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Case Report

Traumatic Pseudoaneurysm of the Superficial Temporal Artery due to Gardner Traction

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We report a case of pseudoaneurysm of the parietal division of the superficial temporal artery (STA) secondary to iatrogenic head injury due to Gardner traction. A 54-year-old man presented with a pulsatile, cystic, and painless mass in the right anterior temporal region which developed three weeks after head fixation via Gardner traction. At the time of discovery, the mass was 10 mm in diameter, compressible and disappeared after manual compression of the proximal STA. A bruit was audible over the mass, which was thought to be a pseudoaneurysm. A computed tomography angiogram (CTA) showed a pseudoaneurysm of the parietal division of the right STA. The tip of the pseudoaneurysm was thrombosed and was both red and tender. The pseudoaneurysm was thought to be filled with infected thrombus, and the mass was resected with ligation of the proximal and distal ends of the STA. A pseudoaneurysm of the STA should be suspected when there is a history of possible vessel injury, such as a history of head-pin fixation, and when a patient presents with a pulsatile, cystic mass near the temple. Pseudoaneurysms can be successfully treated by excision.

KEY WORDS : Superficial temporal artery · Pseudoaneurysm · Gardner traction.

INTRODUCTION

Pseudoaneurysm of the superficial temporal artery (STA) is an infrequent lesion, and it has the characteristic finding of a pulsatile cystic mass in the frontotemporal region[8,10,12]. STA pseudoaneurysm was first described in 1740[4], and since then, more than 400 cases have been reported in the literature[1,4]. Most of the reported cases were caused by blunt trauma. However[1,3,4], STA pseudoaneurysms caused by iatrogenic trauma have also been rarely reported[6]. We report a case of pseudoaneurysm of the parietal division of the STA secondary to iatrogenic head injury by Gardner traction and discuss the etiology, diagnosis, and treatment options.

CASE REPORT

A 54-year-old man was brought to the emergency department at our hospital after an accidental fall. On admission, he was stuporous and in a quadriplegic state with multiple abrasions. A computed tomography (CT) scan and magnetic resonance (MR) imaging showed a C5/C6 fracture and dislocation with spinal cord injury. There were no apparent brain or scalp injuries. Gardner traction was performed by head fixation at the bitemporal area, and a 25 pound weight was used for cervical spine reduction. After achieving anatomical reduction, we performed anterior corpectomy, plate fixation, and posterior lateral mass screw fixation.

Three weeks after the operation, a cystic mass was discovered in the right anterior temporal region. On examination, we found a pulsatile, painless mass measuring approximately 10 mm in diameter, which disappeared after manual compression of the proximal STA (Fig. 1A). In addition, a bruit was audible over the mass using a stethoscope. A contrast enhanced CT scan revealed a well-enhancing round mass in the right temporal region. A computed tomography angiogram (CTA) was obtained and showed a saccular aneurysm of the parietal division of the right STA (Fig. 1B). The patient underwent surgical excision of the lesion under local anesthesia. The mass was severely adherent to the adjacent tissue, and after complete dissection, a pseudoaneurysm was found in the parietal division of the right STA. The pseudoaneurysm

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was resected with ligation of the proximal and distal ends of the STA (Fig. 2). Histopathological examination of the specimen demonstrated a dilated artery with a separation between the intima and the media (Fig. 3). There was also an intraluminal thrombus, representing hemorrhage between the two layers (Fig. 4). After two weeks, the wound resolved without skin necrosis, which was generated by the absence of collateral vascularity (Fig. 5).

