



# A Case of Pseudoaneurysm of the Common Carotid Artery Presented with Upper Airway Obstruction

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## Abstract

Extracranial carotid artery aneurysms account for only 1% of all arterial aneurysms and therefore they are quite rare pathology. Patients with those aneurysms present with a pulsatile neck mass, neurological events such as a stroke and a cranial nerves dysfunction due to compression effects. Because of the high risk of a rupture and thromboembolic events, it is recommended to repair these aneurysms either utilizing open surgical or endovascular approach. This report details a case of a female patient with a common carotid artery pseudoaneurysm presented with upper airway obstruction. Tracheotomy was performed as a lifesaving procedure. We opted for an endovascular management because of the existing tracheostomy that could complicate surgical approach. Pseudoaneurysm was successfully managed with an endovascular deployment of self-expanding stent graft.

**Keywords** Carotid artery · Pseudoaneurysm · Respiratory failure · Tracheotomy

## Case report

An 86-year-old lady presented in the emergency department because of the breathing difficulties. The right side of her neck was swelling and her respiratory status was rapidly declining. She was examined by an otorhinolaryngologist. The rima glottidis was not available for an inspection. Regarding her clinical presentation of acute airway obstruction, patient was immediately intubated to secure the airway. Emergency tracheotomy was indicated by the otorhinolaryngologist. After the procedure, the patient was respiratory sufficient and hemodynamically stable.

After the airway was secured, further clinical investigation on her neck mass and breathing difficulties was conducted. Patient suffered from dementia and most of her anamnestic data were obtained from previous medical records. She denied any previous trauma to the neck region or surgery in that area. In her medical records, there were no signs of connective

tissue disorders or radiotherapy. She was diagnosed with hypothyroidism and years long arterial hypertension and rheumatoid arthritis.

Computed tomography of neck and thorax showed an expansive formation indivisible of the common carotid artery compressing trachea and esophagus to the left.

Computed tomography angiography of carotid arteries was performed as a next step and it revealed a 40 × 25-mm large pseudoaneurysm (PSAN) of the right common carotid artery (CCA). The PSAN aroused from a 1.5-mm long rupture of the medial wall of the common carotid artery located 30-mm caudal to the bifurcation (Figs. 1 and 2).

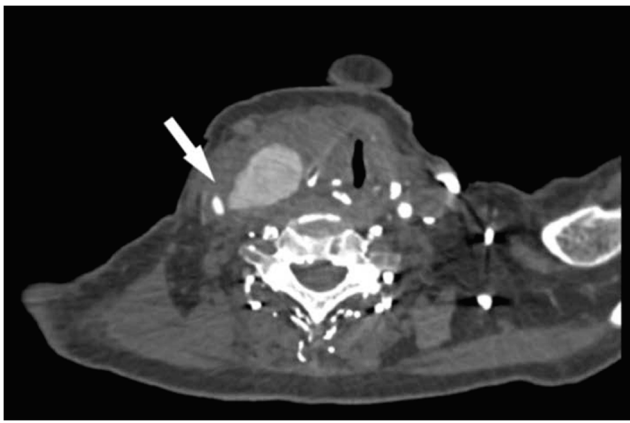
Two approaches for pseudoaneurysm management were considered: open surgical and endovascular approach. We opted for an endovascular management because of the recent tracheostomy that could complicate surgical approach.

After obtaining materials for the procedure, interventional radiologist performed percutaneous transluminal angioplasty of the right CCA. The right common femoral artery was punctured under the local anesthesia. Long introducer sheath (90 cm, 7F) was placed in the proximal part of right CCA. Extravasation of the contrast media from small hole in the medial wall of middle part of the common carotid artery was verified (Fig. 3). Self-expanding stent graft 7 × 25mm (Viabahn®, Gore®) was successfully deployed over the arterial wall where contrast leakage was shown. Additionally,

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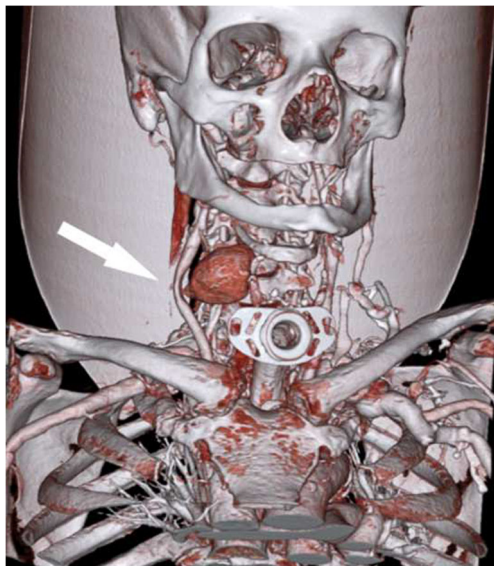


**Fig. 1** Computed tomography angiography showing contrast extravasation from the right common carotid artery (*white arrow*) and compression of the trachea to the left

postdilatation with balloon catheter 6 × 20 mm was done. After the procedure, images have shown patent stent graft and both carotid arteries without contrast filling of the pseudoaneurysm (Fig. 4). Puncture side was sealed with Angioseal®. Good hemostasis was obtained and patient was readmitted on the hospital ward.

