

Sygnatura: Pol J Radiol, 2006; 71(1): 120-122

Otrzymano: 2005.09.20

Zaakceptowano: 2005.12.20

Primary mycotic aneurysm of the common carotid artery: Case report

Pierwotny tętniak zapalny tętnicy szyjnej wspólnej. Opis przypadku

Aleksander Łukasiewicz¹, Stanisław Molski¹, Grzegorz Meder², Wiesław Jundziłł¹, Władysław Lasek²

¹ Katedra i Klinika Chirurgii Ogólnej i Naczyń CM, Bydgoszcz, Polska

² Katedra i Zakład Radiologii i Diagnostyki Obrazowej, Bydgoszcz, Polska

Adres autora: Grzegorz Meder, Katedra i Zakład Radiologii i Diagnostyki Obrazowej CM w Bydgoszczy, kge@wp.pl

Summary

Background:	Aneurysms of the common carotid artery are relatively rare. Mycotic aneurysms in such location occur even less frequently. Causative factors can be sepsis, recent surgery, or dental procedures. Immunosuppression may also be a burdening factor.
Case report:	The authors present the case of a 70-year-old male patient with primary mycotic carotid artery aneurysm. The patient was diagnosed with ultrasound and multidetector spiral computed tomography and treated operatively with a PTFE prosthesis. Culture-appropriate antibiotic therapy was administered during the perioperative period.
Discussion:	The rarity of extracranial carotid artery aneurysms might cause diagnostic and treatment difficulties. Open surgery is the recommended method, although the endovascular approach is gaining more acceptance. The choice of treatment modality might be facilitated by a detailed morphologic description of the aneurysm and its surroundings. Available methods of imaging are described.
Key words:	mycotic aneurysm • internal carotid artery • volume rendering
PDF file:	http://www.polradiol.com/pub/pjr/vol_71/nr_1/8177.pdf

Background

Aneurysms of the common carotid artery are relatively rare entity [1]. It is estimated that less than 0,5% of all carotid artery operations are performed for aneurysmatic disease [2]. Mycotic aneurysms in such localization are even less frequent. Causative factors are bacteremia, recent or remote surgery, soft tissue infection of head and neck, endocarditis and dental procedures. Immunosuppression caused by chemotherapy, prolonged steroid therapy, AIDS, malnutrition are predisposing factor [3]. Below we present a case of primary mycotic aneurysm of the common carotid artery (CCAA) imaged with doppler ultrasound and multidetector computed tomography. The patient was treated with total excision and subsequent PTFE grafting. Perioperative, followed by culture appropriate antibiotic therapy was instituted.

Case report

A 70-years old male patient presented with tender, pulsating left neck submandibular mass. His main complaints consisted of neck pain and recurrent fevers lasting one week prior to admission. There was no history of trauma or any surgical/dental procedures. The body temperature on the day of admission was 39°C with hectic curve. Blood analysis revealed moderate anemia and thrombocytopenia without leukocytosis (HGB 8,0 g/dl, HCT 25,1%, PLT $128 \times 10^3/\mu\text{l}$, WBC $5,05 \times 10^3/\mu\text{l}$). During general examination no obvious source of the infection signs was found. Performed ultrasound examination of the lesion confirmed the clinical diagnosis of the carotid artery aneurysm. Considering hectic fever, multiple blood samples were sent for culture for next few days and empiric antibiotic

(amoxicillin with clavulonic acid) was administered. On 3rd day after admission, culture revealed *Pseudomonas aeruginosa* as relevant pathogen. Based on the antibiogram amoxicillin with clavulonic acid was continued with subsequent clinical improvement. Three dental extractions were performed in order to assure oral sanity (two ipsilateral maxillary and one contralateral).

Performed neurological assessment and brain CT revealed no signs of focal brain damage. In order to precisely define the extent of the aneurysm and its topography an angio-CT was performed. Large, thick-walled, polycyclic aneurysm of the left common carotid artery (CCA) was found (fig. 1). Maximal diameter was 39 mm, maximal wall thickness was 7 mm which was considered as an effect of inflammation (fig. 2). Also tissue below the bifurcation of CCA revealed signs of inflammation (fig. 3).

Transcranial doppler sonography didn't reveal any significant intracranial arterial flow disturbances proving that circle of Willis was patent. The patient underwent surgery on the 10th day of hospital stay. At the time of skin incision, an unexpected abscess within the aneurysm wall was accidentally opened, requiring immediate CCA clamping. A contemporary common carotid artery to internal carotid artery (ICA) shunt was used to maintain cerebral perfusion. Intraoperative samples were sent for culture. Than wide excision and vigorous lavage with saline solution was done. Due to prolonged clamping time, a 6mm diameter PTFE direct prosthesis was utilized to restore the blood flow to the internal carotid artery, while external carotid artery was ligated. Suction drain was placed next to the graft and the operative wound closed by layers. During postoperative course a superficial wound infection with the same *Pseudomonas aeruginosa* strain occurred however it was susceptible to local treatment and prolonged antibiotic therapy. No neurologic deficit was observed during hospital stay. On the 15th postoperative day the patient was discharged with adequate oral antibiotic to be continued for another four weeks.

