

Case Report

Internal maxillary artery pseudoaneurysm in a case of mandibular fracture

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ABSTRACT

We report a rare case of internal maxillary artery pseudoaneurysm in a patient with a subcondylar fracture of the mandible. Though traumatic pseudoaneurysm in the craniofacial region is a known entity, a situation in which a closed mandibular fracture presents as a rapidly growing swelling in the neck and facial region is a rare presentation. Such a warning sign should be taken seriously and investigated further.

KEY WORDS

Fracture mandible, internal maxillary artery, pseudoaneurysm

INTRODUCTION

False arterial aneurysms or pseudoaneurysms are caused by injuries that rupture the full thickness of the arterial wall leading to extravasation of blood into the surrounding tissue, producing a pulsating hematoma. The perivascular connective tissue forms the sac of the false aneurysm. Arterial pressure causes gradual expansion of the false aneurysm which may rupture, producing life-threatening hemorrhage.^[1] False aneurysms following closed fractures of the facial bones have been reported but are rare.^[2,3] Despite the great frequency of subcondylar fracture of the mandible and the proximity of the maxillary artery to the fracture site, false aneurysm of this artery is extremely uncommon.^[4] Most pseudoaneurysms of the internal maxillary artery occur in its terminal pterygopalatine segment, while it is very rare in the first or mandibular segment of the internal maxillary artery, as in our case.^[5]

CASE REPORT

An 18-year-old boy presented with swelling and pain

over the left side of the face and neck following a vehicular accident due to a head-on collision between two buses. On examination, there were abrasions over the left malar and mandibular region with a subcutaneous tissue deep laceration of about 3cm over the left parasymphiseal region of the mandible. A fracture in the left parasymphiseal region of the mandible was palpated and the presence of a large hematoma over the left preauricular region and neck was noted. The patient was in altered sensorium with a Glasgow Coma scale (GCS) of 9/15 (eye movements-2, best motor response-4 and verbal response-3). As the hematoma was noticed to be expanding into the face and cervical region and in view of the significant head injury, an emergency tracheostomy was performed to secure the airway. A CT scan of the brain and the face with 3-D reconstruction was performed which revealed diffuse cerebral edema and fractures of the left parasymphiseal and left subcondylar region of the mandible with a pseudoaneurysm of the left internal maxillary artery (IMPA). This was confirmed with a CT angiography done in the same sitting [Figure 1]. Immediate endovascular intervention was not contemplated as the

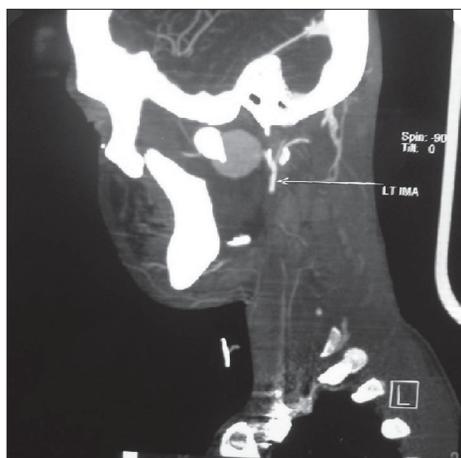


Figure 1: Ct angiography showing the fracture of the left subcondylar region of the mandible and the pseudoaneurysm of the internal maxillary artery

head injury component was significant. The patient was monitored for the head injury and the cervico-facial hematoma in the trauma ICU. There was progressive improvement in the level of consciousness and by the third day the patient was 14/15 on the GCS. On the fourth day of admission the patient developed pain and swelling over the preauricular region which progressed rapidly. An emergency angiography confirmed a ruptured pseudoaneurysm of the left internal maxillary artery. This was embolized with Gelfoam® in the same sitting [Figure 2]. There was rapid regression of the swelling and the pain subsided in the post embolization period. In the ensuing three days the facial swelling decreased and the level of consciousness improved. The patient was taken up for intermaxillary fixation with open reduction and internal fixation of the parasymphiseal fracture mandible with miniplates and screws. The subcondylar fracture was treated by closed reduction. The postoperative period was uneventful and the patient was discharged after removal of tracheostomy four days later. The patient on subsequent follow-up was asymptomatic with good facial contour [Figure 3].

