

## Pseudoaneurysm of the carotid artery with haemorrhage into the hypopharynx

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### Abstract

Pseudoaneurysms of the extracranial carotid arteries are rarely seen following irradiation for cancers of the head and neck. We present a patient with a pseudoaneurysm of the common carotid artery following a radical neck dissection and irradiation for thyroid carcinoma 20 years earlier. Following oesophagoscopy examination, a pseudoaneurysm of the right common carotid artery ruptured into the piriform sinus. The common carotid artery was embolized with multiple coils and the bleeding was halted. The relationship between the carotid artery aneurysm and irradiation, and the treatment of carotid artery aneurysm, is discussed.

**Key words:** Aneurysm; Carotid arteries; Embolization, therapeutic

### Introduction

Aneurysms of the extracranial carotid arteries are both rare and dangerous due to the possibility of haemorrhage and of cerebrovascular accidents. In approximately 8500 operations for arterial aneurysms, at the Baylor College of Medicine, McCollum *et al.* (1979) noted only 21 cervical carotid aneurysms. Causes included arteriosclerosis, trauma, infection, and previous surgery (Rittenhouse *et al.*, 1972). Irradiation injuries to the arteries can produce stenosis, occlusion, and disruption (McCready *et al.*, 1983). A pseudoaneurysm of the extracranial carotid artery following irradiation to the head and neck is rare. Lin *et al.* (1988) reported a case of carotid pseudoaneurysm following irradiation given for nasopharyngeal carcinoma.

We present a case of common carotid pseudoaneurysm following previous surgery and irradiation for thyroid carcinoma, and also the results of treatment.

### Case report

A 46-year-old Japanese woman was admitted to our hospital with a sore throat and mild fever. About 20 years earlier, she had received irradiation to the neck following a lobectomy of the right thyroid and a radical neck dissection for thyroid carcinoma. She expectorated over 500 ml of bright-red blood on the 12th and 22nd day in hospital. Examination of the upper gastrointestinal tract and the lower respiratory tract revealed no abnormality. A laryngoscopic examination revealed an oedematous enlargement of the right arytenoid and the aryepiglottic fold. The right piriform sinus was narrowed (Figure 1). There was no movement of the right vocal fold. The skin of the right anterolateral neck was reddish and scarred from the previous radical neck dissection and irradiation. Palpation of the right carotid artery proved difficult. The CT scan examination, with contrast medium, showed an irregular

area of high density beside the larynx on the right side of the neck. No thyroid tumour was apparent (Figure 2).

Pharyngo-oesophagoscopy examination was performed under general anaesthesia on the 29th hospital day. The mucosa of the lateral wall within the right piriform sinus was eroded and coated with a white substance. Suddenly, after the examination, the patient began to haemorrhage from the lateral wall of the piriform sinus. To stop the bleeding, the wound was firmly packed with gauze. The patient lost more than 1500 ml of blood in 30 minutes, and her systolic blood pressure fell below 50 mmHg.

Angiographic examination revealed that a pseudoaneurysm of the right common carotid artery, having a diameter of about 5 mm, had ruptured into the hypopharynx (Figure 3). Because of the presence of extensive soft tissue

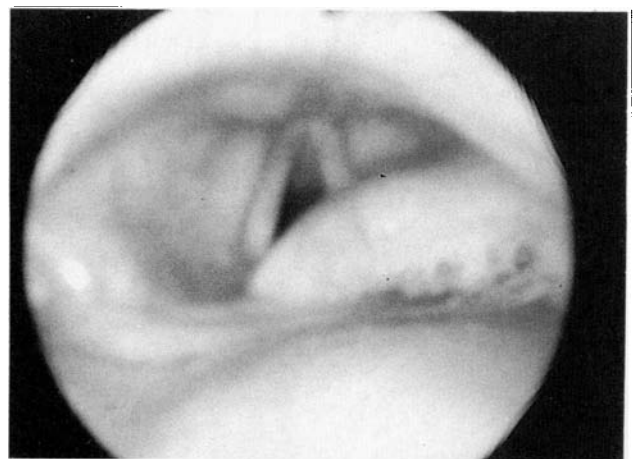


FIG. 1

An oedematous enlargement of the right arytenoid and aryepiglottic fold was observed and the right piriform sinus was narrowed.