Early postprocedural recovery was uncomplicated. There was no deterioration in neurological status. Regarding the general condition of the patient and her satisfying respiratory status with tracheostomy, open surgical procedure for the evacuation of the neck hematoma was not indicated.

After active treatment had ended, patient was transferred into the palliative care hospital for further medical treatment. Patient unfortunately died in the hospice due to heart failure 1 month after endovascular treatment was performed.



**Fig. 2** Three-dimensional reconstruction of computed tomography showing pseudoaneurysm of the right common carotid artery (*white arrow*) and tracheostomy



**Fig. 3** Digital subtraction angiography depicting place of the contrast extravasation (*white arrow*)

### Discussion

Atherosclerotic changes provide the basis for the genesis of true aneurysms. Other common cause is blunt or sharp trauma that usually results in partial arterial wall thickness lesion thus creating a pseudoaneurysm. In pre-antibiotic era infections



**Fig. 4** Postprocedural angiography after stent graft placement (*white arrow*) without contrast leakage

such as middle-ear infection, syphilis or tuberculosis could cause the extracranial carotid artery aneurysm [1, 2]. Extracranial carotid artery aneurysms (ECAAs) can also be seen in connective tissue diseases and in autoimmune disorders [3].

The available literature recommendation is to manage ECAAs due to high incidence of rupture and thromboembolic events such as stroke and transient ischemic attack (TIA) [4, 5]. Conservative treatment is reserved only for small asymptomatic aneurysms without expansion and without intraluminal thrombus in control period [6].

Open surgical aneurysm repair of a carotid artery aneurysm entails excision of the aneurysm and artery reconstruction. The best option is a reconstruction of the artery with an autologous venous graft. Other options are prosthetic graft, primary closure of the artery, patch angioplasty, or end-to-end anastomosis [7]. In case of need, ligation of the artery can be made, but with high postprocedural morbidity and mortality, respectively [8].

Endovascular stent grafting is another repair option. It is highly recommended over the surgical repair when the aneurysm is a part of the distal internal carotid artery, when managing posttraumatic pseudoaneurysms and in patients with “hostile neck” due to previous surgery or radiotherapy.

Systematic reviews reported shorter hospital length stay and lower 30-day mortality and major stroke incidence in cases where endovascular repair was performed in comparison to open surgical procedures [5]. Long-term outcomes are similar for both [7]. Since endovascular procedures are only being performed recently, there are not many data available on late endovascular complications such as stent migration, rupture, or occlusion but they may be expected.

In conclusion, endovascular stent grafting is a feasible and safe method for repair of the common carotid artery pseudoaneurysm in patients with changed neck anatomy due to tracheotomy. It is recommended to evacuate hematoma, but with secured airway and without ongoing leakage from the arterial wall, hematoma can be left for a spontaneous resorption.

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**Authors' contributions** Maja Vizjak: conceptualization, project writing and management, defining the study, extensive literature search, performing the study, practical work, operative work, acquisition, manuscript writing, editing and reviewing of the manuscript.

Dino Štrlek: conceptualization, project writing and management, defining the study, extensive literature search, performing the study,

practical work, operative work, manuscript writing, editing and reviewing of the manuscript.

Danijel Cvetko: project writing and management, defining the study, performing the study, practical work, operative work, manuscript writing, editing and reviewing of the manuscript.

Maja Ljubotina: project writing and management, extensive literature search, performing the study, practical work, operative work, acquisition, manuscript writing, editing and reviewing of the manuscript.

## Compliance with ethical standards

**Conflict of interest** The authors, Maja Vizjak, Dino Štrlek, Danijel Cvetko et Maja Ljubotina, declare that there is no conflict of interest.

**Ethical approval** Ethical approval for this manuscript was obtained from Varaždin General Hospital Ethical Approval Committee.

**Consent to publish** Informed consent has been obtained from the patient's family (deceased patient's daughter) for publication of the case report and accompanying images.

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