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MANDIBLE ANGLE HIGH FLOW ARTERIO-VENOUS MALFORMATION EXCISION THROUGH MEDIAL SIDE BY MANDIBLE SPLIT APPROACH

Plastic Surgery

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ABSTRACT

Arterio-venous malformation of the mandible is a rare and life threatening condition. Significant number of these cases are detected as a result of torrential haemorrhage after tooth extraction. High degree of suspicion and prompt multi-specialty treatment is essential. Selective angiographic embolization has become the standard of treatment. However, embolization needs to be supplemented with other procedures to further reduce the rate of recurrence. Surgical excision of haemangioma post embolization gives promising outcomes and covers the wide spectrum of the disease. Surgical approach depends upon the size, location of lesion and continuity with adjacent structures. Here we present a case of mandibular angle arteriovenous malformation treated with pre-operative embolization followed by surgical excision & curettage through medial side by splitting the mandible in the centre.

KEYWORDS

Arterio-venous malformation, Haemangioma, Mandible, Embolization, Surgical curettage.

INTRODUCTION

Vascular lesions are subdivided into Haemangioma and Vascular malformations (VMs). Haemangiomas demonstrate endothelial hyperplasia and enlarge by cellular proliferation. Clinically, haemangiomas usually appear inearly infancy, grow rapidly during the first months of life, and then slowly involute over 5 or 6 years (1, 2). Arterio-Venous Malformations (AVMs) in contrast exhibit progressive ectasia of abnormal vessels lined by flap epithelium. It is an error in embryogenesis and grows proportionally with the child. (2, 3)

Vascular malformations rarely occur in visceral organs and the bones. 50% of all the osseous AVMs involve the facio-maxillary region with male to female ratio of 1:1.5 (4,5). Moreover mandibular involvement is rare and can have life threatening complications. It can present with pain, swelling and gingival bleeding or with catastrophic haemorrhage after tooth extraction.

Treatment options can be either surgical or non-surgical. The later include ligation, embolization or intra-osseous injection. Surgical options of curettage or radical resection are reserved for conditions not responding to non-surgical approaches.

Here we present a 13 year old girl with mandibular AVM treated with pre-operative embolization followed by excision and curettage of the lesion on the medial side around the angle of the mandible.

CASE REPORT

13 year old girl had frequent complaints of gingival bleeding from posterior margin of last Right lower molar along with pain and swelling on the right side of jaw. The swelling had gradually increased in size over the past 1 year. On dental examination there was swelling in relation to the right molar teeth extending till the angle of mandible. The swelling was pulsatile with a palpable bruit. An Orthopantogram (OPG) revealed an area of radiolucency in the body of the right side of mandible in relation to the molar teeth (figure 1). CT scan demonstrated typical moth eaten appearance, dilated inferior alveolar canal and the mental foramen along with root resorption of the molar teeth (Figure 2). There was thinning of the lingual cortex of the mandible. This made the diagnosis of the mandibular AVM very likely. Super selective angiography (figure 3a & 3b) was then performed to confirm the diagnosis and determine the feeding vessels. Selective embolization was performed of the facial, lingual and internal maxillary artery. Within 48 hours of embolization patient was posted for surgical excision & curettage.

Intraoperatively, in view of high flow arteriovenous malformation, first external carotid artery exposed & a rubber band looped around it to ensure a vascular control in future if torrential bleeding occurs.

Submandibular incision with extension into the submental area and lip splitting was done. Mid line mandibular osteotomy followed by swinging of the right side of the mandible to expose the lingual cortex of mandible, inferior alveolar artery, nerve and lingual nerve was performed(figure 4). Inferior alveolar artery (the main feeding vessel) ligated. The AVM was excised after breaking the thinned out inner cortex and curettage done. As significant thickness of the outer cortex was remaining, there was no need for the use of bone graft.

Blood loss was approximately 300 ml with no damage to the marginal mandibular branch of the facial nerve, inferior alveolar or lingual nerve. There was no intraoperative complication. Post-operative period was uneventful and the patient was discharged in 5 days. Histo-pathology confirmed the lesion as Arterio-Venous Malformation.

At three months and six months follow up, the mandibular swelling had completely resolved with no recurrence. There was no episode of intraoral bleeding in the post-operative period. Repeat MRA has not detected recurrence of any vascular lesion.

DISCUSSION

International society for the study of vascular anomalies has classified them as Haemangioma and Vascular Malformations based on the biological classification of Mullike and Glovanki in 1982 (1). Vascular malformations can be either low flow (Capillary, venous or lymphatic malformation) or high flow lesions (AVMs or arteriovenous fistulas). Although 50 % of vascular lesions occur in the head and neck, mandibular AVMs are very uncommon (7-9). There usually occur in the second decade with female preponderance (6, 7). These lesions become apparent as it grows in size along with the age of the child.

