mostly, radiation-induced necrosis and recurrent head and neck tumors. Indeed, patients with carotid blowout syndrome typically have a history of radiotherapy (89%), nodal metastasis (69%), and neck dissection (63%) [4]. In our series, CBS was caused by pharyngocutaneous fistulas in two cases and chondroradionecrosis in one case. This disease occurs proximal to the carotid bifurcation and is commonly associated with soft tissue necrosis in the neck (55%) and mucocutaneous fistulas (40%).

Management of CBS is very critical and difficult [5–11]. A multidisciplinary approach is very important for the management of CBS. Correct and suitable management can be life saving. An endovascular technique is a good and effective alternative with much lower morbidity rates than surgical repair or ligation. The mainstay of this approach is the
Carotid blowout syndrome in patients with head and neck cancers

Figure 1 Extravasation from the intern and lateral part of the right intern carotid artery.
Extravasation partie latérale et interne de la carotide droite interne.

preservation of blood flow to the brain, which is vital for life and brain function. Before embolization super selective angiography may offer more detailed information concerning the source of bleeding. A super selective embolization of the bleeding vessel allows sparing as many proximal arteries as possible.

In contrast to other studies in which detection of the bleeding sites was successful only in a minority of cases [12,13], Schrock et al. identified, in their series [14], the bleeding artery in nearly 70% of patients. Their long-term success-rate of the endovascular treatment was 100% and no complication related to the procedure was observed.

Even for this massive bleeding event, the endovascular approach was favored as treatment of choice by Powitzky et al. [4].

In a retrospective study of Powitzky et al. [4], eight patients with head and neck cancer sustaining a carotid blowout syndrome underwent endovascular treatment. The high success — and low complication — rate supports the significance of an endovascular approach.

In their series, Zussman et al. [15] evaluated emergent endovascular management of carotid rupture in eight patients. Carotid deconstruction using liquid embolic material, coil embolization or both achieved immediate hemostasis in every cases (100%). No patient died as a result of their hemorrhage.

Chang et al. [16] reported a technical success and immediate hemostasis in all patients treated. They observed no difference in technical and hemostatic outcomes between the reconstructive and deconstructive endovascular management methods.

In contrary, Chang et al. [17] concluded that reconstructive endovascular stent-graft placement in patients with head and neck cancers in association with CBS appeared

Figure 2 Rupture treated by stenting (8 × 38 mm).
Rupture par envahissement traité par stent couvert de 8 × 38 mm.
unfavorable. Indeed, although stent-grafts achieved immediate and initial hemostasis in patients with head and neck cancers and CBS, long-term safety, stent patency, and permanency of hemostasis were not high.

Warren et al. [18] reported in their studies, by reviewing three cases of acute or threatened carotid hemorrhage managed by endovascular stent placement, that carotid hemorrhage can be successfully managed with directed placement of endovascular grafts, but the long term sequelae of placing the foreign bodies in a field with ongoing contamination make this a temporizing rather than permanent measure for use while more definitive long-term solutions are pursued.

Roh et al. [19] evaluated the efficiency of endovascular treatment in 16 head and neck patients. Immediate hemostasis was achieved in all patients. CBS was caused by tumor invasion in eight patients, pharyngocutaneous fistula in seven, and laryngeal chondroradionecrosis in one, with the external and common carotid arteries being the most common rupture sites. Seven patients had recurrent CBS, all of whom were retreated effectively by endovascular management. Most patients died of tumor progression, with a mean survival time of five months from initial CBS; only two patients survived.

Recurrent carotid blowout syndrome has not been well described [20,11]. In their series [20], 12 patients (26%) had more than one episode of CBS in which a total of 32 (20 recurrent) events were observed (average 2.7, range 2—4). Intervals of rCBS ranged from 1 day to 6 years. Thirteen (65%) of 20 recurrent events were attributed to progressive disease (PD), and seven (35%) of 20 to treatment failures (TFs). In the PD group, seven (54%) of 13 had recurrent ipsilateral disease, and six (46%) of 13 had recurrent contralateral disease. Twenty-seven of 32 events were treated with endovascular therapy, which included the following: nine carotid occlusions; 11 small-branch embolizations; four transarterial tumor embolizations; one carotid stent; and two direct puncture embolizations. Four of the six TFs were retreated successfully with endovascular therapy; the remaining two TFs were managed successfully by surgery. In our series, no recurrent carotid blowout syndrome was described.

Conclusion

Management of carotid blow syndrome is very critical and difficult. A multidisciplinary approach is very important in the management of carotid blow syndrome. Correct and suitable management can be life saving. An endovascular technique is a good and effective alternative with much lower morbidity rates than surgical repair or ligation.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References


