



# Hidden danger in the neck—a problem of differential diagnostics: benign chronic lymphadenitis following carotid endarterectomy and patch angioplasty (CEAP) or a metastasis due to a squamous cell cancer of the tongue

Ákos Bicsák<sup>1</sup> · Dirk Jansen<sup>1</sup> · Laurence Tack<sup>1</sup> · Serguei Popov<sup>2</sup> · Katja Swiadek<sup>3</sup> · Olaf Struckmeier<sup>4</sup> · Richard K. Ellerkmann<sup>3,5</sup> · Markus Winkler<sup>2</sup> · Stefan Rohde<sup>4</sup> · Stefan Hassfeld<sup>1</sup> · Lars Bonitz<sup>1</sup>

Received: 6 June 2019 / Accepted: 30 June 2019 / Published online: 9 July 2019  
© Springer-Verlag GmbH Germany, part of Springer Nature 2019

## Abstract

**Introduction** Oncological head and neck operations as well as carotid endarterectomy are common surgical procedures. In some occasions, both procedures have occurred in the past, leading to possible diagnostic and therapeutic challenges when follow-up operations seem indicated.

**Case report** We report of a patient presenting with carotid endarterectomy including patch operation 8 years ago and neck dissection due to a squamous cell cancer of the tongue 3 months ago, now showing up with a suspected metastatic tumor of the neck during routine follow-up. Intraoperatively, nearly fatal bleeding occurs due to a partial release of the carotid patch and needs to be managed immediately.

**Discussion** The primarily pre-operated neck remains challenging for the radiologist in terms of differentiating between chronic lymphadenitis and metastasis. Furthermore, it remains challenging for the oncological surgeon in case these entities are in the near proximity of the previously operated carotid artery. The operative treatment according to the guidelines can lead to major bleeding during the second surgery. During the diagnostic process, metastases and chronic lymphadenitis after alloplastic carotid operations must be differentiated remaining however difficult, due to only scarce data in the literature.

**Conclusion** In the case of previous neck surgery, the decision to operate must be chosen individually regarding the specific conditions and their sometimes vital risks. In case an operation is indicated, the team must be trained to treat life-threatening intraoperative bleeding. In reviewing the literature, we were unable to find published recommendations on how to tackle these challenges.

**Keywords** Alloplastic carotid patch · Chronic lymphadenitis · Lymph node metastasis · Head and neck cancer · Major intraoperative bleeding

✉ Ákos Bicsák  
akos.bicsak@klinikumdo.de

## Introduction

Oral squamous cell cancer and atherosclerosis have some common etiologies: excessive smoking and alcohol intake are common under patients observed with these diseases [9]. Atherosclerosis is often observed during radiological diagnostics and found intraoperatively in cancer patients. In patients undergoing carotid artery operations, a later development of the tumorous disease of the oral cavity mostly squamous cell cancer cannot be excluded.

In some cases of relapse or reconstructions, re-operations are inevitable. Such surgical interventions are always complex and associated with a high surgical risk level. Despite careful

<sup>1</sup> Department of Oral- and Maxillofacial Surgery, Klinikum Dortmund gGmbH, Münsterstraße 240, D-44145 Dortmund, Germany

<sup>2</sup> Department of Vascular Surgery and Angiology, Klinikum Dortmund gGmbH, Münsterstraße 240, D-44145 Dortmund, Germany

<sup>3</sup> Department of Anaesthesiology, Operative Intensive Care and Pain Therapy, Klinikum Dortmund gGmbH, Münsterstraße 240, D-44145 Dortmund, Germany

<sup>4</sup> Department of Radiology and Neuroradiology, Klinikum Dortmund gGmbH, Münsterstraße 240, D-44145 Dortmund, Germany

<sup>5</sup> Universitätsklinikum Bonn, Klinik für Anästhesiologie und Operative Intensivmedizin, Sigmund-Freud-Str. 25, D-53127 Bonn, Germany

intraoperative dissection of tissue and vessels, excessive bleeding cannot be ruled out. In patients who already have been operated, a radiologic differentiation of the lesions may remain difficult especially since specific data in the literature is missing.