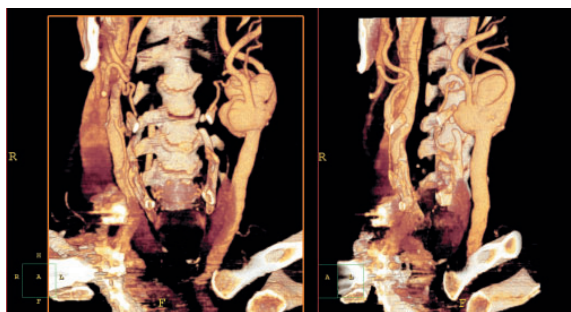


Figure 1. VR: large, aneurysm of common carotid artery bifurcation, AP and oblique view.

Rycina 1. Duży, policykliczny tętniak rozwidlenia tętnicy szyjnej wspólnej – badanie TK, rekonstrukcja objętościowa, projekcja AP i skośna.

Discussion

Primary mycotic aneurysms of the extracranial carotid arteries are extremely rare. A review by Knouse et al. revealed only 73 case reports cited in MEDLINE between 1966-2002 however these included also postendarterectomy pseudoaneurysms [1]. Single center studies only confirm this fact. El-Sabrou et al. described The Texas Heart Institute experience in treatment of such lesions. Only 13 of 60 aneurysms, during a 35 period were infected. All of these were found in postendarterectomy arteries patients [4]. This is the first case of primary mycotic carotid artery aneurysm we have encountered since the foundation of our Department in 1975. Such rarity constitutes a problem, as vascular surgeons are not familiar with treatment of such lesions. Until now open surgery is preferred treatment modality [4,9,14,15]. Experience with endovascular treatment has also been gained [5-8,10,11,13]. Proper and detailed preoperative imaging is very important. Although ultrasound seems to be sufficient to diagnose an aneurysm it has a limited value when it comes to depicting potentially complex anatomy of the aneurysm and its surroundings.

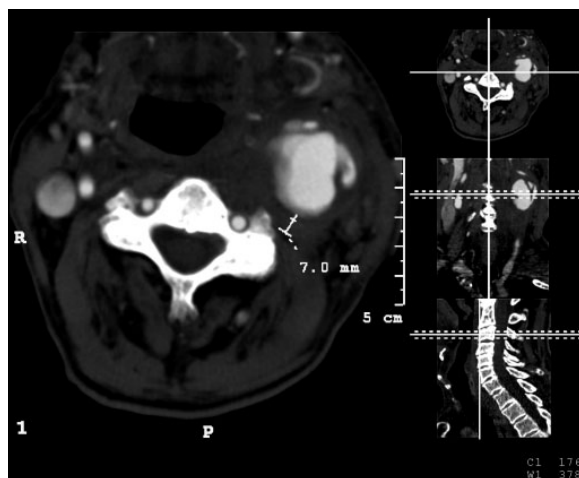


Figure 2. Native axial scan. 7-mm-thick wall of the aneurysm.

Rycina 2. Badanie TK, obraz poprzeczny – gruba (7 mm) ściana tętniaka.

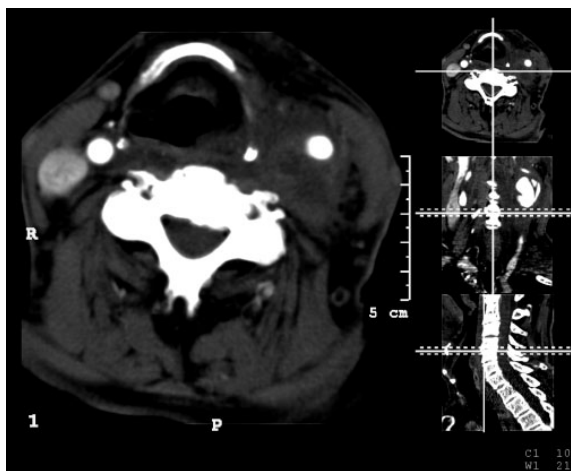


Figure 3. Native scan: tissue below common carotid artery bifurcation with signs of inflammation, early abscess formation.

Rycina 3. Obraz TK poprzeczny, tkanki poniżej rozwidlenia tętnicy szyjnej wspólnej, cechy zapalenia – wczesna faza ropnia.

