Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology 2023;9(2):99–103

Content available at: https://www.ipinnovative.com/open-access-journals

Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology

Journal homepage: www.joooo.org

Case Report

Management of large multicystic ameloblastoma of mandible- Resection and reconstruction with recon plate

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ARTICLE INFO

Article history:
Received 11-02-2023
Accepted 14-03-2023
Available online 02-06-2023

Keywords:
Ameloblastoma
Odontogenic
Multicystic
Mandibular reconstruction
Recon plate

ABSTRACT

Ameloblastoma is a common benign, locally aggressive odontogenic neoplasm that usually occurs in the vicinity of the mandibular molars or ramus. Uncontrolled, ameloblastoma may cause significant morbidity and occasionally death. The majority of ameloblastomas are multicystic, which are more difficult to eradicate than the unicystic and peripheral varieties. Although surgery is the mainstay of treatment, the extent of resection is controversial. The challenge in managing ameloblastoma is in achieving complete excision such that chances of recurrence is minimal and reconstruction of the defect when the tumour is large.

1. Introduction

Ameloblastoma is the most prevalent benign tumor of odontogenic origin, formed from developing dental tissues and epithelial cellular components. It is generally a slow growing but locally invasive tumour. The male-to-female ratio is 1:1, and the third to fourth decades of life is when it is most prevalent. It might become apparent as the outcome of a regular radiography examination finding. Ameloblastoma typically affects the mandible's angle and ramus region, where they account for 80% of all cases.[1] The most typical divisions include unicystic, multicystic, peripheral, and malignant subtypes. Ameloblastoma can be divided into different types based on their histological characteristics, including follicular, plexiform, acanthomatous, basal cell pattern, unicystic, granular cell pattern, papilliferous, hemangioma, desmoplastic, plexiform unicystic, clear cell, dentinoameloblastoma, melanoameloblastoma, and keratoameloblastoma.[2] The follicular and plexiform type of ameloblastoma is the most prevalent histologic variant of the disease. They both makeup, respectively, 27.7% and 21.1%.[3] If not treated properly, the solid/multicystic ameloblastoma of the jaws is a slow-growing, locally invasive, epithelial odontogenic tumor with a high risk of recurrence and almost little potential to metastasize. It may destroy cortical bone as it slowly spreads via the medullary gaps. It will eventually resorb the cortical plate and can spread to surrounding tissues.[4]

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https://doi.org/10.18231/j.jooo.2023.022

Enucleation/curettage versus resection with broad margins has been the two treatment options for ameloblastomas that have generated controversy. With cautious enucleation, solid ameloblastomas have a high recurrence rate (60–90%). According to a recent meta-analysis, conservative treatment was 3.15 times more likely to result in a recurrence than curative treatment.[5] The solid or multicystic-type ameloblastoma has so been given the preference for a segmental excision with a 1 to 2-cm margin. For the reconstruction of the ensuing defect, there are numerous options. Mandibular reconstruction's main goals are to restore function and produce a satisfactory cosmetic result.[6] Massive multicystic ameloblastoma of the jaw was treated by en-bloc excision and reconstruction with a reconstruction plate in this case report.

2. Case Report

A 45-year-old female patient presented with a five-year history of slow-growing swelling in her left lower jaw (Figure 1 a). The patient was asymptomatic when a swelling appeared in the mandibular left posterior region 5 years ago. The swelling was initially smaller in size, but it gradually grew to its current size. The swelling was not accompanied by pain or paraesthesia. Because of the effect of the mass over the left mandible, there was a reduced mouth opening and a slight difficulty in chewing. There was no difficulty with articulation or swallowing. There was no history of trauma or pus discharge from that area. History of extraction of teeth with respect to (w.r.t) 36, 37, 38 due to dental caries around 3 years back. The medical, surgical, family, and personal histories were not significant.

