Recurrent ameloblastoma of mandible and maxilla; intricacies of management: a case series

Rohit Bhardwaj[1], Himani Lade[1], Akriti Sharma[2*], Sandeep Trehan[1], Sabarirajan Ponnusamy[1]

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ABSTRACT

Background: Ameloblastoma, one of the most common odontogenic tumors, although classified as benign yet shows strong predilection for local infiltration. This leads to the recurrence of the tumor after surgical resection (more so when treated conservatively). Recurrent cases may progress toward malignant transformations on rare occasions, thus repeated attempts of conservative surgery in these should be avoided.

Case Presentation: We present two cases of ameloblastoma that recurred after limited resection. One of them was showing focal area of cellular atypia denoting its path toward malignant transformation. Both the cases were managed with aggressive radical resection and suitable reconstruction.

Conclusion: Tumor histology, anatomical location, and adequacy of tumor resection with safety margins are various factors which influence the recurrence of tumor and thus are to be considered along with the possibility of malignant transformation while formulating a treatment plan for revision cases. An individualized decision-making approach should be adopted for every case and long-term follow-up is necessary to avoid unacceptable morbidity due to extensive recurrences.

Keywords: Recurrent ameloblastoma, mandibular, maxillary, free fibular flap, malignant ameloblastoma, mandibular reconstruction.

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Correspondence to: Akriti Sharma
*Department of Otorhinolaryngology, SGT Medical College, Hospital and Research Institute, New Delhi, India.
Email: drakriti2709@gmail.com
Full list of author information is available at the end of the article.

Background

Ameloblastoma is a one of the most common benign odontogenic epithelial tumors, which represents 1% of all head and neck tumors and 10% of odontogenic tumors [1]. Possible sources of the anatomically benign and clinically persistent lesions include dental enamel/dental lamina, epithelial lining of odontogenic cyst, displaced epithelial remnants, or squamous epithelium of oral cavity [2]. Ameloblastoma has a preference for mandible (80%) over maxilla (20%) [3]. The most common site of ameloblastoma involvement is the mandibular molar region. It primarily affects adults in their third decade of life with equal sex predilection. Ameloblastoma can broadly be classified into two categories with various architectural variants, i.e., central (intra-osseous) and peripheral (tissue) ameloblastomas [4]. This commonly occurring tumor has a strong tendency of local invasion, resulting in deformity and debilitation. Microscopically, these tumors have been found to the extent of 2-8 mm beyond the clinical margins [5]. This becomes important in management, as failing to obtain an adequate clear surgical margin invariably results in local recurrence. Although rare, these tumors do demonstrate metastatic and malignant potential [6]. The dilemma exists in formulating an appropriate surgical treatment plan for these tumors between conservative and radical resections, and being complicated by the possibility of recurrence and duel morbidity with revision surgeries for conservative modality and facial disfigurement resulting from radical surgeries (more so in maxillary ameloblastomas).

We present two cases of the recurrence of ameloblastoma (one involving the mandible and other occurring in the maxilla) following limited resection. Both the cases were managed successfully by appropriate surgical resection. We intend to emphasize the role of individualized decision-making for surgical resection of ameloblastoma by adding these two revision cases to the existing literature.

Case Presentation

Case 1

A 38-year-old male patient presented to the outpatient department with a complaint of painless gradually progressive swelling of the right lower jaw for the past 1 year. He also had a similar complaint 4 years back for which he underwent limited surgical resection of the involved mandible. On evaluation, a well-defined firm-to-hard,

non-tender swelling was noted on the right side of the face and was found originating from right mandible [Figure 1 shows the clinical photographs (A and B) of the patient with swelling involving the right mandibular region]. There were no teeth on the right hemi-mandible. Rest of the oral cavity examination revealed no abnormality.