These lesions have a wide spectrum of clinical presentation. Asymptomatic AVMs have also been reported (10, 11). These may present as a painful swelling, loose teeth, tooth migration, asymmetry of the face, local pulsation, noticeable bruit, discolouration of the mucosa or the overlying skin or gingival bleeding. Frequently the lesion becomes evident due to catastrophic haemorrhage after tooth extraction. Plain radiological appearance is not always reliable. They can present as ill-defined radiolucency, soap bubble or sunray appearance (12). Other radiological appearance includes cortical expansion with resorption of the tooth. CT scan or MRI with angiography can be helpful. However the gold standard investigation is selective angiography (13- 15)

Treatment options are either surgical or non-surgical. Spontaneous regression has never been noted. On the contrary there is a gradual increase in the size of the lesion with age. Ligation of the external carotid artery is no longer performed, since it doesn't occlude the flow to the lesion completely due to the presence of collaterals and prevents embolization in future. Super-selective angiographic embolization is the initial treatment of choice with the reported success rate of 70% (13-15). However, embolization has its fair share of complications (e.g. Occlusion of pulmonary and cerebral vessels) and chances of recurrence of the disease. Hence, surgical excision of lesion within 48 hrs (16, 17) of embolization is usually advised to reduce the recurrence rate.

Radical resections with reconstruction using free fibula graft cause significant morbidity and still cannot eliminate recurrence of disease (13). On the other hand excision and curettage with the use of bone graft if required gives comparable results. Our approach of flipping the mandible after osteotomy to expose the inner cortex of the mandible and approach to the feeding vessels directly to ligate and control the bleeding of AV malformation has not been documented previously which gives direct & better control over vessel while dissection, and also prevent the possible torrential bleeding which one might face. This approach prevents the need for breaking the outer cortex and hence obviating the need for mandibular reconstruction.

Recent advancement by direct intra-lesional injection of isobutyl cyanoacrylate offers us a new perspective. There seems to be less morbidity reported with this approach even though limited outcome data are available. (18-20).

CONCLUSION

Mandibular haemangioma is a rare condition which can present with catastrophic life threatening complications. High degree of suspicion is required for its diagnosis. A multi-speciality approach towards its management is the key for a successful outcome. Super-selective angiographic embolization with surgical excision and curettage provides satisfactory results with minimum morbidity. Flipping of the mandible in order to approach the feeding vessels and a lesion on the lingual cortex can avoid the need for mandibular reconstruction & blood loss. Size and location of the lesion should merit for this particular approach.

Figure 1. Orthopantomogram (OPG)

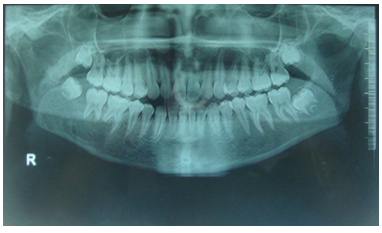


Figure 2. CT Scan

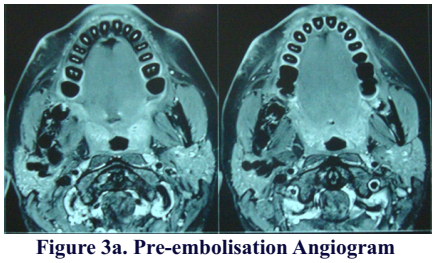


Figure 3a. Pre-embolisation Angiogram

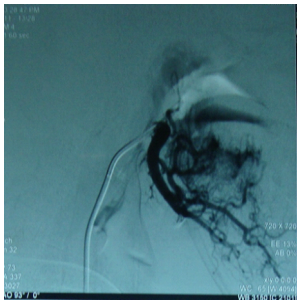


Figure 3b – Post embolization Angiogram

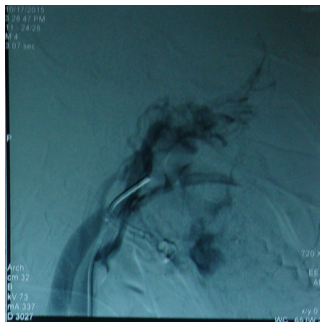
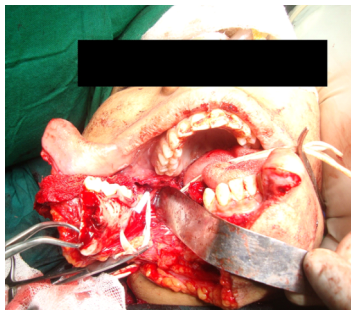


Figure 4 – Intraoperative : Exposure of the medial surface of the mandible after splitting the mandible



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