

# Carotid blowout syndrome

Yung-Shang Lin, M.D.,<sup>1</sup> Chia-Ti Wang, M.D.,<sup>2</sup> Yen Ting Chen, M.D.,<sup>2</sup> Kuo-Tai Chen, M.D.<sup>3</sup>

<sup>1</sup>Department of Neurosurgery, Yuan's General Hospital, Kaohsiung;

<sup>2</sup>Department of Emergency, Chi-mei Medical Center, Tainan;

<sup>3</sup>Department of Emergency Medicine, Taipei Medical University, Taipei

## ABSTRACT

Carotid blowout syndrome refers to the rupture of the carotid artery and its branches. Carotid blowout syndrome is a dangerous medical emergency typically resulting from complications of treatments for head and neck cancer. A patient without a prior history of head or neck cancer presented to the emergency department with a painless, enlarging neck mass was reported in this study. The mass progressed to acute airway obstruction during imaging of the lesion and necessitated emergency cricothyrotomy to secure the airway. The patient underwent four endovascular treatments to manage repeated bleeding thus producing the neurological complication of right middle cerebral artery infarction. Clinical manifestations, varied treatments, and common complications of carotid blowout syndrome were discussed.

**Key words:** Carotid blowout syndrome; difficult airway; emergency cricothyrotomy.

## INTRODUCTION

Carotid blowout syndrome (CBS) refers to the rupture of the carotid artery or one of its major branches and is a rare, devastating medical emergency.<sup>[1-4]</sup> The majority of CBS cases are complications of therapies for head and neck cancers and physicians are aware of the development of the disease.

Herein, a case of CBS was reported in a patient without a history of cancer or prior treatments on the head or neck regions. The patient presented with a rapidly enlarging neck mass progressing to acute airway obstruction which required emergency airway management.

## CASE REPORT

A 60-year-old man found an enlarging lump on the right side of his neck and came to the emergency department one hour later. The lump was painless and did not influence his ability

to eat or breath or his articulation. The patient denied any systemic disease but reported that he had undergone gastric surgery several years ago. Additionally, he could not recall any events of trauma, fever, or upper respiratory tract infection symptom within the previous month. At the time of arrival, his vital signs were as follows: body temperature, 36.8°C; pulse, 107 beats/min; respiratory rate, 19/min; and blood pressure, 174/134 mmHg. Physical examination revealed a soft, non-movable and non-tender round mass on the right side of the patient's neck.

The emergency physician arranged a computed tomography scan of the neck, which revealed a pseudo-aneurysm of the right internal carotid artery (Fig. 1). Soon after the completion of the scan, the patient experienced dyspnea and lost consciousness. The physician performed an emergency cricothyroidotomy to secure the patient's airway. A subsequent following angiography confirmed the presence of a pseudo-aneurysm of the right internal carotid artery, which was treated via embolization of right internal carotid artery (Fig. 2).

Additionally, the radiologist identified an osteolytic lesion in the patient's right middle skull base suspected to be a nasopharyngeal carcinoma. Unfortunately, recurrent bleeding in the neck and oropharyngeal regions was observed one day, ten days, and twenty-three days after the first angiographic embolization attempt, and the patient underwent repeated embolization of the branches of the right internal carotid artery, right occipital artery, and right ascending pharyngeal

Address for correspondence: Yen Ting Chen, M.D.

