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Case Report

Minimally invasive sclerotherapy for mandibular aneurysmal bone cyst: A case report and literature review

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ABSTRACT

A 14-year-old male football player presented for routine dental radiographs, during which an expansile cystic lesion was identified within the left mandible. CT and MRI scans performed thereafter demonstrated frank cortical breakthrough with findings overall most consistent with a diagnosis of aneurysmal bone cyst. Given the high-risk lesion and the patient's significant physical activity, treatment was pursued. Instead of traditional surgical excision, a minimally invasive sclerotherapy approach was undertaken. Follow-up computed tomography performed approximately four months later demonstrated complete intralesional sclerosis consistent with complete response to therapy. No complications were encountered, and the patient remained symptom-free. The literature surrounding minimally invasive sclerotherapy for aneurysmal bone cysts and more specifically the scant number of studies evaluating this technique for mandibular lesions is reviewed in this case report.

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1. Introduction

Aneurysmal bone cysts (ABCs) are locally aggressive osteolytic tumors that consist of large blood-filled cystic spaces separated by fibrous septations.[1] They are characterized by the presence of foamy macrophages, giant cells, and woven bone histologically.[1] These lesions are often associated with cortical thinning or frank cortical breakthrough which can lead to complications such as pathological fractures.[2]

Percutaneous sclerotherapy is a minimally invasive alternative to traditional surgical excision for the treatment of ABCs that has been shown to achieve similar results with far fewer complications.[3,4] However, relatively sparse data is available regarding the use of percutaneous sclerotherapy for the treatment of mandibular ABCs.

2. Case Report

A 14-year-old male football player was referred from oral surgery to the interventional neuroradiology clinic after the discovery of an expansile lesion within the left mandibular ramus. The patient reported no symptoms associated with the lesion. No palpable abnormality or cutaneous discoloration was identified during physical examination. The patient had no relevant past medical history.

In April 2022, an unenhanced CT examination of the mandible was performed, followed by an MRI examination in May 2022. These studies demonstrated a multiloculated cystic lesion at the left mandibular ramus, with areas of frank cortical dehiscence (Figure 1). The lesion was notably hyperintense on T2-weighted imaging with a questionable fluid-fluid level and evidence of peripheral enhancement on a post gadolinium T1-weighted fat saturation sequence (Figure 2). The features were thought to be most in keeping with an aneurysmal bone cyst.

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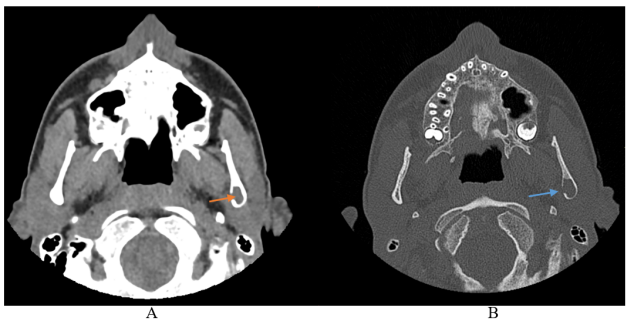

Figure 1: Axial unenhanced CT demonstrates an expansile lytic lesion within the left mandibular ramus. **A**): Soft tissue attenuation is demonstrated centrally on soft tissue window (orange arrow); **B**): Cortical breakthrough along the lesion's medial border is demonstrated on bone window (blue arrow)

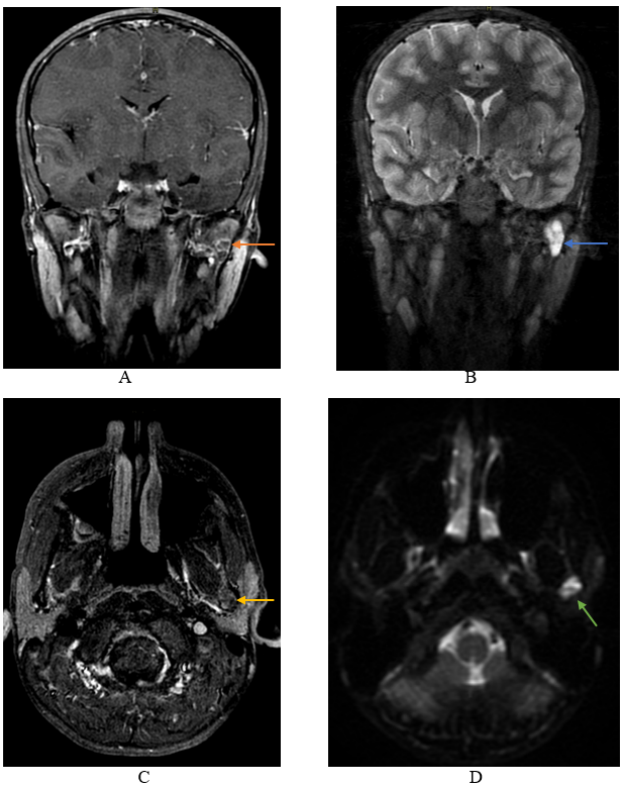

Figure 2: Multisequence enhanced MRI of the head. **A** and **C**): Coronal and axial T1-weighted fat-saturated (FS) post gadolinium sequences demonstrate a heterogeneously enhancing mass in the left mandibular ramus (orange arrows). **B** and **D**): Coronal and axial T2-weighted FS sequences demonstrate fluid signal within this mass (blue arrow) as well as the presence of a fluid-fluid level (green arrow)