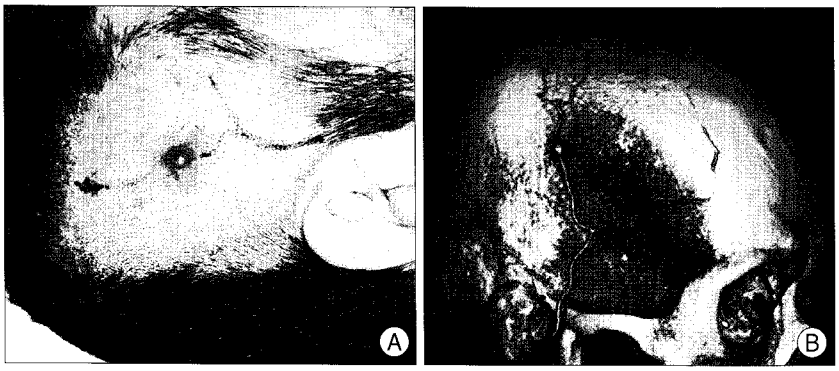

Fig. 1. A : A photograph shows the round mass in the left temporal region. B : Three-dimensional CT angiography of the lesion shows a pseudoaneurysm with flow in the underlying artery.

DISCUSSION

The STA is the most frequent site of traumatic aneurysm on the face because of its anatomic location[4]. In its superficial tract, the temporalis muscle is the only protective tissue between the STA and the outer table of the skull. STA pseudoaneurysms may be solitary or multiple and sizes vary from 0.5 to 5.7 cm[1,4,6]. They usually present as palpable, pulsating masses associated with headache and/or ear discomfort. Other complaints, including dizziness, hemorrhage, and cosmetic or neurologic defect, may be present depending on the location of the STA pseudoaneurysm. Most STA pseudoaneurysms occur within 2-6 weeks after injury, although the time window ranges from just a few hours to as long as 10 years[6,7,13]. The majority of STA pseudoaneurysms involve the anterior branch because of the lack of cushioning at the

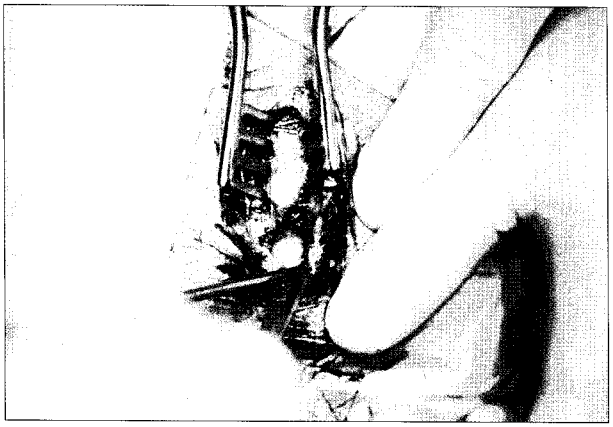

Fig. 2. Intraoperative photograph shows the pseudoaneurysm of the parietal division of the left superficial temporal artery. Vessel loops are in place under the proximal and distal ends of the vessel.

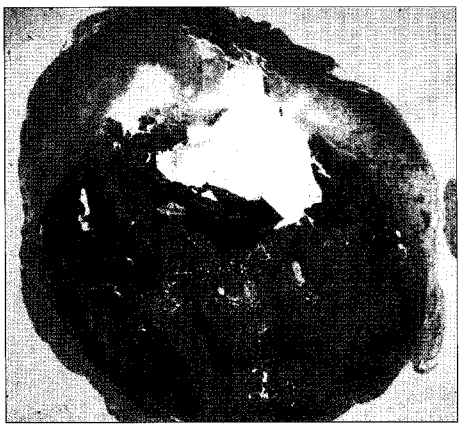

Fig. 4. Histopathological examination of the specimen demonstrates a dilated artery with a separation between the intima and the media. An intraluminal thrombus is observed, representing hemorrhage between the two layers.