Fig. 1: a): Facial asymmetry due to left mandibular swelling, **b**): Intra oral view showing soft tissues swelling distal to 35

Extraoral examination revealed a large diffused swelling on the left mandible region. The swelling extended superior-inferiorly 1.5 cm from the tragus of the ear to 2.0 cm to the inferior border of the mandible. The swelling extended 1.0 cm anteroposteriorly from the corner of the mouth to the angle of the mandible, causing left facial asymmetry. The swelling's overlying surface was smooth and of normal skin color. The swelling was non-tender and hard to the touch, and there was no local increase in temperature. There were no regional lymph nodes that could be felt.

An intraoral examination revealed a swelling approximately 3 cm X 6 cm in diameter around the alveolar ridge distal to 35. An obliterated buccal vestibular w.r.t the alveolar ridge distal to the left second premolar extending up to the anterior border of the ramus was present. The swelling was non-tender, soft in consistency, and not associated with any discharge when palpated. Missing teeth were found in positions 36, 37, and 38 (Figure 1 b). Based on the history and clinical examinations, ameloblastoma in the left mandibular region was proposed as a provisional diagnosis. However, the differential diagnosis of dentigerous, residual rand odontogenic keratocyst was considered.

OPG (Figure 2 a) well-defined multilocular radiolucent lesion extending from 33 to the ascending ramus, involving condyle and coronoid process with corticated borders measuring approximately 3 x 8 cm. It had a distinctive soap-bubble appearance because the lesion runs from 33 till the ascending ramus areas, which displayed septa and partitioned the radiolucency into different parts. The inferior alveolar canal was pushed inferiorly because of its expansile character.

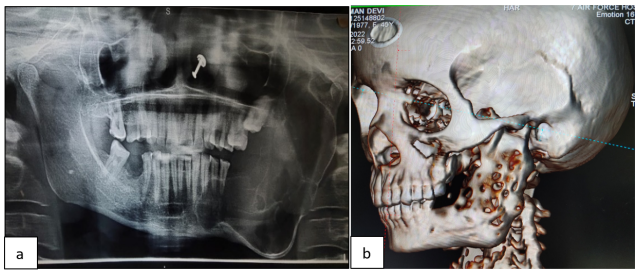

Fig. 2: a): OPG showing a well-defined radiolucent lesion making a shape bow in the mandibular posterior region, extending from distal of 33 to ramus involving coronoid and condylar process. **b**): NCCT mandible suggestive of expansile lytic lesion of left mandible

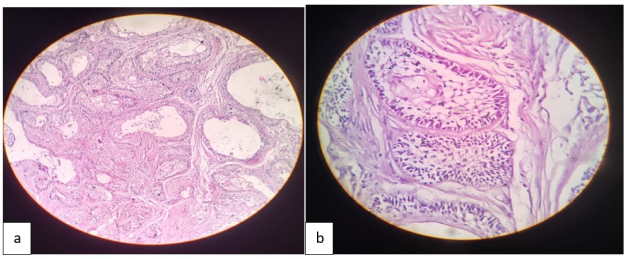

Fig. 3: a): Cystic degeneration of Ameloblastic follicles.(H & E 100x); **b**): Squamous metaplasia in few of the ameloblastic follicles.(H & E 400x)

2.1. Surgical technique

The patient underwent left mandibular resection under general anesthesia with nasal endotracheal intubation. Left side modified Risdon (Peri angular) incision was made through the skin subcutaneous tissue, and platysma. Dissection was carried down through the deep cervical fascia, which was reflected anteriorly to protect the marginal mandibular branch of the facial nerve. Identification and ligation of the facial artery and vein were done. A complimentary intraoral degloving incision was performed from the right canine to the left mandibular angle, and the soft tissues were reflected from the mandible. The tongue and lingual mucosa were dissected from 33 to the medial surface of the ramus, and communication was established with the modified Risdon incision. The exposed solid tumor involving the left mandible measuring about 7x 5 cm involves the body, ramus, coronoid, and head of the condylar process (Figure 4 a). Left mandibular en-bloc resection was done along the distal aspect of 33 with the help of piezo surgery. Disarticulation of the condyle was done and resected segment was removed in toto (Figure 4 b). Intermaxillary fixation was performed with an IMF screw.

