

Pseudoaneurysm of the External Carotid Artery After a Blunt Facial Trauma

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Main causes of pseudoaneurysm of the carotid artery include arteriosclerosis, trauma, infections, cystic medial necrosis, fibromuscular dysplasia, and congenital anomalies.¹ Traumatic pseudoaneurysm is most often the result of blunt trauma sustained in motor vehicle crashes and presents several days or weeks after the initial injury. Pseudoaneurysms of the branches of the external carotid artery are well known, but traumatic pseudoaneurysm of the external carotid artery is an uncommon event.

In this article, we present a case of external carotid artery pseudoaneurysm that developed after blunt facial trauma. The patient presentation was atypical, since the main symptom was a pharyngeal hematoma. A false aneurysm of the external carotid artery was diagnosed by angiography and treated by embolization with silk wires. To the best of our knowledge, this is the first case of a nonpenetrating posttraumatic pseudoaneurysm of the distal portion of the external carotid artery with such as presentation.

CASE REPORT

A 24-year-old man was first admitted to the hospital after a fight. He was inebriated and presented with a laceration of the left pinna. A head, neck, and body computed tomographic (CT) scan did not reveal any significant abnormalities. The laceration was sutured and the patient was discharged after few hours of observation. Five days later, the patient was readmitted because of bleeding from the mouth. The reported blood loss amounted to 500 mL. Clinical examination showed a large mucosal hematoma bulging into the pharynx, with involvement of the left arytenoid. However, the vocal cords exhibited normal motion and the airway was not compromised. A CT angiogram demonstrated a 10-mm false aneurysm at the terminal part of the external left carotid artery between the styloid process and the ramus of the

mandible (Fig. 1). A submucosal hematoma infiltrated the parapharyngeal tissues from the nasopharynx to the lower oropharynx.

An angiography was performed confirming the pseudoaneurysm situated at the distal external carotid, below its bifurcation into internal maxillary and superficial temporal arteries (Fig. 2). The aneurysmal sac was catheterized with a microcatheter and a microguide and embolized. Several silk wires were released to obtain a complete obstruction of the false aneurysm, with reduction of the internal maxillary artery flow (Fig. 3). The postembolization recovery was uncomplicated, with resolution of the submucosal hematoma within a few weeks. The clinical examination was normal 2 months later.

DISCUSSION

Pseudoaneurysms have been found throughout history. Early reports describe aneurysms resulting from dueling with swords, rapiers, and other weapons. The first report of a posttraumatic pseudoaneurysm involving extracranial arteries was published in 1644² and up to 400 cases have been described since then. More recently, pseudoaneurysms have resulted from gunshot wounds, sports injuries, high-speed vehicular crashes, head and neck or maxillofacial surgery, and irradiation. In blunt carotid injuries, the proposed causes include exaggerated neck movements, direct blows to the head and neck, blunt intraoral trauma, or strangulation. The presumed pathophysiologic mechanisms include a stretching or a compression of the external carotid artery over the transverse process of the cervical vertebrae or over the styloid process, or both.¹ Involvement of branches of the external carotid artery is considerably more common than involvement of the main external carotid artery. The superficial temporal artery is by far the most frequently involved vessel, followed by the internal maxillary and facial arteries. A delay between the initial trauma and the diagnosis of the false aneurysm (5 days in our case) is well known.³

A review of the recent English literature yielded only 13 other cases^{4–9} of pseudoaneurysms of the external carotid artery (Table 1). The majority of patients were men (11 of 13), ranging in age from 9 months to 75 years. Seven cases were posttraumatic, two were caused by an infection from bacterial or mycotic agents, two occurred after surgery (ton-

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Fig. 1. Selective left external carotid angiography after embolization. No flow is seen in the pseudoaneurysm of the external carotid artery (arrow).

sillectomy and left radical neck dissection with pectoralis major flap in an irradiated field), and two cases were attributed to arteriosclerosis.