Radiological investigation (orthopentogram) showed the gross extent of the lesion involving the right hemi-mandible (Figure 2 shows the orthopentogram of the gross extent of the mandibular lesion). A detailed evaluation was further carried out by computed tomography (CT) scan which described the lesion as a well-defined large expansile and unilocular lesion (6 × 7.7 cm) arising from the buccal cortex of the right hemi-mandible with a predominantly cystic architecture and the presence of eccentric soft tissue nodules. Fine needle aspiration cytology suggested the possibility of the lesion being ameloblastoma. The lesion was excised by right segmental mandibulectomy (Figure 3 shows the intra-operative clinical photograph showing the lesion *in situ* and excised lesion in totality). Considering the benign nature of the lesion and adequacy of the resected margins after histopathological confirmation on frozen section, reconstruction was planned within the same sitting. A free fibular osteocutaneous flap reconstruction was carried out. The patient recovered well and is free of any recurrence at present with 5 years of follow-up [Figure 1 shows the postoperative clinical photograph of the patient (C and D) and Figure 4 shows the histopathological images of the resected specimen].

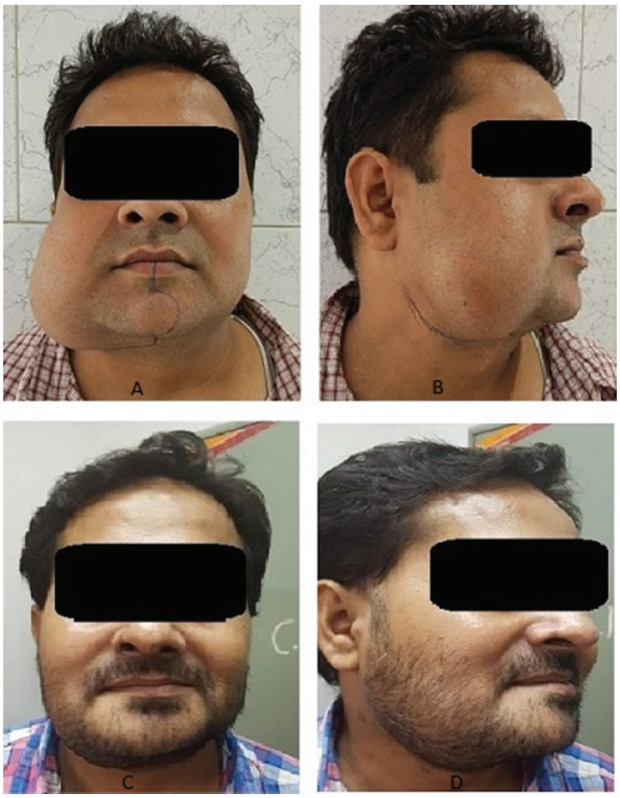

Figure 1. *Preoperative (A and B) and postoperative (C and D) clinical photographs.*

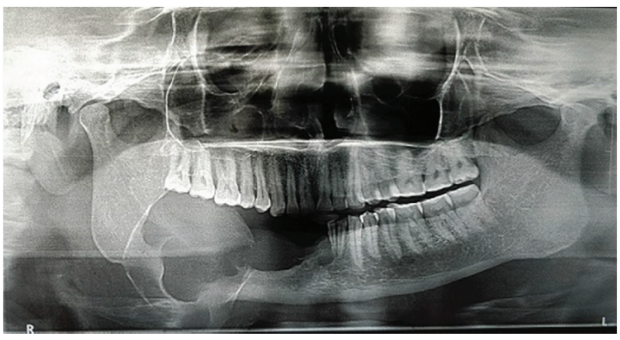

Figure 2. *Orthopentogram showing a radiolucent lesion of right hemi-mandible.*

Case 2

A 20-year-old female presented with a 1-year history of gradually progressive swelling near the left ala and dorsum of the nose and nasal obstruction. The patient had a history of surgical intervention (excision) for left upper alveolar mass 3 years prior, following which she developed swelling again 1 year later and was subjected to limited re-excision of the lesion. The excised mass was identified as ameloblastoma on histopathological examination on both of these occasions. On assessment, a firm-to-hard, non-tender, swelling involving left side of nose and adjacent area was noted [Figure 5 shows the preoperative clinical photograph (A) of the patient]. Also a firm, pinkish mass noted in the left nasal cavity which was insensitive to touch, did not bleed to touch. This was seen extending in the nasal cavity through its lateral wall, as confirmed by the probe test. A bony defect was noted in the left canine fossa through which the protruding mass