DISCUSSION

Internal maxillary artery pseudoaneurysms (IMPAs) are rare events, documented as a possible complication of trauma,^[4,6,7] infection or occurring as a result of maxillo-mandibular surgery.^[8] Our search in the literature leads us to believe that the most common etiology for the IMPAs are the fractures of the maxilla. More rarely, IMPAs may result from postradiation vasculopathy or tumor invasion in patients with head and neck cancers who received composite treatment.^[9] Most IMPAs occur in the terminal

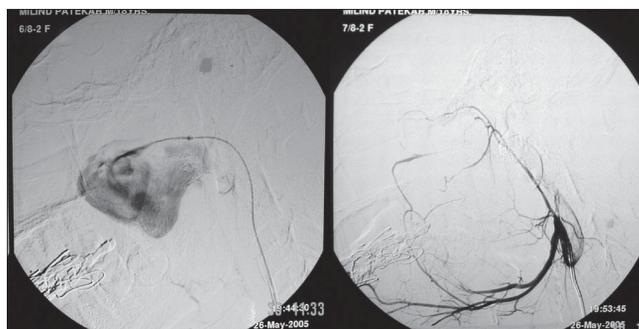


Figure 2: The left image shows the internal maxillary artery pseudoaneurysm prior to embolisation. The right image shows the complete obliteration of the pseudoaneurysm after embolisation



Figure 3: The patients profile before any intervention (right) and 3 weeks post-operatively (left) showing significant reduction in oedema and satisfactory facial contour

pterygopalatine segment of the internal maxillary artery, it is very rare in the first or mandibular segment of the internal maxillary artery as in our case.^[5] The IMPAs lead to different complications and clinical manifestations, such as life-threatening oronasal hemorrhage following rupture of the IMPAs, compression of the adjacent nerves or artery and release of embolic thrombi to downstream blood flow, to produce thromboembolic events. In addition, unruptured IMPAs may also present as an expanding, pulsatile mass, often with an audible bruit heard almost exclusively during systole. These must be distinguished from arterio-venous fistula, which can result from partial injury to both an artery and a nearby vein.^[5] The development of a traumatic aneurysm can occur as soon as four hours after injury^[10] and as late as eight hours.^[11] Most reported instances have occurred within two months of the injury.^[5] Angiography is the most confirmatory of the investigations. A CT angiography along with midface skeleton will help assess the extent and relation of the aneurysm to the fractures. Before initiation of the endovascular procedure, detailed evaluation of the CT images may help to guide catheter angiography

to localize the IMPA. Endovascular embolization is the most successful way to manage IMPAs with rapid relief of symptoms.^[12] This must precede any operative procedure planned for fixation of faciomaxillary injuries. The surgical approach for management of pseudoaneurysms is now relegated to the books and is no more in practice. It involved proximal and distal control of internal maxillary artery by ligating the external carotid artery and its branches and trans-antral clipping of the third portion of the maxillary artery. Resection of the false aneurysm sac should only be performed if it can be done safely.^[4] To summarize, IMPA in the first part of the maxillary artery presenting acutely in a closed fracture of mandible is a rare but ominous sign which calls for a team approach for an immediate and effective management.

REFERENCES

1. Rich NM, Spencer FC. Vascular trauma. WB Saunders Co: Philadelphia; 1978. p. 233-59.
2. Cameron HS, Laird JJ, Carroll SE: False aneurysms complicating closed fractures. *J Trauma* 1972; 12:67-74.
3. Gerbino G, Roccia F, Grosso M, Regge D. Pseudo aneurysm of the internal maxillary artery and Frey's syndrome after blunt facial trauma. *J Oral Maxillofac Surg* 1997;55:1485-90.
4. Schwartz HC, Kendrick RW, Pogorel BS. False aneurysm of the maxillary artery. An unusual complication of closed facial trauma. *Arch Otolaryngol* 1983;109:616-8.
5. Luo CB, Teng MM, Chang FC, Chang CY. Role of CT and endovascular embolization in managing pseudoaneurysms of the internal maxillary artery. *J Chin Med Assoc* 2006;69:310-6.
6. D'Orta JA, Shatney CH. Post-traumatic pseudoaneurysm of the internal maxillary artery. *J Trauma* 1982;22:161-4.
7. Rogers SN, Patel M, Beirne JC, Nixon TE. Traumatic aneurysm of the maxillary artery: The role of interventional radiology. *Int J Oral Maxillofac Surg* 1995;24:336-9.
8. Lanigan DT, Hey JH, West RA. Major vascular complications of orthognathic surgery: False aneurysms and arteriovenous fistulas following orthognathic surgery. *J Oral Maxillofac Surg* 1991;49:571-7.
9. Chaloupka JC, Putman CM, Citardi MJ, Ross DA, Sasaki CT. Endovascular therapy for the carotid blowout syndrome in head and neck surgical patients: Diagnostic and managerial considerations. *AJNR Am J Neuroradiol* 1996;17:843-52.
10. Ferry DJ, Kempe LG. False aneurysm secondary to the penetration of brain through orbito-facial wounds. *J Neurosurg* 1972;36:503-6.
11. Beale PJ. Late development of a false aneurysm of the common carotid artery. *Br J Surg* 1971;58:76-8.
12. Krishnan, D G, Marashi A, Malik A; Pseudoaneurysm of Internal maxillary artery secondary to Gunshot Wound managed by endovascular technique. *J Oral Maxillofac Surg*. 2004; 62:500-502.

Source of Support: Nil, **Conflict of Interest:** None declared.