A 2.4-mm titanium reconstruction plate was shaped to fit the contours of the excised mandible (Figure 4 c), and the reconstruction plate was internally fixed with a 2 x 10 mm titanium screw (Figure 4 d). Drain was placed and layer closer done with resorbable sutures. The recovery period was uneventful. The patient was fed through Ryle's tube until the 14th post-op period when she was switched to a soft diet after Ryle's tube was removed. The incisional biopsy report confirmed the histopathology of the excised specimen.

The post-op PA view of the skull revealed a well-aligned implant that followed the contour of the mandible (Figure 5 a). On follow up patient had no significant complaint except for mild weakness along the course of left marginal mandible nerve. On one-year follow up no recurrence was noted during a clinical examination (Figure 5 b). The patient had no difficulties in swallowing or chewing and her voice quality was good.

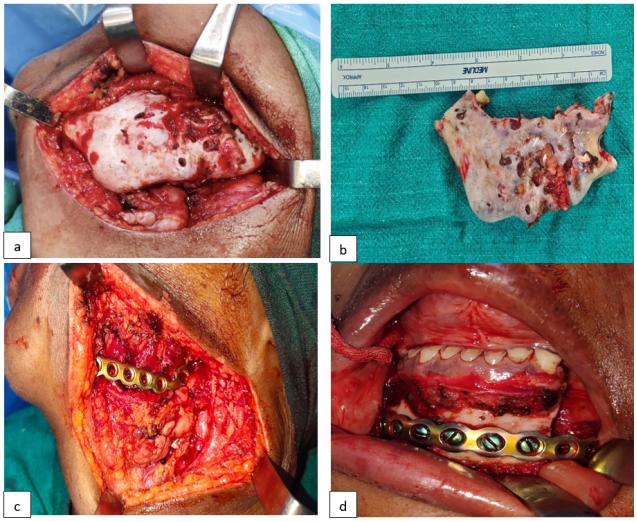

Fig. 4: a): The solid tumour exposed that involve the left mandible which include body, ramus, coronoid and head of condyle; **b**): Left mandible resected segment in toto; **c**): A 2.4-mm titanium reconstruction plate shaped to conform to the contours of the excised mandible; **d):** Internal fixation for reconstruction was done with 2 x 10 mm titanium screw

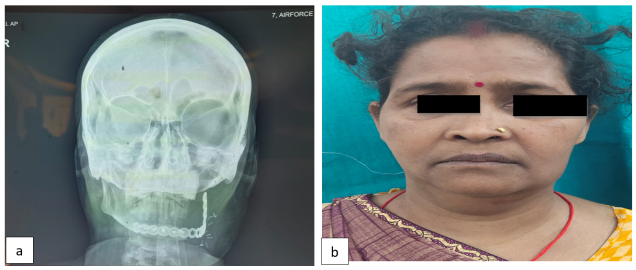

Fig. 5: a): Post op PA view of skull; **b**): Post op follow up after 1 year

3. Discussion

Ameloblastoma is a benign odontogenic tumor that develops in the jaw bone from epithelial cellular elements and dental tissues in various stages of development. It accounts for 10% of all jawbone tumors and is found in the mandible in 80% of cases and the upper jaw in the remaining 20%. The 3^{rd} molar-ramus area of the mandible is the most commonly affected by this neoplasm, with a variable incidence ranging from 80% to 99%.[7]

Ameloblastoma of the mandible can grow to be quite large, causing facial asymmetry, tooth displacement, loose teeth, malocclusion, and pathologic fractures. Tumor size at presentation can range from 1 to 16 cm due to bone expansion and invasion into soft tissue.[1] Ameloblastoma typically presents as a painless, slow-growing mass, and in this case, it took about 5 years for the patient to develop symptoms such as significant facial asymmetry and difficulty chewing. Becelli et al. (2002) studied 60 patients with mandibular ameloblastoma and discovered that approximately half of them had typical symptoms such as swelling of the affected region (38.3%), paraesthesia of the innervated region of the mandibular nerve (13.3%), and alteration in dental occlusion (10%). Ameloblastoma appears radiographically as a radiolucent lesion that can be unilocular or multilocular. It may cause the cortical plate to expand, resulting in a paper-thin and soap bubble appearance on panoramic X-ray and CT scans (Figures 3 and 4).