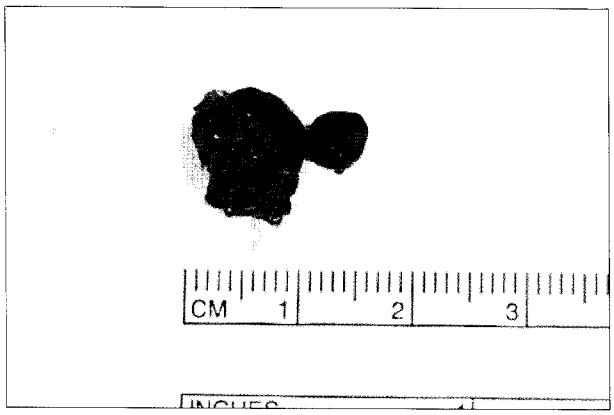

Fig. 3. A photograph shows the resected pseudoaneurysm of the superficial temporal artery.

Fig. 5. The operative wound resolved without skin necrosis, which is generated by the absence of collateral vascularity.

site where the artery crosses from the temporalis to the frontalis muscle, and because of the tethering effect of the fascia at this level which limits any lateral displacement of the artery in response to tangential forces[4,5].

More than 95% of pseudoaneurysms are traumatic in origin. The frequent causes are blunt head trauma (62%), penetrating wounds (27%), and interventional procedures (11%)[5,6]. Rarely, spontaneous pseudoaneurysms of congenital or degenerative origin have been reported. Modern reported traumatic cases include accidental falls, car accidents, gunshot wounds, and sports-related injuries[2,3,9]. In addition, iatrogenic causes such as neurosurgical procedures, i.e. skull fixation, or hair transplantation have been reported[1,12]. However, the incidence of these etiologies is far fewer than STA pseudoaneurysms caused by other traumatic origins[4,5].

Aneurysms may be classified as true, false, or dissecting. Most aneurysms are designated as true, while pseudoaneurysms account for less than 1% of all reported cases[6,11]. Splitting of the wall layers leads to dissecting aneurysms, whereas dilation of all layers without splitting generates a true aneurysm. False aneurysms, or pseudoaneurysms, are a consequence of an injured wall through which blood flows out to form a hematoma that is first surrounded by fibrous tissue and is then later recanalized. Arterial pressure on the wall enlarges the cavity in a manner that is spatiotemporally dependent on the resistance of the surrounding tissue. Loose tissue, such as in the case of an STA, explains the appearance of a growing pulsatile mass on the scalp.

A thorough history and physical examinations are the most important tools to diagnose a STA pseudoaneurysm. Diminution or disappearance of the pulsation upon compression of the proximal STA is a meaningful finding. However, selective angiography is thought to be the most effective method for arriving at the correct diagnosis[11]. It not only allows to evaluate of the shape of the aneurysm and adjacent vessel structure, but also aids in ruling out other possibilities in the differential diagnosis, such as arteriovenous malformation and fistula.

The main objectives of treatment are to reduce the risk of hemorrhage, to relieve headaches, and to resolve any cosmetic defects[5,7]. Conservative treatment is not recommended because the aneurysm may lead to headach and cosmetic disfiguration to the patient, and more importantly, it may cause the risk of rupture and bony erosion. Surgical ligation and resection of the lesion is considered the treatment of choice[6,12], especially when there is evidence of infection like our case. General anesthesia may be necessary for safe access during surgical excision of a STA pseudoaneurysm if the aneurysm is located in proximity to the facial nerve or the parotid gland[5]. Although such an operation has a high level of success, the patient is left with a permanent noticeable scar. On the other hand, endovascular intervention has become an increasingly popular mode of treating vascular abnormalities, and a few cases of successful endovascular obliteration of STA aneurysms using thrombin have been reported[11,13]. In our case, the patient was treated with surgical resection. The portion of the pseudoanerusysmal tip that was thrombosed appeared to be infected, and surgical resection was therefore needed for the removal of a possible source of infection.

CONCLUSION

In case of STA pseudoaneurysm with an open wound and possible infectious thrombus due to Gardner traction, surgical intervention is the treatment of choice rather than endovascular intervention or conservative management.

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