Posttraumatic pseudoaneurysm of the external carotid arteries usually affects the parotid gland and can result in transient or complete facial paralysis.⁷ Oropharyngeal hem-

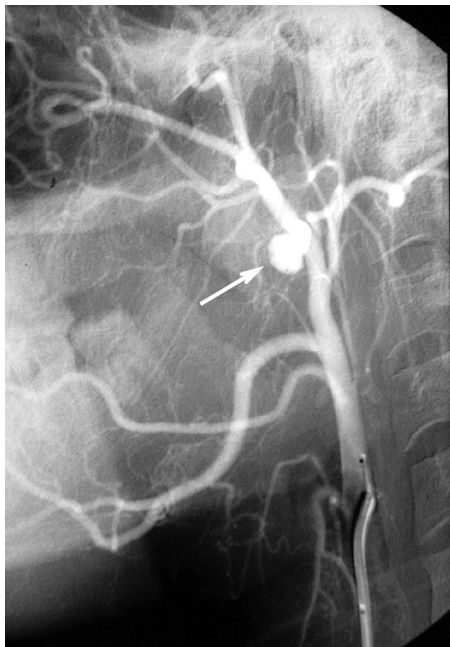


Fig. 2. Contrast-enhanced CT scan showing the retromandibular location of the false aneurysm (arrow) with a peripheral thrombus.

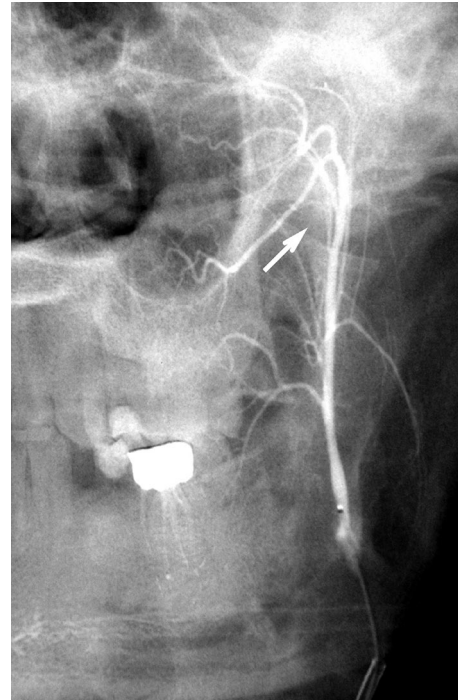


Fig. 3. Selective left external carotid angiography 5 days after the blunt facial trauma; lateral view. A pseudoaneurysm is seen at the distal part of the external carotid artery (arrow).

orrhage as the first manifestation of an external carotid pseudoaneurysm has been described only once, in a 9-month-old infant with mycotic aneurysm.⁸ In contrast, the hemorrhage of our patient was not limited to the oropharynx but also involved the naso- and hypopharynx. The condition was therefore more hazardous because of the potential risk of airway obstruction.

Diagnosis of an external carotid artery pseudoaneurysm can be suspected by clinical examination when a pulsatile mass is palpated or a typical systolic bruit appreciated during auscultation. Radiologic exams are performed to define the precise localization. Contrast-enhanced computed tomography could define the extent of the lesion and its relation to surrounding bony and soft tissue structures. Although the initial CT scan sometimes confirms the diagnosis,¹⁰ often, as in our patient, no clear vascular abnormalities are detected, possibly because the false aneurysm had not yet developed. Angiography remains essential for diagnosis, especially in deep localizations.