Ameloblastoma has a high recurrence rate if excision is incomplete. As a result, surgical excision with wide free

margins is the preferred treatment. A lip-splitting incision is a traditional method for performing a mandibulectomy. Although this technique has been widely used in the resection of head and neck tumors, it is associated with troubling postoperative sequelae such as decreased lip sensation and mobility, as well as oral commissure incontinence. Disfiguring scars, lip vermilion notching, and loss of chin pad contour are all cosmetic sequelae. Although some of these complications have been reduced by variations of the lip-splitting procedure, such as the chevron chin-contour incision, the results remain aesthetically unfavourable.[8] In this instance, we approached the excision and restoration of the mandible using the less invasive and more aesthetically pleasing modified Risdon incision. We coupled an intraoral incision with a modified Risdon incision to allow extensive access to the mandibular body and lateral ramus. This method is great for the removal of locally invasive benign tumors, however, it would not be suitable for the excision of malignant tumors. When compared to the lip-splitting method, it minimizes the aesthetic and functional consequences and preserves oral competence and face motor function.

Large mandibular abnormalities constitute a difficulty for head and neck reconstructive surgeons in terms of reconstruction. The mandible is a crucial structural component of the head and neck that affects face appearance on both a functional and cosmetic level. Microvascular surgery has emerged as the most popular way of mandibular reconstruction for major defects among all those that have been described in the literature. The main donor sites for vascularized bone and soft tissue for oral reconstruction are the fibula, iliac crest, radial forearm, and scapula. Since the fibula has the most benefits of all of these, including bone length and thickness, donor site location that allows flap harvest to occur concurrently with tumor resection because both teams are seated on opposite ends of the table, and minimal donor site morbidity, it should be taken into consideration for reconstruction.[9]

Bone plates and screws are the most often utilized alloplastic implants for mandibular restoration. In patients with poor performance status or in situations where the soft-tissue defect of the oral cavity/oropharynx is more severe than the bony mandibular defect, the use of mandibular reconstruction plates is often necessary. The radiation dosages received by the surrounding tissues have not been found to be significantly impacted by titanium plates or screws. Although several recent studies comparing THORP plates to vascularized bone grafts for mandibular reconstruction show that there are significantly delayed complications of hardware extrusion or plate fracture with the THORP system,[10] the Titanium Hollow Screw Osseo integrating Reconstruction Plate (THORP) system was found to be superior to solid screw steel and titanium plates in terms of plate extrusion and exposure. In one study, up to 30% of these patients required secondary salvage reconstruction with a vascularized osteocutaneous free flap. Microvascular reconstruction with osseous free tissue transfer is the preferred technique for mandibular reconstruction in patients whose mandibular continuity is restored with a reconstruction plate. This type of reconstruction also necessitates rigid internal fixation at osteotomy sites with plates and screws. The development of self-drilling, self-tapping screws, and locking mini plates is the most recent advancement in screw and plate technology. Locking mini plates employ double-threaded screws that secure both the bone and the plate, resulting in increased stability.[11] We had difficulty, in this case, reconstructing the mandibular defect with a microvascular bone graft, which is an ideal reconstruction for such a defect, because we did not have a reconstruction surgeon in our center.

4. Conclusion

In conclusion, en-bloc resection reduces the likelihood of tumor recurrence but results in large mutilating bony and soft tissue defects, as seen in our case and many other reported cases and series. The challenge in treating large ameloblastoma of the mandible is not only to completely excise the tumor to prevent a recurrence, but also to provide the best reconstruction method.

5. Source of Funding

None.

6. Conflict of Interest

None.

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Cite this article: Singh SK, Indu S, Saidha N, Madhusudana H N, Sharma P, Srivastava A, Kamboj A. Management of large multicystic ameloblastoma of mandible- Resection and reconstruction with recon plate. *J Oral Med, Oral Surg, Oral Pathol, Oral Radiol* 2023;9(2):99-103.