

A false aneurysm

D MITCHELL¹, C REPANOS², W B COMAN¹

Departments of ¹Otolaryngology, and ²Head and Neck Surgery, Princess Alexandra Hospital, University of Queensland, Brisbane, Queensland, Australia

Abstract

Objective: We report a case of a remaining hemi-thyroid following laryngectomy, which was misinterpreted as a pseudoaneurysm.

Methods: Case report and comment on this understandable error which is easily avoidable.

Results: A 59-year-old man had undergone salvage laryngectomy for recurrent squamous cell carcinoma of the larynx, which had previously been treated with radiotherapy. Three months after his laryngectomy, he presented with a sore neck and subcutaneous collections. Computed tomography revealed a unilateral mass with high signal contrast uptake anterior to the left common carotid artery, which was thought initially to be a carotid pseudoaneurysm. Further investigation, including ultrasonography and a review by the senior head and neck radiologist, demonstrated that this mass was actually the remnant hemi-thyroid preserved at laryngectomy (which is often misshapen compared with a normal hemi-thyroid). The collections were found to be recurrent tumour, and unnecessary further interventions were avoided.

Conclusion: Ultrasonography easily distinguishes between a thyroid remnant and a pseudoaneurysm. Furthermore, the opinion of an experienced head and neck radiologist may be vital when interpreting complex post-surgical head and neck radiology.

Key words: Pseudoaneurysm; Squamous Cell Carcinoma; False Aneurysm; Ultrasound

Introduction

Head and neck cancer patients often present with complex, multidisciplinary problems that span many specialties. Clinicians who only occasionally deal with head and neck cancer patients, or who are inexperienced, are unlikely to appreciate these subtleties, and are therefore likely to misdiagnose presentations.

We highlight a particular problem which arose when imaging a post-operative laryngectomy patient, in order to draw attention to the need for subspecialisation; this issue is relevant not only to ENT surgeons' subspecialisation as head and neck surgeons, but also to all members of the head and neck multidisciplinary team.

Clinical case

A 59-year-old man presented with a one-month history of worsening neck pain, neck swelling and leaking subcutaneous collections around his post-laryngectomy tracheal stoma.

Three months earlier, he had undergone a salvage laryngectomy, bilateral neck dissection and hemi-thyroidectomy.

Two years prior to this, the patient had been diagnosed with a tumour stage 1a, node stage 0, right glottic squamous cell carcinoma (SCC). He had been treated with laser excision, but had re-presented 12 months later with local recurrence at the anterior commissure extending to both anterior vocal folds. He had subsequently been treated with radiotherapy, with a total dose of 66 Gy in 33 fractions. A further local

recurrence, 12 months later, had been treated with surgical salvage.

During the current re-presentation, examination revealed two subcutaneous collections peri-stomally, and significant bilateral neck swelling.

Computed tomography (CT) scanning with contrast was performed to exclude deep neck collections (Figure 1). A unilateral mass with high signal contrast uptake was found anterior to the left common carotid artery. This CT scan with contrast was initially interpreted by a junior radiologist as a pseudoaneurysm. However, a subsequent ultrasound of the left neck demonstrated a patent left common carotid artery and left internal jugular vein.

Fluid aspirated from the subcutaneous collections was amylase-positive, indicating a pharyngo-cutaneous fistula; it also demonstrated malignant SCC.

Discussion

In this case, the important CT findings that were suggestive of pseudoaneurysm, and which can be seen in other patients with extensive neck surgery, included the positioning of the thyroid in relation to the internal carotid artery. Due to previous surgery, the remnant hemi-thyroid was in close proximity to the internal carotid artery. Another important feature was the distorted shape of the thyroid following surgery. A normal thyroid has a typical, distinct triangular shape; however, in our case the thyroid was round in appearance, consistent with a pseudoaneurysm. The intense contrast enhancement, seen in both pseudoaneurysms and thyroids,



FIG. 1

Axial computed tomography scan of a 59-year-old man with bilateral neck swelling post-laryngectomy.

was another important distinguishing feature. A delayed contrast scan was not performed in our case – this would have distinguished between thyroid and pseudoaneurysm by demonstrating no retention of contrast in the case of a pseudoaneurysm, but retention of contrast in the case of a thyroid.

Given these features, our patient's CT scan findings, taken out of context by a radiologist inexperienced in head and neck surgery, could easily be misinterpreted as a pseudoaneurysm.