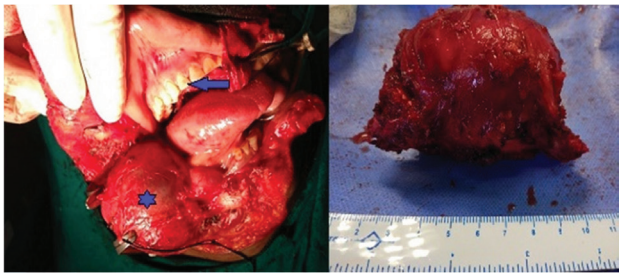

Figure 3. *Intra-operative photograph showing lesion in situ (star marked) and excised lesion.*

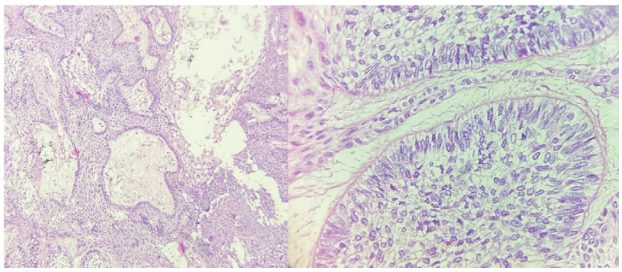

Figure 4. *A section showing epithelial islands comprising palisading columnar cells lining central stellate reticulum cells lying in a fibrous stroma (H&E; 100× and 200×).*

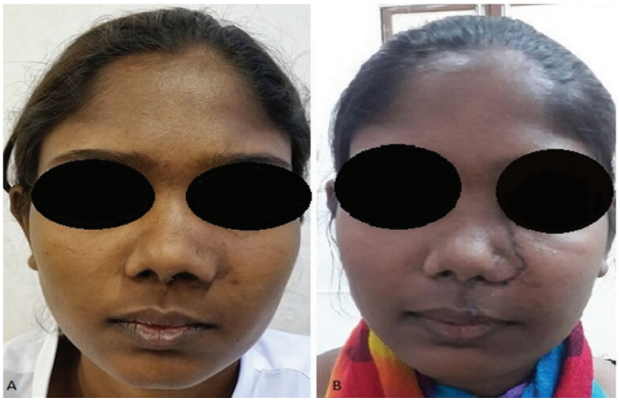

Figure 5. *Intra-operative (A) and postoperative (B) clinical photograph.*

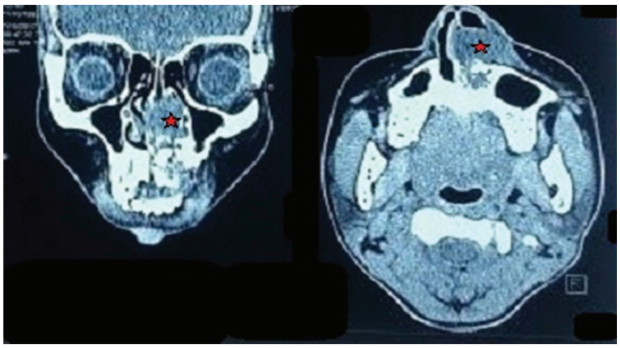

Figure 6. *CT scan showing maxillary lesion (star).*

lesion was seen. Loss of the upper left incisor was documented. CT scan showed an ill-defined, heterogeneous soft tissue mass lesion arising from the alveolar process of the left maxilla causing lytic destruction of the left maxilla and anterior part of the hard palate and it is extending into the left nasal cavity invading the lateral nasal wall structures (Figure 6 shows the CT scan showing the lesion). Biopsy of the nasal mass suggested the possibility of recurrence of ameloblastoma. The patient was subjected to partial maxillectomy where the tumor mass along with bony medial wall of left maxillary sinus, part of anterior maxillary sinus wall, inferior turbinate, and part of the middle turbinate were removed. Histopathological examination revealed desmoplastic variety of ameloblastoma with focal areas of cellular atypia. However, the resection was carried out taking adequate margins all around the lesion and no further action was needed. In the early postoperative period, the patient developed oroantral fistula which was managed successfully. The patient has been under follow-up for 5-and-a-half years and is free of any disease [Figure 5 shows the postoperative clinical photograph (B) of the patient].

