

Case Report Orthognathic Surgery

Pseudoaneurysm in the inferior alveolar artery following a bad split in bilateral sagittal split osteotomy

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Abstract. Pseudoaneurysms in the external carotid artery system are rare, mostly reported in the superficial temporal and facial arteries. The bilateral sagittal split osteotomy has a low incidence of complications requiring emergency interventions. We report the case of a patient with acute bleeding from a pseudoaneurysm of the inferior alveolar artery diagnosed by angiography and treated successfully by super-selective embolization.

Key words: orthognathic surgery; pseudoaneurysm; haemorrhage; therapeutic embolization; complications.

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A pseudoaneurysm is a trauma-induced partial dissection of a blood vessel forming a haematoma in the surrounding tissues that undergoes cavitation to become continuous with the arterial lumen, displaying a pulsatile characteristic¹. The trauma could be blunt, penetrating, or surgical. Pseudoaneurysm of the external carotid artery (ECA) system is rare, and such pseudoaneurysms are mostly reported in the superficial temporal and facial arteries². Endovascular therapy has become the primary treatment modality for pseudoaneurysms^{3,4}.

The bilateral sagittal split osteotomy (BSSO) is one of the most common surgical procedures used in the treatment of orofacial deformities, and the branches of

the ECA potentially affected by the surgical procedure include the inferior alveolar artery (IAA) and the facial artery. However, pseudoaneurysm after a BSSO is a rare complication, with few reported cases, and these have mostly related to the facial artery^{5–7}. An unusual case of IAA pseudoaneurysm after BSSO that was complicated with a bad split is reported here.

Case report

A 21-year-old healthy female patient was referred to the Oral and Maxillofacial Surgery Division of Jordan University Hospital for Le Fort I osteotomy and BSSO setback. Preoperative haemoglobin

was 14.1 g/dl. The surgical procedure was performed under hypotensive anaesthesia. The maxillary osteotomy was uneventful, however during the BSSO a bad split occurred on the right side, with buccal plate fracture and a fracture line extending posteriorly to the sigmoid notch including the condylar neck. Osteotomes were used to complete the distal segment separation from the proximal segment. Pulsatile bleeding ensued from the medial side of the ramus, which was controlled with direct pressure using a gauze and absorbable haemostatic agent (Surgicel, Ethicon). With the final occlusion established, fixation was achieved. The Valsalva manoeuvre confirmed haemostasis and the estimated blood loss was 900

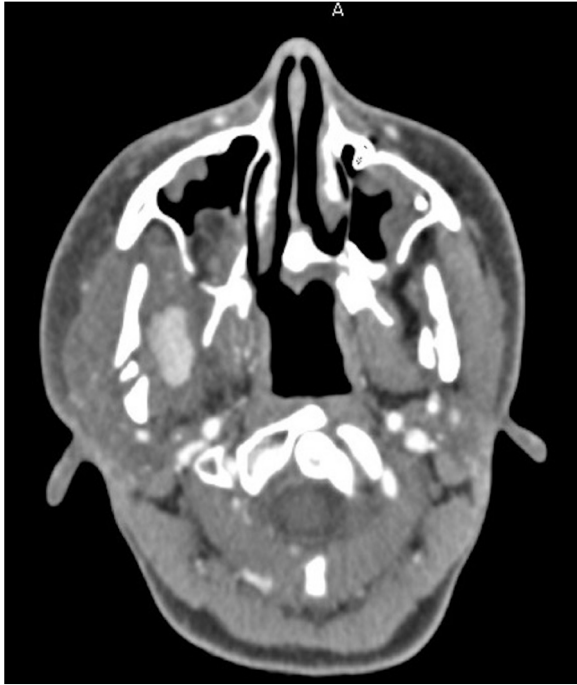


Fig. 1. Axial view of contrast-enhanced CT revealing a pseudoaneurysm in the right inferior alveolar artery, measuring 1.3 cm in its maximum diameter, with surrounding soft tissue swelling and haematoma.



Fig. 2. (A) Digital subtraction angiogram showing a pseudoaneurysm of the inferior alveolar artery. (B) Digital subtraction angiogram demonstrating embolization of the pseudoaneurysm.

ml. The patient made an uneventful recovery and postoperative haemoglobin was 9.1 g/dl. She was discharged on day 3 postoperative with more swelling noted on the right side.

On day 18 postoperative, the patient attended as an emergency due to recurring bleeding episodes and recurring throbbing pain on the same side of the throat. She was conscious, hypotensive (70/40 mmHg), and tachycardic (130 bpm) and her haemoglobin was 7.2 mg/dl. She was admitted and transfused with one unit of packed red blood cells. A contrast-enhanced computed tomography (CT) scan

gave the impression of bleeding from the maxillary artery or IAA (Fig. 1).

A decision was made to proceed with angiography, with possible selective embolization of the bleeding vessel. The procedure was performed in the angiography suite under local anaesthesia. The right common femoral artery was punctured using a 5 F vertebral catheter (Impress; Merit Medical) to selectively catheterize the right ECA, followed by a super-selection of the maxillary artery down to the bleeding vessel, which proved to be the IAA. Multiple images showed a large pseudoaneurysm that was actively

bleeding, with contrast (Omnipaque 300 (iohexol); GE Healthcare Inc.) extravasation from the aneurysmal sac and contrast pooling into the oral cavity through the wound (Fig. 2A). Selective catheterization of the ostium of the IAA into the pseudoaneurysm was attempted successfully. Multiple embolization coils (Nester Embolization Coils; Cook Medical) measuring 0.035 inch and 0.018 inch were deployed successfully into the aneurysmal sac, resulting in complete filling and thrombosis. The completion angiographic images showed normal flow to the rest of the external carotid branches, with no evidence of non-target embolization (Fig. 2B).

Two more units of packed red blood cells were transfused, and the patient was discharged from hospital after 2 days. She remained well 6 months after surgery.

Discussion

The reported incidence of bad split in BSSO is about 2.3%⁸. In the case presented here, the unanticipated split was complex and included a fracture of the buccal plate of the proximal segment and a condylar neck fracture. Pseudoaneurysm as a complication of BSSO, although rare, remains a serious one and is difficult to diagnose and manage⁵⁻⁷. The IAA originates from the first part of the maxillary artery just as it passes posterior to the neck of the condyle; crossing the bony surface makes the vessel vulnerable to trauma⁹. We suspect that the injury to the vessel was caused by manipulating the osteotomes whilst completing the split. Bleeding in the orofacial region that fails to respond to local measures requires an invasive intervention: surgical exploration and arterial ligation or selective arterial embolization.

The aggressive manipulation in the mandible posteriorly towards the condyle with osteotomes to achieve a split should be avoided. If associated with bouts of postoperative bleeding, the surgical team should seek advanced radiological investigations to confirm a potential pseudoaneurysm. Once the patient is haemodynamically stabilized, a CT-assisted angiography is useful to locate and embolize the bleeding vessel. The use of trans-catheter intervention has improved access to surgically inaccessible vessels and reduced the morbidity associated with open surgery^{3,4}. The risk of dislodging the embolization material into the internal carotid system causing a cerebrovascular accident is minimal in experienced hands⁴.

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Competing interests

None.

Ethical approval

Not required.

Patient consent

Patient consent was obtained.

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