2f, No. 16, North District, Yude 1st Road 704 Tainan, Taiwan

Tel: +886987509108 E-mail: paradoxcyt@gmail.com

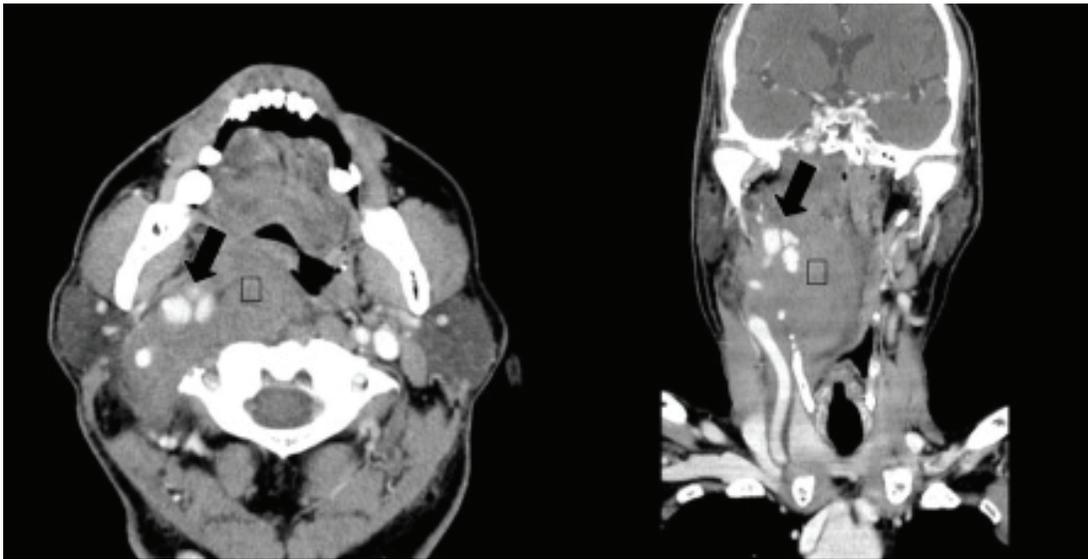
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Ulus Travma Acil Cerrahi Derg  
2015;21(1):68-70

doi: 10.5505/tjtes.2015.76992

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**Figure 1.** A hematoma (asterisk) in the right carotid space extending to the retropharyngeal space with marked anterior bulging of hypopharynx. There is an active contrast medium extravasation from the right internal carotid artery (black arrow).

artery. After the secondary embolization attempt, the patient was left hemiplegic and a computed tomography scan of the brain revealed a right middle cerebral artery infarction. The patient was discharged two months later with the neurologic consequence of left-sided hemiparesis.

## DISCUSSION

CBS occurs commonly in the settings of surgery and/or irradiation therapy of head and neck cancers and penetrating injuries to the neck.<sup>[1-4]</sup> This hazardous complication usually presents as acute trans-oral or trans-cervical hemorrhage and is accompanied by high rates of mortality and neurological morbidity.<sup>[1-6]</sup> Nevertheless, this case had neither a history of head or neck cancer nor any manifestations of acute hem-

orrhage. It is difficult for emergency physicians to connect a seemingly harmless neck swelling with CBS. The case reported here should remind emergency physicians to always consider the possibility of dangerous vascular lesions in patients with rapidly growing masses.

We could not be sure whether the patient already had an unknown carotid aneurysm and the pre-existing aneurysm ruptured spontaneously. However, the patient experienced three episodes of recurrent bleeding from three different foci, not showing on the first angiography. Accordingly, the occult nasopharyngeal carcinoma is the most likely etiology of the CBS.

The structure of the presenting patient was not altered by



**Figure 2.** The angiography revealed a pseudoaneurysm arising from the right internal carotid artery (left, black arrow). The radiologist performed an arterial trapping with coils on the pseudoaneurysm (right, white arrow).

prior cancer or trauma therapy. The intact skin presumably limited the outward expansion of the hematoma. The enlarging neck hematoma, resulted from a pseudo-aneurysm of the carotid artery, likely extended rapidly inward to occlude the oropharynx or the trachea. Therefore, once a CBS is recognized, it is crucial to first secure the airway and then perform surgical or endovascular management of the CBS.