We present a patient, who underwent a carotid endarterectomy including patching, years later, a partial glossectomy and bilateral selective neck dissection of the Robins levels I-II-III of both sides, and had to be operated again due to urgent indications of metastasis of the neck. During this operation, there was severe and life-threatening bleeding, which could only be treated successfully in cooperation with a vascular surgeon. The case and the literature data are discussed.

## Case report

The presented patient is a 74-year-old man. He was treated in February 2018 for a pT1 N0 (0/25) Pn0 L0 V0 R0 (UICC 2017) squamous cell cancer of the tip of the tongue mainly on the left side but crossing the midline, too. As per the German guideline on treatment of oral squamous cell cancer [9] and based on the suggestion of the interdisciplinary Tumor Board of the Head and Neck Oncologic Centre of the Klinikum Dortmund—a partial glossectomy and bilateral selective neck dissection Robins levels I-II-III not including the region of the discussed lesion next to the right carotid bulb were performed.

Previously, carotid endarterectomy and patching had been performed in July 2010 on the right carotid bulb. Other pre-existing conditions were chronic obstructive pulmonary disease and emphysema, atherosclerosis, non-insulin-dependent diabetes, diverticulitis, benign prostate hyperplasia, hyperscoliosis of the thoracic spine, nicotine, and alcohol abuse. The screening computed tomography found a possibly chronic infection process laterally to the big blood vessels of the right neck and suggested a re-evaluation in 3 months.

In February 2018, we performed the initial tumor surgery: in toto resection and bilateral selective neck dissection. The postoperative interdisciplinary Tumor Board Conference suggested—based on the above classification pT1 N0 R0—a regular follow-up.

After a 3-month time, in May 2018, the patient presented for a follow-up appointment. A fixed and solid swelling just behind the sternocleidomastoid muscle of the right neck with a progression in growth was diagnosed. The actual computed tomography indicated enlargement of the neck lesion and raised the suspicion of a metastasis. Figure 1 presents the status at the time of the first follow-up visit in May.

Based on the diagnostic results and the current guideline of the German Association of Oral- and Maxillofacial Surgery, a surgical lymph node biopsy was planned. During the operation, a detailed dissection of the blood vessels of the neck was

necessary. Despite careful procedure laterally from the internal jugular vein, severe bleeding was suddenly observed, which appeared at first as bleeding from out of the jugular vein. An adequate personal reinforcement was immediately requested and the jugular vein was ligated and resected. In the course of the operation, it became apparent that the bleeding originated from the caudal end of the common carotid artery patch. The carotid artery was fixed by an experienced vascular surgeon, the patch was removed, and the vessel was closed with direct sutures.

Intraoperative blood loss measured approximately 2500 ml. Treatment consisted of massive blood transfusion, fluid resuscitation, and intravenous application of catecholamines. Vital parameters remained stable throughout the course of the operation. Immediately, post-operative, the patient showed a transitory ascending hemiparesis resolving within 10 min. A computed angiography of the neck and the brain was performed without any evidence of brain damage or hypoperfusion. During the follow-up sessions, the patient revealed no symptoms or complaints referable to brain damage.

The histology of the lymph node biopsy showed no malignancy.

