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Spontaneous Giant Aneurysm of the Superficial Temporal Artery

—Case Report—

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Abstract

A 78-year-old woman presented with preauricular superficial temporal artery (STA) aneurysm and scalp porocarcinoma, which had both increased in size over 2 years. She had no previous history of head trauma. Three-dimensional (3D) computed tomography (CT) angiography revealed a 4-cm diameter STA aneurysm arising from the main trunk of the left STA and located just lateral to the zygomatic arch. The scalp porocarcinoma was excised by dermatologists. The STA aneurysm was carefully dissected from the surrounding tissues, and was resected after ligation of the proximal STA. Histological examination showed the aneurysm consisted of intima, media, and adventitia, and the diagnosis was atherosclerotic fusiform aneurysm. 3D CT angiography is quite useful to plan surgical strategy for such an unusually large STA aneurysm.

Key words: superficial temporal artery, true aneurysm, giant aneurysm, three-dimensional computed tomography angiography

Introduction

Traumatic aneurysm of the superficial temporal artery (STA) is not unusual, with more than 400 reported cases,[13] including the first case in 1740.[4] Traumatic STA aneurysm usually develops in young adult men at 2 to 6 weeks after blunt head trauma,[11] and the majority are pseudoaneurysms. Spontaneous or non-traumatic STA aneurysms are quite rare, with only 16 cases described.[1,2,4,5,7,9,10,12,15] Histological examination confirmed ''true'' aneurysm in 7 of these cases,[1,2,5,7,9,10,12] and 3 were giant true STA aneurysm, with more than 25-mm diameter.[1,2,5]

Here we describe a case of giant true STA aneurysm of 47-mm diameter that gradually increased in size over 2 years.

Case Report

A 78-year-old female first noticed two masses in the left temporal region 2 years previously, but did not consult a physician because of the absence of pain or discomfort. However, both masses gradually increased in size over 2 years, so she visited our hospital. She had no history of head trauma. Physical examination found a painless, pulsatile mass in the left preauricular area, and a black, hairy non-pulsatile mass in the left temporal region (Fig. 1). First, she was admitted to the Department of Dermatology and underwent surgical resection of the non-pulsatile mass. The histological diagnosis was porocarcinoma. She was then admitted to our department.

The pulsatile mass was round and about 4 cm in diameter. The left external auditory meatus was almost obstructed by the mass. Facial nerve function was intact. Computed tomography (CT) with contrast medium demonstrated homogeneous enhancement. Three-dimensional (3D) CT angiography revealed that the aneurysm arose from the main trunk of the left STA, which was located medial to the mass. The distal STA was not visible, probably because the blood flow was delayed due to turbulent flow in the huge aneurysm (Fig. 2). Magnetic resonance (MR) imaging and ultrasonography showed turbulent flow within the aneurysm. Based on these physical and radiological findings, our diagnosis was a non-traumatic, giant STA aneurysm.

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Fig. 1 Photograph showing a huge pulsating tumor in the left preauricular region (4 × 4 × 4 cm) and a hairy, black tumor in the left temporal region (3 × 3 × 2 cm).

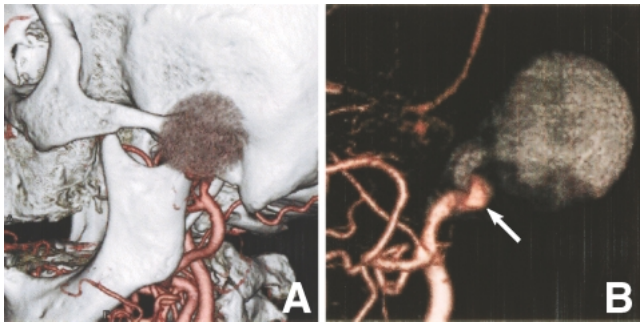

Fig. 2 Three-dimensional computed tomography angiograms demonstrating a giant aneurysm arising from the main trunk of left superficial temporal artery (STA), and located lateral to the zygomatic arch (A), and the proximal STA located medial to the aneurysm (B, *arrow*).

She underwent surgical excision under general anesthesia. After exposure of the distal STA, the aneurysm was carefully dissected from the surrounding tissues, including the temporal fascia, parotid gland, and zygomatic arch. The dissected aneurysm was rotated and the proximal STA was ligated. Finally, the aneurysm was resected (Fig. 3). The aneurysm was 47 mm × 45 mm × 35 mm with thickened wall. Histological examination revealed that the aneurysm consisted of the intima, media, and adventitia, and the elastic membrane was extended and fragmented. No malignant or inflammatory cells were found in the specimen. The histological diagnosis was a true aneurysm (Fig. 4). She was discharged without neurological deficits.

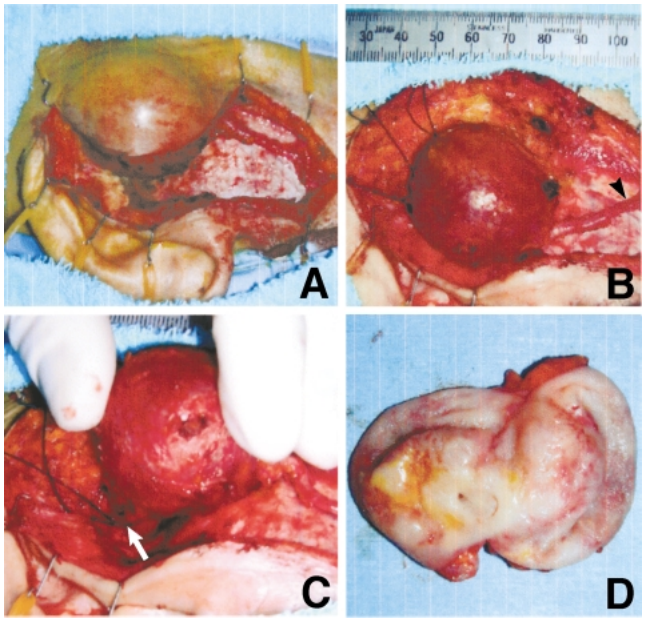

Fig. 3 Intraoperative photographs showing the parietal branch of the superficial temporal artery (STA) and the aneurysm covered by the skin (A). The aneurysm and the parietal branch of the STA (*arrowhead*), seen at the distal end of aneurysm, were completely exposed (B). The proximal STA medial to the aneurysm was dissected and ligated (C, *arrow*). The resected aneurysm had thickened wall around the orifice (D).