In the reported cases, treatments included ligation with excision of the pseudoaneurysm in seven cases, ligation without excision in one case, and embolization in five cases. When the pseudoaneurysm is anatomically amenable to repair, surgical intervention is recommended.¹ Recently, radiologists have developed considerable expertise in angiography and selective embolization. Among the available embolization materials, silk wires are safe and associated with less inflammation or hemorrhagic complications.¹¹ In our patient, the location close to the

Table 1 Case Summary of Pseudoaneurysm of the External Carotid Arteries

Source	Age (yr)	Sex	Side	Size (cm)	Cause	Interval to Onset	Presentation	Initial Diagnosis	Treatment	Complications
Calam	26	M	R	4	MVC	2 yr	Painful mass, "buzzing" in right ear	Parotid tumor	Ligation and excision	None
Okafor	14	M	R	6 × 8	Fish bone in pharynx	5 wk	Painful mass	Tuberculosis	Ligation and excision	Laryngeal obstruction requiring tracheostomy
Johnson	75	M	R	5	Arteriosclerosis	ER	Painful mass	Aneurysm	Ligation and excision	Neurological deficit
Maurizi	1	M	L	Extra large	Tonsillitis	4 d	Otorrhagia	Mycotic aneurysm	Ligation and excision	None
Mauldin	19	M	R	NA	MVC	7 d	Epistaxis	Trauma from nasal trumpet	Embolization	Underwent ligation of ethmoidal and internal maxillary arteries before diagnosis; massive blood loss
Taher	19	M	R	Large	Trauma (wooden club)	>1 yr	Pulsatile mass, facial nerve paralysis	Traumatic aneurysm	Ligation and excision	Paralysis remains
Minion	54	M	L	2 × 4	RND irradiation	8 yr	Pulsatile mass	Pseudoaneurysm	Embolization	None
Bartoli	11	M	R	Large	Trauma (ice skate)	10 d	Pulsatile mass	Pseudoaneurysm	Embolization	None
Lewis	67	F	R	2.5	Arteriosclerosis?	ER	Parotid mass	Traumatic aneurysm	Embolization	None
Karas	6	M	R	NA	Tonsillectomy	3 mo	Pulsatile mass	Pseudoaneurysm	Ligation	None
Rhee	32	M	R	5	Trauma (stab injury)	7 d	Pulsatile mass	Traumatic aneurysm	Ligation and excision and superficial parotidectomy	Transitional Facial nerve palsy
Jarvis	<1	F	L	1.8 × 2.5	Mycotic	ER	Hematemesis	Acute bacterial tonsillitis with tonsillar hemorrhage	Embolization	None
Campbell	53	M	L	2.8	Trauma (hyoid bone fracture)	Chronic	Pulsatile mass otalgia	Pseudoaneurysm	Ligation and excision and removed a portion of the hyoid bone	None
Present case	24	M	L	1	Trauma (punching fight)	5 d	Hematemesis	Carotid dissection	Embolization	None

ER, emergency room; MVC, motor vehicle crash; NA, not available; RND, radical neck dissection.

facial nerve increased the risk during the surgery, and so we treated our patient by embolization.

This case demonstrates that pseudoaneurysms of the external carotid artery might present after a blunt facial trauma and result in a pharyngeal hemorrhage. When treating blunt facial trauma, physicians must be aware of the potential risk of arterial damage and of the delay of its appearance.