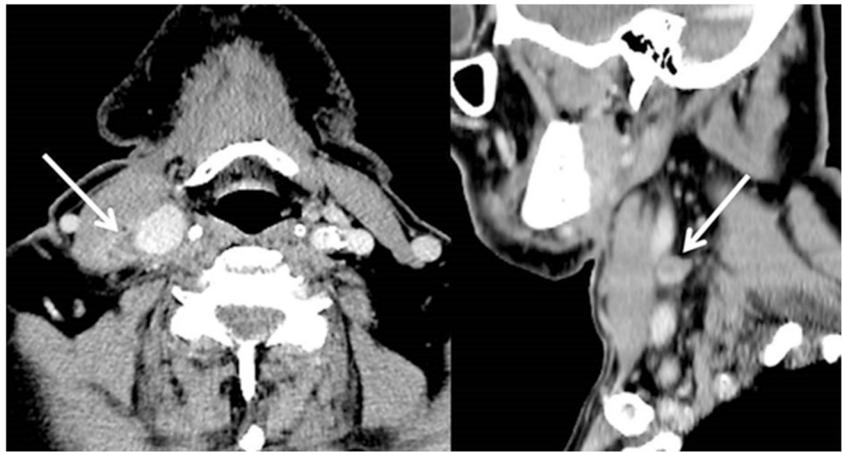
## Discussion

The authors believe that the previously diagnosed scar tissue of the neck was due to a chronic inflammatory reaction triggered by the carotid patch material. The neck dissection 8 years later might have worsened this inflammatory reaction leading to a progression of the lymph node swelling misleading the clinicians and resulting in the difficulty to clearly differentiate between a reactive lymph node and a metastasis.

In general, due to excellent therapeutic options, patients benefit from invasive treatment of severe arteriosclerosis of the carotid artery by vascular surgeons as well as from tumor resection and neck dissection by head and neck oncologists [3, 4, 7, 9]. After long years of survival under the same risk profile of consuming cancerogenic noxes—smoking, alcoholism, and so on, we can anticipate the onset of carotid stenosis in surviving oncologic patients or vice versa head and neck cancer in surviving patients with carotid allografts.

The guidelines of vascular surgery include a warning that any patient with prior surgery or radiation therapy has to be seen as a high-risk patient. They suggest carotid stenting instead of an operation, but they do not list any statement about long-term complications or suggestions on the diagnostic or therapeutic procedures in oncologic patients. The American guideline of carotid surgery was presented in 2011 [7]. It suggests that patients after irradiation are always high-risk patients and suggest stenting. The German guideline cites the American one and suggests the same procedure [3]. There are only a few references on the late complications after

**Fig. 1** Arrows showing the inflammatory mass mimicking lymph node metastasis, in both axial and sagittal CT-scans. The lesion is directly attached to the carotid artery



carotid allografts. Alawy et al. describe lately a chronic inflammatory process as a reaction on Dacron patches [1].

The guidelines on head and neck squamous cell cancer include no suggestions on the difficulties of the diagnostics or surgical procedure of previously treated necks [4, 9]. In the case of suspected metastasis, they suggest, however, a clarification in a timely manner via operative biopsy [9]. There is no exclusion criteria listed.

We performed a literature review without any findings on this specific topic in PubMed in English and German, current textbooks of radiology, vascular surgery, and head and neck/oral and maxillofacial surgery.

The issue of diagnostics of cervical metastases is controversially discussed. 18-Fluorodesoxyglucose positron emission tomography combined with computed tomography (18-FDG-PET-CT-scan) is superior to computed tomography or magnetic resonance imaging [8]. Liu stated that PET-CT-scans cannot provide reliable differentiation between cervical lymphadenitis and lymph node metastases [6].

Fine-needle aspiration cytology (FNAC) or fine-needle biopsy (FNB) can provide a histological diagnosis [5]. Chan and Chan found dramatic worsening in the results in the previously treated neck: sensitivity (82% vs. 40%), negative predictive value (74% vs. 37%), and accuracy (88% vs. 54%) [2]. In further, according to the German guideline, an ultrasound-assisted fine-needle aspiration biopsy has however a higher specificity in comparison to computed tomography, its reliability is not higher [9].

The German guideline [9] also suggests that the PET-CT has a too high rate of false-positive results and cannot provide with histologic diagnosis in case of metastases. It is stated also that in cases of relapse, a histological clarification and a re-staging of the interdisciplinary tumor board is required before starting additional therapy.