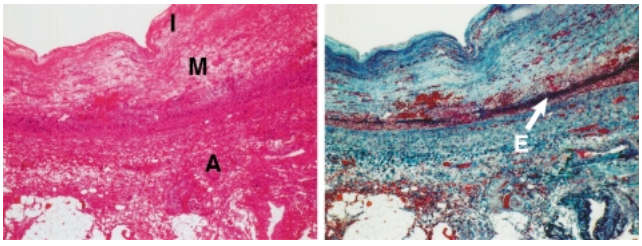

Fig. 4 Photomicrographs of the resected aneurysm showing preservation of the intima (I), media (M), and adventitia (A), and fragmentation of the elastic membrane (E, *arrow*). Hematoxylin and eosin stain (*left*) and elastica Masson stain (*right*), original magnification ×200.

Discussion

Eight cases of histologically verified, spontaneous true STA aneurysm have been reported, including

Table 1 Previous cases of histologically confirmed spontaneous true superficial temporal artery aneurysm

Author (Year)	Age (yrs)	Sex	Symptoms and signs	Location of aneurysm	Diagnosis	Size of aneurysm (mm)	Treatment	Outcome
Brown (1942)[1]	34	M	pulsatile mass	preauricular	physical examination	32 × 21 × 21	surgical excision	excellent
Martin and Shoemaker (1955)[9]	60	M	pulsatile mass	frontal branch	physical examination	not described	surgical excision	excellent
Buckspan and Rees (1986)[2]	70	M	pulsatile mass	preauricular	angiography	30 × 40	surgical excision	excellent
Locatelli et al. (1988)[7]	10	M	pulsatile mass	parietal branch	angiography	10 × 40	surgical excision	excellent
Nishioka et al. (1988)[10]	14	M	pulsatile mass	parietal branch	angiography	15 × 10	surgical excision	excellent
Endo et al. (2000)[5]	85	M	two pulsatile masses	preauricular and frontal branch	angiography	30 × 30, 10 × 10	surgical excision	excellent
Porcellini et al. (2001)[12]	24	F	pulsatile mass	parietal branch	physical examination	not described	surgical excision	excellent
Present case	78	F	pulsatile mass	preauricular	3D CT angiography	47 × 45 × 35	surgical excision	excellent

3D CT: three-dimensional computed tomography.

the present case (Table 1).[1,2,5,7,9,10,12] The 6 male and 2 female patients were aged between 10 and 85 years old. The aneurysm arose in the main trunk of STA in 4 cases and in the distal branch of STA in 4. All patients safely underwent surgical excision. The age range suggests that atherosclerosis is not the common and only cause, although atherosclerotic change of the STA and/or hemodynamic stress to the arterial wall might be important in its development.[5] Congenital vulnerabilities of the arterial wall, such as defect of the elastic membrane, may contribute to the development of a true STA aneurysm.[10] In the present case, both aneurysm and scalp tumor simultaneously increased in size for about 2 years. Therefore, we speculate that increased blood supply to the scalp tumor may have caused hemodynamic stress in the proximal STA and promoted the unusual growth of the aneurysm. The histological findings in the present case support this mechanism (Fig. 4). Three previous cases of giant true STA aneurysm of more than 25 mm of diameter have been reported.[1,2,5] All cases were located in the preauricular region, as in the present case. The aneurysm size varied from 30 to 40 mm.

Spontaneous true STA aneurysm usually occurs as a pulsatile scalp mass (Table 1). Any pulsatile, preauricular mass requires careful diagnosis. STA aneurysms often display arterial pulsation and thrills corresponding to systole, whereas STA arteriovenous fistula displays continuous thrill and bruit.[11,12,14] The differential diagnosis also includes aneurysm of the middle meningeal artery with temporal bone erosion, abscess, inflammatory lesion, epidermal inclusion cyst, angiofibroma, meningocele, encephalocele, parotid tumor, and lipoma.[3,11,14]

Cerebral angiography is the gold standard for diagnosis of spontaneous true STA aneurysm.[2,5,7,10,11] In the present case, MR imaging and ultrasonography were useful to visualize the turbulent flow within the aneurysm. Recent developments of multi-detector CT can non-invasively visualize intra- and extracranial vascular lesions with high spatial resolution.[6] Especially in the present case, 3D CT angiography provided important information on the anatomical relationship between the aneurysm and the surrounding tissue, including the external auditory meatus and zygomatic arch. Furthermore, 3D CT angiography could clearly visualize the topographical relationship between the aneurysm and the proximal STA. Based on the findings, we could avoid intraoperative massive bleeding by ligating the proximal STA.

The natural history of spontaneous true STA aneurysm is not well documented. However, we selected surgical resection because the giant aneurysm had gradually increased in size to almost obstruct the left external auditory meatus. Although local anesthesia is preferred for surgical excision, the aneurysm was resected under general anesthesia because of the large size and apparent location near the facial nerve.[8] STA aneurysm in the preauricular region should carefully be dissected from the surrounding tissue to avoid postoperative facial nerve paresis.

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