REFERENCES

1. Kraus RR, Bergstein JM, DeBord JR. Diagnosis, treatment, and outcome of blunt carotid arterial injuries. *Am J Surg.* 1999;178:190–193.
2. Conner WC III, Rohrich RJ, Pollock RA. Traumatic aneurysm of the face and temple: a patient report literature review, 1644 to 1998. *Ann Plast Surg.* 1998;41:321–326.
3. Feliciano DV, Cruse PA, Burch JM, et al. Delayed diagnosis of arterial injuries. *Am J Surg.* 1987;154:579–584.
4. Minion DJ, Lynch TG, Baxter BT, et al. Pseudoaneurysm of the external carotid artery following radical neck dissection and irradiation: a case report and review of the literature. *Cardiovasc Surg.* 1994;2:607–611.
5. Bartoli JM, Triglia JM, Farnarier P, et al. Embolization of an intraparotid false aneurysm of the external carotid artery: case report. *Cardiovasc Intervent Radiol.* 1991;14:173–174.
6. Karas DE, Sawin RS, Sie KC. Pseudoaneurysm of the external carotid artery after tonsillectomy. A rare complication. *Arch Otolaryngol Head Neck Surg.* 1997;123:345–347.
7. Rhee CS, Jinn TH, Jung HW, et al. Traumatic pseudoaneurysm of the external carotid artery with parotid mass and delayed facial nerve palsy. *Otolaryngol Head Neck Surg.* 1999;121:158–160.
8. Jarvis SJ, Parker AJ. External carotid artery aneurysm in an infant presenting with oropharyngeal haemorrhage. *J Laryngol Otol.* 2001; 115:500–501.
9. Campbell A, Butler A, Grandas O. A case of external carotid artery pseudoaneurysm from hyoid bone fracture. *Am Surg.* 2003;69:534–535.
10. Calem WS. Traumatic (false) aneurysm of the terminal portion of the external carotid artery. *Am J Surg.* 1963;106:522–524.
11. Okafor BC. Aneurysm of the external artery following a foreign body in the pharynx. *J Laryngol Otol.* 1978;92:429–434.
12. Johnson JN, Helsby CR, Stell PM. Aneurysm of the external carotid artery. *J Cardiovasc Surg.* 1980;21:105–107.
13. Maurizi M, Almadori G, Paludetti G, et al. Pseudoaneurysm of the external carotid artery: report of a case. *Int J Pediatr Otorhinolaryngol.* 1985;8:263–269.
14. Mauldin FW, Cornay WJ III, Mahaley MS Jr, et al. Severe epistaxis from a false aneurysm of the external carotid artery. *Otolaryngol Head Neck Surg.* 1989;101:588–590.
15. Taher AA. Traumatic external carotid artery aneurysm causing facial nerve paralysis. A case report. *Int J Oral Maxillofac Surg.* 1991; 20:88–89.
16. Minion DJ, Lynch TG, Baxter BT, et al. Pseudoaneurysm of the external carotid artery following radical neck dissection and irradiation: a case report and review of the literature. *Cardiovasc Surg.* 1994;2:607–611.
17. Bartoli JM, Triglia JM, Farnarier P, et al. Embolization of an intraparotid false aneurysm of the external carotid artery: case report. *Cardiovasc Intervent Radiol.* 1991;14:173–174.
18. Lewis R, Lampe H. An aneurysm of the external carotid artery presenting as a parotid mass: A case report. *J Otolaryngol.* 1993; 22:413–414.
19. Karas DE, Sawin RS, Sie KC. Pseudoaneurysm of the external carotid artery after tonsillectomy. A rare complication. *Arch Otolaryngol Head Neck Surg.* 1997;123:345–347.
20. Rhee CS, Jinn TH, Jung HW, et al. Traumatic pseudoaneurysm of the external carotid artery with parotid mass and delayed facial nerve palsy. *Otolaryngol Head Neck Surg.* 1999;121:158–160.
21. Jarvis SJ, Parker AJ. External carotid artery aneurysm in an infant presenting with oropharyngeal haemorrhage. *J Laryngol Otol.* 2001; 115:500–501.
22. Campbell A, Butler A, Grandas O. A case of external carotid artery pseudoaneurysm from hyoid bone fracture. *Am Surg.* 2003;69:534–535.
23. Walker MT, Liu BP, Salehi SA, et al. Superficial temporal artery pseudoaneurysm: diagnosis and preoperative planning with CT angiography. *AJNR Am J Neuroradiol.* 2003;24:147–150.
24. Schmutz F, McAuliffe W, Anderson DM, et al. Embolization of cerebral arteriovenous malformations with silk: histopathologic changes and hemorrhagic complications. *AJNR Am J Neuroradiol.* 1997;18:1233–1237.