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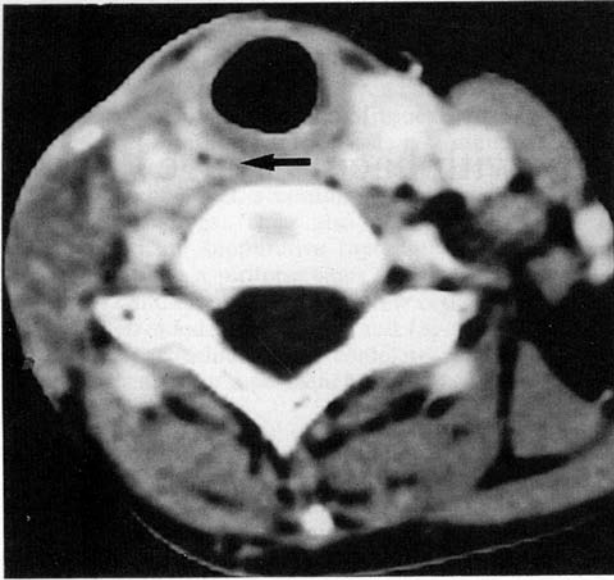


FIG. 2

Axial CT scan showing an irregular high density area beside the larynx on the right side of the neck (arrowed).

fibrosis due to the patient's previous surgery and irradiation, we attempted a transcatheter embolization of the common carotid. No ischaemic change was observed on the electroencephalogram after a balloon occlusion test was performed for five minutes. An angiogram of the left carotid showed a collateral blood supply. Vascular occlusion devices consisting of five coils were then placed in the common carotid artery, including the neck of the pseudoaneurysm. The first two coils were placed just proximal to the bifurcation of the common carotid but in the common carotid artery, two coils were placed at the neck of the pseudoaneurysm, and one coil was placed proximal to the pseudoaneurysm. An angiogram taken after embolization revealed occlusion of the carotid artery

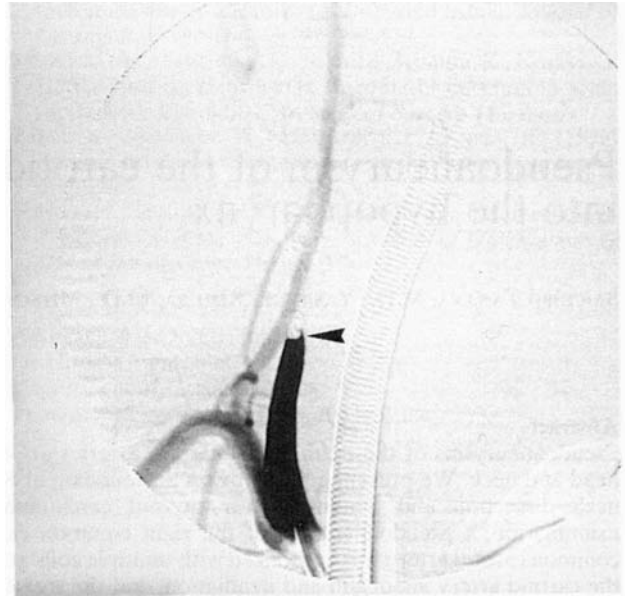


FIG. 4

Angiogram showing occlusion of the carotid artery after embolization (arrowed).

with filling of the intracranial vessels via the collateral circulation (Figure 4). We removed the packing from the hypopharynx after the embolization with no further bleeding. No neurological deficit was noted following treatment.

After approximately one month, an abscess was observed on the right side of the neck. There was a salivary fistula which communicated with the right piriform sinus (Figure 5). After we resected the fibrotic soft tissue, including the salivary fistula and skin, reconstruction was accomplished with a vascularized free peroneal skin flap, and the salivary fistula was closed.