In our opinion, as both clinical and radiological signs stated a progression of the neck mass, it was necessary to clarify the situation. As current imaging methods cannot provide us with histological diagnosis, taking histological samples is a

necessary procedure. Preoperatively, the case was discussed in detail among the most experienced surgeons of our clinic. The conclusion was that the fine-needle biopsy in this specific case would have been a high-risk procedure with very questionable results under the given anatomical circumstances, thus the decision was taken to perform an open surgical biopsy to achieve a higher quality of the histological sampling and better control of the surgical site.

## Conclusion

An increasing number of patients has to be expected who report for cancer of the head and neck area after having received carotid surgery. This is why we suggest a careful procedure and interdisciplinary cooperation of radiologists, oral and maxillofacial surgeons, head and neck surgeons, and vascular surgeons so that in special cases the patient safety can be improved. In individual cases with a similar medical history, a close follow-up and eventually a conservative treatment can be adequate and safe.

Additionally, we suggest that surgical interventions in such patients are carried out in centers with adequately trained staff which can perform well-organized interdisciplinary teamwork and can fix serious situations in the operating ward.

Previously treated neck remains a partly undiscovered and very challenging area. Both diagnostics and treatment procedures require far more evidence and steadily updated guidelines to be able to provide safe treatment.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from the subject included in this study.

## References

1. Alawy M, Tawfick W, ElKassaby M, Shalaby A, Zaki M, Hynes N, Sultan S (2017) Late Dacron patch inflammatory reaction after carotid endarterectomy. *Eur J Vasc Endovasc Surg Off J Eur Soc Vasc Surg* 54:423–429. <https://doi.org/10.1016/j.ejvs.2017.06.015>
2. Chiu-Lung Chan R, Chan JY-W (2012) Effect of previous radiotherapy on cervical lymph node fine-needle aspiration cytology diagnostic accuracy in head and neck cancers. *Laryngoscope* 122(8):1779–1781. <https://doi.org/10.1002/lary.23380>
3. Eckstein H-H (2012) S3-Leitlinie zur “Diagnostik, Therapie und Nachsorge der extracraniellen Carotisstenose”. *Gefäßchirurgie* 17: 495–496. <https://doi.org/10.1007/s00772-012-1050-3>
4. Gramza, Jalisi, Truong (n.d.) Oropharyngeal Cancer Treatment (PDQ®)—Health Professional Version - National Cancer Institute [WWW Document]. URL <https://www.cancer.gov/types/head-and-neck/hp/adult/oropharyngeal-treatment-pdq> (accessed 7.28.18)
5. Jonson JT (2018) Fine-needle aspiration of neck masses: overview, indications, contraindications. 2018. <https://emedicine.medscape.com/article/1819862-overview>
6. Liu Y (2014) Postoperative reactive lymphadenitis: a potential cause of false-positive FDG PET/CT. *World J Radiol* 6(12):890. <https://doi.org/10.4329/wjr.v6.i12.890>
7. Ricotta JJ, AbuRahma A, Ascher E, Eskandari M, Faries P, Lal BK (2011) Updated Society for Vascular Surgery guidelines for management of extracranial carotid disease. *J Vasc Surg* 54:e1–e31. <https://doi.org/10.1016/j.jvs.2011.07.031>
8. Roh J-L, Park JP, Kim JS, Lee JH, Cho K-J, Choi S-H, Nam SY, Kim SY (2014) 18 F fluorodeoxyglucose PET/CT in head and neck squamous cell carcinoma with negative neck palpation findings: a prospective study. *Radiology* 271(1):153–161. <https://doi.org/10.1148/radiol.13131470>
9. Wolff K-D (2012) Langversion S3 Mundhöhlenkarzinom - S3-Mundhoehlenkarzinom-OL-Langversion\_.pdf

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.