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True aneurysms of the superficial temporal artery: Diagnosis and treatment

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ABSTRACT

Objectives: True aneurysms arising from the superficial temporal artery (STA) are quite uncommon. The present study reviews the surgical experience with true STA aneurysms to describe the clinical features and treatment options.
Methods: This study comprised of 12 patients (6 female; mean age, 44.7 years) of spontaneous aneurysms of the STA who have undergone the surgical or endovascular treatment. All the patients had no history of trauma or surgery to the head and neck. The clinical presentation, radiographic findings, pathological and laboratory data, and treatment outcomes were retrospectively analyzed.
Results: A pulsatile and progressively growing lump in the STA area was the symptom leading to clinical attention. None neurological defects existed. Six patients had frontal lesions, two had parietal and the remaining 4 patients had preauricular region aneurysms. Imaging studies revealed that the subcutaneous mass was a saccular aneurysm accompanied by the afferent and efferent vessels. The lesions ranged in size from 8 to 23 mm (mean, 11.7 mm). Aneurysm trapping and excision was performed in 11 patients. Pathological examination confirmed a true aneurysm of the STA.
Conclusions: True STA aneurysms are usually discovered as a pulsating mass over the temple and their diagnosis could be done with ultrasonography, and computed tomography and magnetic resonance angiography. Simple ligation and resection of the aneurysm is safe and curative.

1. Introduction

Aneurysms of the superficial temporary artery (STA) are rare occurrences compared to the cerebral aneurysms. Most of these lesions are false aneurysms caused by blunt trauma because of the anatomic location of the STA [1,2]. However, surgeons have rarely encountered nontraumatic or spontaneous STA aneurysms in their modern practice. In the literature, very few cases of true STA aneurysms which developed spontaneously have been reported [3,4]. The therapeutic options for both true and false aneurysms include elective surgical excision, endovascular intervention, conservative surveillance, ultrasonography (US)-guided compression, and direct intralesional injection of sclerosing agents [5–8]. The purpose of this clinical study was to describe the preoperative evaluation, differential diagnosis, and optimal treatment strategy of the true aneurysms of the STA.

2. Materials and methods

This is a retrospective case series study on the patients who underwent treatment for true STA aneurysm in the years 1995–2012. The 12 patients (6 men, 6 women) had a mean age of 44.7 years (range, 23–70 years). These patients have received the open or endovascular surgery at three teaching hospitals. The patients were followed up for a period ranged from 12 to 190 months (mean, 84.7 months). Demographic data, clinical presentation, aneurysm characteristics, diagnostic tools, treatment modalities, and complications were collected and analyzed.

Preoperative diagnosis was made by patients' history and physical examination, with further evaluations. All the patients had no medical history of surgery or trauma to the head and face. A pulsating lump in the scalp was the symptom leading to image studies. The following investigations were performed preoperatively: plain and dynamic computed tomography (CT), CT angiography, magnetic resonance image (MRI), MR angiography,

Abbreviations: CT, computed tomography; CTA, computed tomography angiography; MRI, magnetic resonance image; MRA, magnetic resonance angiography; STA, superficial temporal artery; US, ultrasonography.

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and duplex US studies. Cerebral angiogram was routinely performed for the patients treated earlier in this series and if there are associated intracranial lesions. The blood counts, chemistries, and serology tests were included for laboratory examinations.

Once aneurysm diagnosed, open surgery was generally recommended in an outpatient basis. Under local anesthesia, proximal and distal ligation and exclusion of the aneurysm were done. Supplementation with minimal sedation facilitated the treatment in the patient with less cooperation and affected by proximal STA aneurysm. Patients were discharged a few hours after surgical treatment. For the patients who had the aneurysm located in the proximity to the facial nerve and parotid gland, it was decided to do a nerve monitoring and stimulation. Endovascular approach was used for the cases that had a preference to the nonsurgical option. Experienced interventional neuroradiologist was involved in the procedures, retrieval of data and image analysis.

Follow-up imaging study was not considered until there was clinical suspicion of recurrence. Reported similar cases were extracted in the literature and all the data were analyzed.

3. Results

The clinical characteristics of the 12 patients with true STA aneurysms are listed in Table 1. For all the patients in this series, their history in combination with physical examination was sufficient for diagnosis. Three patients complained of localized headache in the STA distribution. Three patients presented with pain from the lesion, 1 patient had ear discomfort. None of our patients manifested neurological deficits; also, none had aneurysm bleeding. The interval between diagnosis and first awareness of symptoms widely ranged from 6 to 55 months with a mean of 19.3 months. On examination, in all the patients, a pulsatile swelling of the scalp with a palpable thrill and systolic bruit was encountered. These soft tissue swellings were compressible and their pulses were lost with compression of the proximal STA. No laboratory findings suggestive of connective tissue disorders or inflammatory reactions were found. Three patients had history of hypertension, diabetes mellitus, or dyslipidemia.