Surgical ligation of the common carotid artery or internal carotid artery is the traditional treatment for CBS. However, this approach is accompanied by unacceptably high rates of neurological complications and mortality.<sup>[5-7]</sup> The high morbidity and mortality rates of this treatment are attributable to the following factors. First, the surgical exploration of a field with previous irradiation and operation is technically difficult. Second, without pre-surgical evaluation of the intracranial collateral circulation, surgical ligation of the carotid artery often results in thromboembolic events. Finally, CBS often causes massive hemorrhages leading to hypovolemia and the depletion of coagulation factors. Global cerebral ischemia and uncontrolled re-bleeding can be encountered during the subsequent operation and increase the surgical risk.

Endovascular management with either permanent occlusion or stent deployment has become a practical alternative to surgical treatment. Two case series from Hong Kong and Taiwan have reported that immediate hemostasis is achieved in all cases.<sup>[3,4]</sup> Cerebral ischemia has been found in 15-20% of the patients with CBS treated with permanent occlusion.<sup>[4,7]</sup> Some authors advocate the examination of the availability of collateral circulation with the balloon occlusion test to identify patients with a high risk of stroke after endovascular management. However, this test is not usually possible in patients with acute massive hemorrhage and a small subset of cases develop cerebral ischemia despite the completion of balloon occlusion test.<sup>[1,4]</sup> Additionally, a significant portion of patients undergoing endovascular management of CBS exhibit delayed complications that include re-bleeding, thromboembolic events, stent migration, and intracranial infection.<sup>[1,3,4]</sup>

After the establishment of a patent airway and treatment for CBS, emergency physicians or neurosurgeons should look for occult lesions in the head and neck region. Since the majority of CBS cases result from the sequelae of head and neck cancer, meticulous studies of the underlying etiology are important for further therapeutic planning.

## Conclusion

Although rare, CBS can occur in patients without histories of head and neck cancer or prior irradiation or surgical therapy on the neck. The disease may lead to acute airway obstruction, necessitating emergency airway intervention. Surgical or endovascular managements are available as treatments for CBS; however, both treatments are accompanied by significant mortality and neurologic complications.

Conflict of interest: None declared.

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## OLGU SUNUMU - ÖZET

### Karotis patlama sendromu

Dr. Yung-Shang Lin,<sup>1</sup> Dr. Chia-Ti Wang,<sup>2</sup> Dr. Yen Ting Chen,<sup>2</sup> Dr. Kuo-Tai Chen<sup>3</sup>

<sup>1</sup>Yuan Genel Hastanesi, Beyin Cerrahisi Kliniği, Kaohsiung;

<sup>2</sup>Chi-mei Tıp Merkezi, Acil Tıp Kliniği, Tainan;

<sup>3</sup>Taipei Tıp Üniversitesi, Acil Tıp Anabilim Dalı, Taipei

Karotis patlama sendromu karotis arter ve dallarının yırtılmasına işaret eder. Karotis patlaması sendromu tipik olarak baş veya boyun kanserleri için uygulanan tedavilerin komplikasyonları sonucu oluşan tehlikeli bir tıbbi acildir. Daha önce baş veya boyun kanseri öyküsü olmayan ve acil servise ağrısız büyümüş bir boyun kitlesiyle gelen bir hastayı raporluyoruz. Lezyonun görüntülenmesi sırasında kitle büyüyerek akut hava yolu tıkanmasına neden olmuş ve hava yolunu korumak için acil krikotirotomi gerekmiştir. Hastanın yinelenen kanamalarını kontrol altına almak için dört kez endovasküler tedavi uygulanmış ve bu tedavi sağ orta serebral arter infarktına bağlı nörolojik komplikasyona neden olmuştur. Karotis patlama sendromunun klinik belirtileri, değişik tedavilerini ve sık görülen komplikasyonlarını tartıştık.

Anahtar sözcükler: Acil krikotirotomi; karotis patlama sendromu; sorunlu hava yolu.

Ulus Travma Acil Cerrahi Derg 2015;21(1):68-70 doi: 10.5505/tjtes.2015.76992