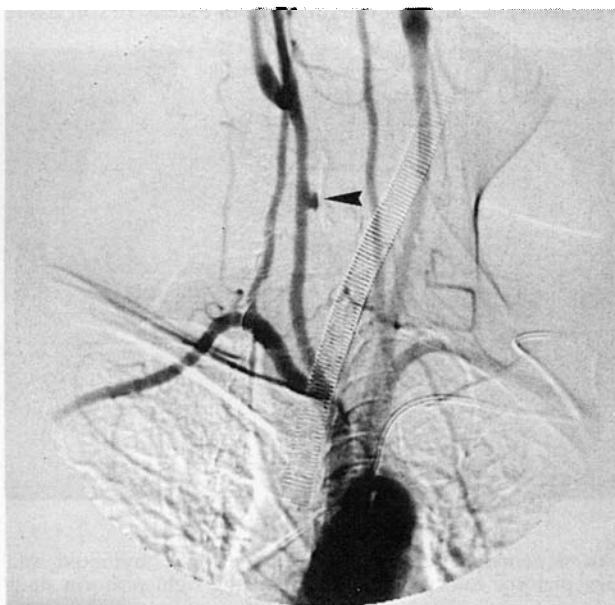


FIG. 3

Angiogram showing a pseudoaneurysm in the right common carotid artery (arrowed).



FIG. 5

A salivary fistula which communicated with the right piriform sinus was observed on the right side of the neck (arrowed).

## Discussion

Extracranial carotid aneurysms can be caused by infections such as syphilis; arteriosclerosis; trauma; previous surgery; vasculitis; and congenital anomalies (Rittenhouse *et al.*, 1972). Newer causes of extracranial carotid pseudoaneurysms include trauma and surgery including endarterectomy (Schwartz and McCann, 1989). The use of irradiation for treating patients with head and neck carcinomas has recently increased and with it complications resulting from radiotherapy, including injuries to blood vessels. Irradiation injury to the arteries includes stenosis, occlusion, and haemorrhage. The development of arterial stenosis or occlusion occurs after two to 24 years following irradiation. The period required for arterial haemorrhage is short, ranging from two weeks to eight months (Silverberg *et al.*, 1978; McCready *et al.*, 1983). The injury to the vasa vasorum of the large arteries may explain the increase in the incidence of haemorrhage from the large arteries. Pseudoaneurysm formation due to irradiation is extremely rare. Lin *et al.* (1988) reported a 40-year-old man who developed a pseudoaneurysm of the right common carotid artery following irradiation of a nasopharyngeal carcinoma about four years earlier. The pseudoaneurysm had ruptured into the skin of the neck before hospitalization. Transcatheter embolization with coils failed to stop the bleeding, such that an emergency ligation of the common carotid artery with total excision of the pseudoaneurysm was required. The patient presented in this report developed a pseudoaneurysm of the common carotid artery following previous surgery and irradiation for thyroid carcinoma administered about 20 years earlier. Because of the prolonged period between surgery and irradiation to the time of arterial haemorrhage, the patient's soft tissue had become fibrotic and hard enough to contain the ruptured artery, thus forming a pseudoaneurysm.

The clinical manifestations of extracranial carotid aneurysms include a pulsating mass in the neck, dysphagia, respiratory obstruction, neck pain, and cerebrovascular symptoms. Disruption of a carotid aneurysm appears to be extremely rare. It may lead to massive, life-threatening haemorrhage and necessitate an emergency operation. The treatment of extracranial carotid aneurysms involves grafting following resection of aneurysms and arterial occlusion. Arterial occlusion can be accomplished with either surgical ligation or the use of a transcatheter detachable balloon system and coils (Braun *et al.*, 1986).

Before techniques of arterial reconstruction were developed, ligation of the common carotid artery also carried a high mortality risk.

In therapy of the aneurysm, the reconstruction of the carotid artery after resection of the aneurysm should be the preferred treatment although healing of the anastomosis following previous irradiation would have been unpredictable. However, we successfully used transcatheter embolization in our patient although she showed extensive fibrosis.

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