All the lumps were preoperatively diagnosed as STA aneurysms by angiography ($n = 4$), US ($n = 9$), MRA ($n = 2$), and CTA ($n = 7$). Three patients with headache underwent MR imaging for excluding the associated intracranial pathologies. In 10 patients (83.3%), more than one diagnostic imaging was done to confirm the diagnosis. None cerebral lesion was observed in any patient. Six aneurysms (50.0%) of the STA were located in the frontal branch and 2 were found in the parietal branch. Four aneurysms involved the main trunk of the STA in the preauricular region. The size of the aneurysm varied from 8 to 23 mm (mean, 11.7 mm).

Open excision of the STA aneurysms was performed for the 11 patients in day surgery unit. The aneurysm sac was easily separated from the surrounding tissue by means of sharp and blunt dissection with little bleeding. The feeding vessel was ligated then the saccular lump was resected. Aneurysm was a localized or diffuse dilatation of the STA that involves intima, media, and adventitia. They had no bleb and their surface was smooth. Patients had no operative complications and were all done with local anesthesia. One patient received an intravascular approach and trapping for the proximal STA aneurysm. All the preoperative symptoms and signs were resolved. No recurrence had occurred during the follow-up period.

Histopathology of the surgical specimens confirmed the diagnosis of true aneurysms, which showed the presence of all three layers, with luminal ectasia and areas of indistinct internal elastic fiber. There was no evidence of any giant cells, inflammation, malignant cells, or vasculitis. An elderly patient had an aneurysm with some signs of arteriosclerotic changes.

4. Case illustration

A 53-year-old female was referred to neurosurgery clinic with headache and gradually enlarging bump just anterior to the left tragus. There was a round mass with low signal intensity in the preauricular region corresponding to the STA on MRI taken 2 years before the current presentation (Fig. 1A). The lesion was asymptomatic so that the patient was not initially keen on surgery. The lump was well demarcated and pulsating on palpation which abolished via digital compression of the proximal artery. This patient did not complain of visual impairment or ear discomfort. She had no history of head trauma. Cardiovascular and neurological examination was unremarkable. Family history did not highlight any connective tissue disorders. The blood counts, routine chemistry, and serological analyses were negative or within the normal limits.

Duplex US of the swelling showed an 8×7 mm aneurysm in the STA with a normal peripheral vasculature (Fig. 1B,C). Three-dimensional CT angiography depicted the presence of a saccular aneurysm arising from the main trunk of the left STA (Fig. 1D,E). In view of the risk of further growing, the patient was listed for outpatient surgery. Under local anaesthesia, the aneurysm completely resected with its ends ligated through a small preauricular incision. The excised sac did not appear to contain any thrombus, calcification, or atheroma. Histopathological study demonstrated a rare finding of a true aneurysm of the STA. Microscopically, the surgical specimen showed marked

Table 1
Summary of 12 cases with true superficial temporal artery aneurysm.

Case no.	Sex	Age (years)	Symptoms and signs			Duration (months)	Side	Location	Diagnosis	Diameter (mm)	Treatment	Outcome
			Pulsatile	Pain	Headache							
1	F	70	+			6	Left	Frontal branch	USG,CTA†	8	Excision	Excellent
2	F	68	+		+	10	Left	Frontal branch	USG,CTA, MRI,MRA	9	Excision	Excellent
3	M	23	+			21	Right	Frontal branch	USG,CTA	8	Excision	Excellent
4	F	43	+	+		21	Right	Preauricular	CTA	14	Excision	Excellent
5	M	29	+			7	Left	Frontal branch	USG,CTA	11	Excision	Excellent
6	F	67	+	+		10	Left	Parietal branch	USG,CTA, MRA	23	Excision	Excellent
7	M	43	+			55	Left	Preauricular	CTA	10	Embolization	Excellent
8	F	53	+		+	30	Left	Preauricular	MRI,CTA	8	Excision	Excellent
9	M	30	+	+		36	Left	Frontal branch	USG,CT, DSA	15	Excision	Excellent
10	M	46	+		+	11	Left	Frontal branch	USG,CT, MRI,DSA	13	Excision	Excellent
11	F	39	+			10	Right	Parietal branch	USG,CT, DSA	12	Excision	Excellent
12	M	25	+			15	Right	Preauricular	USG,CT, DSA	7	Excision	Excellent

USG, ultrasonography; CTA, computed tomography angiography; MRI, magnetic resonance imaging; MRA, magnetic resonance angiography; DSA, digital subtraction angiography.