The majority (95%) of aneurysmal bone cysts are of the vascular subtype.[5] Vascular aneurysmal bone cysts are often locally aggressive, rapidly growing, and expansile lesions causing cortical destruction.[5] The patient's lesion within the mandible demonstrated prominent cortical thinning with an area of focal breakthrough. Given these high-risk imaging features, the locally aggressive nature of aneurysmal bone cysts, and the patient's wishes to pursue tackle football, the decision was made to proceed with treatment. Still, the family found the cosmetic consequences, risk, and time of recovery of a surgical resection to also be unacceptable. Upon further discussion with both maxillofacial surgery and interventional neuroradiology, the patient opted for either cerebral angiography and embolization of a feeding vessel or percutaneous sclerotherapy if the former approach was not possible.

Cerebral angiography performed in September failed to find an arterial feeding pedicle or robust lesional blush associated with the mandibular ABC. Therefore, the lesion was percutaneously accessed using cone beam CT guidance, following which a foamed preparation of 3% sodium tetradecyl sulfate (STS) and lipiodol was injected (Figure 3 C).

Follow-up CT performed 6 months after treatment demonstrated new sclerosis of the left mandibular lesion (Figure 3 B). Previously noted areas of cortical disruption had healed, and no pathological fractures or other evidence of local complications were evident. The patient remained asymptomatic.

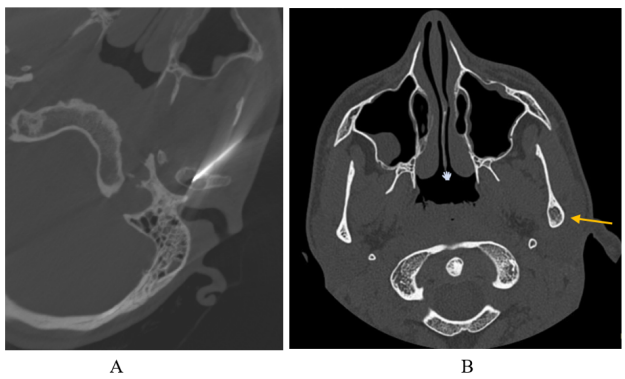

Figure 3: Cone beam CT for needle guidance and post sclerotherapy follow up CT. **A**): Cone beam CT demonstrates needle in appropriate position within the left mandibular ramus ABC; **B**): Follow up CT facial bones demonstrates diffuse sclerosis of the left mandibular ramus lesion and reduction in size (yellow arrow)

3. Discussion

Treatment for ABCs has traditionally centred on complete surgical excision/curettage.[6] Other options include radiotherapy and catheter embolization. More recently,

percutaneous sclerotherapy has been investigated as a minimally invasive alternative that has been shown to achieve similar results with far fewer complications than traditional surgery.[3,4] For example, retrospective data published by Brosjö et al. in 2013 demonstrated successful healing of ABCs treated with sclerotherapy using polidocanol on 37 of 38 patients.[3] Only a few patients experienced minor local inflammatory reactions. Similarly, a limited prospective single-center randomized control trial performed by Varshney et al. in 2009 randomized 94 patients to treatment with percutaneous sclerotherapy or extended curettage and bone grafting. The study demonstrated equivalent healing rates with significantly lower clinically important complications, including deep infections and growth disturbance.[4]

Although percutaneous sclerotherapy for the treatment of ABCs has been well studied in the form of both retrospective and prospective studies, its use in mandibular ABCs is less well-established. This is important as traditional surgical curettage or en bloc resection may carry additional risks including aesthetic deformity, damage to the alveolar neurovascular bundle, and significant hemorrhage.[6] Aside from four patients with mandibular lesions included in a prospective study of percutaneous sclerotherapy for treatment of ABC's in 17 pediatric patients,[7] no other papers have drawn attention to this unique application. This case report highlights the potential of percutaneous sclerotherapy as a safe and effective treatment option for high-risk mandibular ABCs. Further research is needed to establish the efficacy and safety of this approach in larger cohorts of patients with mandibular ABCs.

4. Author Contribution Statement

Sachin Pandey conceived the idea of writing this case report and reviewed the manuscript. Gokce Hatipoglu Majernik reviewed the manuscript. Naman Siddique wrote the manuscript.

5. Source of Funding

None.

6. Conflicts of Interest

The authors declare no conflicts of interest.

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