Digital subtraction angiography (DSA) may give more information about aneurysm anatomy but almost none about its surroundings. Major advantage of DSA over less invasive imaging methods is possibility of performing endovascular treatment. Multidetector spiral computed tomography is in our opinion the best imaging tool. It is fast, cost effective and noninvasive. Volume rendering (VR) protocols allows for 3-dimensional imaging with a high resolution (pic. 1). Images may be viewed from an unlimited number of angles [16]. This may be crucial when deciding open or endoluminal treatment. But even though VR 3-d images are

impressive, one should not ignore reviewing native scans or using multiplanar reformatting (MPR) technique which may give an additional information. In case discussed here, after surgery, during second review we focused on a hypodense structure with slightly enhancing outer limits, surrounding CCA just below bifurcation (pic. 3). It was not overlooked preoperatively and described as "surrounding tissue inflammation". Since there was a 3 day gap between angio-CT and surgery we now believe this structure was an early stage abscess within the aneurysm wall. We would consider this to be a pitfall.

References:

1. Knouse M, Madeira RG, Celani VJ: Pseudomonas aeruginosa causing a right carotid artery mycotic aneurysm after dental extraction procedure. *Mayo Clinic Proc*; Oct 2002; 77, 1125-1130.
2. Hertzner NR Extracranial carotid aneurysms: A new look at an old problem *J Vasc Surg* 2000; 31: 823-5.
3. Hubaut JJ, Albat B, Frapier JM, Chaptal PA Mycotic Aneurysm of the Extracranial Carotid Artery: An Uncommon Complication of Bacterial Endocarditis *Ann Vasc Surg* 1997; 11: 634-636.
4. El-Sabrou R, Cooley DA Extracranial carotid artery aneurysms: Texas Heart Institute experience. *J Vasc Surg* 2000; 31: 702-12.
5. Szopinski P; Ciostek P; Kielar M; Myrcha P; Pleban E; Noszczyk W. A series of 15 patients with extracranial carotid artery aneurysms: surgical and endovascular treatment. *Eur J Vasc Endovasc Surg* 2005 Mar; 29(3): 256-6.
6. Amar AP; Teitelbaum GP; Giannotta SL; Larsen DW. Covered stent-graft repair of the brachiocephalic arteries: technical note. *Neurosurgery* 2002 Jul; 51(1): 247-52.
7. Fischer B; Palkovic S; Wassmann H; Heindel W; Kramer SC. Endovascular management of tandem extracranial internal carotid artery aneurysms with a covered stent. *J Endovasc Ther* 2004 Dec; 11(6): 739-41.
8. Juszkat R; Wrobel M; Golusinski W; Szyfter W; Checinski P; Oszkinis G. Stent-graft treatment of extracranial internal carotid artery aneurysm. *Eur Arch Otorhinolaryngol* 2005 Mar 1; pS0937-4477.
9. Zhang Q, Duan ZQ, Xin SJ, Wang XW, Dong YT Management of Extracranial Carotid Artery Aneurysms: 17 Years' Experience *Eur J Vasc Endovasc Surg* 1999; 18, 162-165.
10. Reisner A, Marshall GS, Bryant K, Postell GC, Eberly SM. Endovascular occlusion of a carotid pseudoaneurysm complicating deep neck space infection in a child. *J Neurosurg* 1999; 91: 510-514.
11. Ferguson DJ, Boyle JR, Millar J., Phillips MJ Retrograde Endovascular Management of a Mycotic Internal Carotid Artery False Aneurysm *Eur J Vasc Endovasc Surg* 2002 24, 88-90.
12. El-Sabrou R, MD, Reu G, Cooley DA Infected Postcarotid Endarterectomy Pseudoaneurysms: Retrospective Review of a Series *Ann Vasc Surg* 2000; 14: 239-247.
13. Bush RL; Lin PH; Dodson TF; Dion JE; Lumsden AB Endoluminal stent placement and coil embolization for the management of carotid artery pseudoaneurysms. *J Endovasc Ther* 2001 Feb; 8(1): 53-61.
14. Aleksic M; Heckenkamp J; Gawenda M; Brunkwall J. Differentiated treatment of aneurysms of the extracranial carotid artery. *J Cardiovasc Surg (Torino)* 2005 Feb; 46(1): 19-23.
15. Davidovic L; Kostic D; Maksimovic Z; Markovic D; Vasic D; Markovic M; Duvnjak S; Jakovljevic N. Carotid artery aneurysms. *Vascular* 2004 May-Jun; 12(3): 166-70.
16. P. S. Calhoun B. S. Kuszyk, D.G. Heath, J. C. Carley, E.K. Fishman. Three-dimensional Volume Rendering of Spiral CT Data: Theory and Method. *Radiographics*. 1999; 19: 745-764.