Pseudoaneurysms of the carotid artery are not common in our clinical practice as they are predominantly associated with cranial trauma. Typically, pseudoaneurysm formation occurs secondary to hyperextension and contralateral head rotation, which compresses the cervical internal carotid artery against the lateral mass of the second cervical vertebra, resulting in arterial dissection and pseudoaneurysm formation.¹ These lesions are typically treated endovascularly.² Clinically, pseudoaneurysms of the carotid artery can present with pain, swelling, a pulsatile thrill or audible bruit, and/or neurological deficits.

- Pseudoaneurysms are rare following head and neck surgery
- Post-laryngectomy, a misshapen remaining hemi-thyroid may easily be mistaken for a pseudoaneurysm
- Ultrasonography easily distinguishes a thyroid remnant from a pseudoaneurysm
- An experienced head and neck radiologist is vital for interpreting complex post-surgical radiology

There are several documented case reports of pseudoaneurysms associated with neck dissection and radiotherapy used in the management of head & neck cancer. There are three cases of pseudoaneurysms reported to have arisen following neck dissection, two involving the carotid bifurcation^{3,4} and one involving the common carotid artery.⁵ Four cases are reported to have arisen following radiotherapy used as singular therapy, two involving the internal carotid artery,^{6,7} one involving the common carotid artery⁷ and another involving the external carotid artery stump following ligation.⁸ Another two case reports have described pseudoaneurysm formation following both neck dissection and

radiotherapy involving the common carotid artery⁹ and the external carotid artery.¹⁰

Pseudoaneurysms are a rare delayed complication of head and neck cancer management. Despite this, it is important for head and neck surgeons and radiologists to consider the possibility of such a diagnosis, especially in patients presenting with neck swelling and pain following neck dissection or radiotherapy. It is also important to determine the patient's surgical and treatment history before interpreting their radiological images.

This common radiological misinterpretation of a remaining hemi-thyroid following total laryngectomy is a lesson that all ENT surgeons and radiologists should learn. Early recognition and correct diagnosis will not only save the surgeon considerable angst but will also prevent unnecessary additional investigations.

References

- 1 Cummings CW. *Otolaryngology Head & Neck Surgery* 2005; **16**:3692–3
- 2 Nadig S, Barnwell S, Wax MK. Pseudoaneurysm of external carotid artery – review of literature. *Head Neck* 2009;**31**:136–9
- 3 Iguchi H, Takayama M, Kusuki M, Nakamura A, Kanazawa A, Hachiya K *et al.* Carotid artery pseudoaneurysm as a sequela of surgery for laryngeal cancer. *Acta Otolaryngol* 2006;**126**: 557–60
- 4 Girishkumar T, Sivakumar M, Andaz S, Santosh V, Solomon R, Brown M. Pseudo-aneurysm of the carotid bifurcation secondary to radiation. *J Cardiovasc Surg (Torino)* 1999;**40**:877–8
- 5 Flor N, Sardaneli F, Ghilardi G, Tentori A, Franceschelli G, Felisati G *et al.* Common carotid pseudoaneurysm after neck dissection: colour Doppler ultrasound and multidetector computed tomography findings. *J Laryngol Otol* 2007;**121**:497–500
- 6 Cheng KY, Lee KW, Chiang FY, Ho KY, Kuo WR. Rupture of radiation induced internal carotid artery pseudoaneurysm in a patient with nasopharyngeal carcinoma – spontaneous occlusion of carotid artery due to long term embolizing performance. *Head Neck* 2008;**30**:1132–5
- 7 Chen HC, Lin CJ, Jen YM, Juan CJ, Hsueh CJ, Lee JC *et al.* Ruptured internal carotid pseudoaneurysm in a nasopharyngeal carcinoma patient with skull base osteoradionecrosis. *Otolaryngol Head Neck Surg* 2004;**130**:388–90
- 8 Maruyama Y, Arai K, Hoshida S, Yoneda K, Furukawa M, Yoshizaki T. Case of three delayed complications of radiotherapy: bilateral vocal cord immobility, esophageal obstruction and ruptured pseudoaneurysm of carotid artery. *Auris Nasus Larynx* 2009;**36**:505–8
- 9 Tanaka S, Kimura Y, Furukawa M. Pseudoaneurysm of the carotid artery with haemorrhage into the hypopharynx. *J Laryngol Otol* 1995;**109**:889–91
- 10 Minion DJ, Lynch TG, Baxter BT, Lieberman R. Pseudoaneurysm of the external carotid artery following radical neck dissection and irradiation: a case report and review of literature. *Cardiovasc Surg* 1994;**2**:607–11

Address for correspondence:

Mr Costa Repanos,
ENT Department,
Queen Alexandra Hospital,
Southwick Hill Road,
Cosham, Ports mouth, UK, P06 3LY

E-mail: costa@repanos.com

Mr C Repanos takes responsibility for the integrity of the content of the paper
Competing interests: None declared