Discussion

Although ameloblastomas are benign lesions, yet due to their strong tendency for local invasion, they pose a burden on health facilities by showing recurrences. With the detailed analysis of the available literature, the four major factors influencing the recurrence included clinicopathologic variety of tumor, site/anatomical location affected by lesion, the utilized surgical approach, and genetic basis (Ki67 and CD10 expressions).

Clinicopathological variety of ameloblastoma

As per the World Health Organization (WHO) classification (2005), the four main subtypes of ameloblastoma are multicystic/solid, unicystic, desmoplastic, and extraosseous. The multicystic ameloblastoma can be further divided into follicular, plexiform, acanthomatous, granular, and basal cell variants. A mixture of different patterns coexists and the lesion is defined by the predominant pattern. The highest recurrence is possessed by the solid/multicystic variant due to its notorious propensity for local infiltration [7,8]. Among the various variants, follicular has the highest chance of recurrence [9]. The luminal variant of unicystic ameloblastoma has the least chances of recurrence following complete enucleation owing to presence of a fibrous connective tissue wall as a barrier to local infiltration of it.

Site/anatomical location of the lesion

The mandible is affected more in preference over maxilla by this tumor (ratio being 4-5:1). Mandibular ameloblastomas have a higher recurrence rate than their maxillary counterparts [10]. Even though the mandible is a dense cortical bone which prevents the local invasion of tumors for a long duration, unfortunately the central cancellous bone gives an easy way out for the tumor to spread beyond the radiological margins. Maxilla in comparison to mandible not only has a thin cortical plate offering little resistance to the tumor spread, but also helps in the accelerated growth of the tumor by having rich vascularity [11].

Utilized surgical approach

Available surgical options for management of these tumors include enucleation with curettage and limited tumor resection without adequate margins (as conservative approach) and marginal/segmental resections including adequate safe margins of 1-1.5 cm (as a radical approach). This conservative method offers better functional and cosmetic outcomes along with a higher possibility of recurrence than radical resection [12]. The remnant odontogenic epithelium in the native site, as well as relatively difficult to access areas, can be a source of further recurrence in most cases. The curettage carried out following limited resection of the tumor can implant the foci of ameloblastoma into the bone leading to future recurrence [13]. Unlike malignant lesions, the resultant morbidity following radical resection for these benign lesions is not very acceptable for both (patients and surgeons). And this treatment dilemma is further complicated by proximity of various anatomically important structures in obtaining clear surgical margins like orbit. This mandates an

individualized approach for decision-making for every case in the best interest of patient.

Genetic basis (Ki67 and CD10 expression)

A significant relationship between Ki67 proliferation index and CD10 expression has been found [10]. This study suggested the presence of epidermal growth factor receptors on tumors and opened the possibility of role of anti-epidermal growth factor receptor agents in treatment. However, this area is still under evaluation and can be useful in future.

Most of the recurrences (almost half) of these lesions have been noted to occur within first 5 years [14]. Thus, long-term follow-up is required. Whenever recurrences are to be managed, a more radical approach should be adopted to obtain long-term satisfactory results. For a long time, these tumors were considered radio-resistant. In the current context with the advancements in technology of radiotherapy, the literature suggests the role of radiotherapy in managing ameloblastoma satisfactorily [15]. This could be a better alternative for selected cases where either resection is not feasible or results in greater morbidity and mortality like recurrence adjacent to skull base.

A WHO classification system describes ameloblastoma, malignant ameloblastoma, and ameloblastic carcinoma [16]. Malignant ameloblastoma has similar histological features as the ameloblastoma along with the presence of metastasis. Ameloblastic carcinoma possesses the true malignant cytological features irrespective of metastasis. Metastasis, however uncommon, is mostly found to involve lungs [17]. Chances of malignant transformation are also less but when it occurs, resection margins of 2-3 cm are advocated [18].

Both the presented cases in this series had recurrence, which can be attributed to previous limited resection. We also encountered the possibility of malignant transformation in recurrent maxillary lesion, which we attribute to the repeated surgical attempts made on lesion. The surgical challenge was to remove the lesion and to give good aesthetic results. Both the cases were subjected to the radical resection approach and suitable reconstruction was carried out. With this, both the cases were managed satisfactorily. They have been under follow-up for more than 5 years and are free of the disease.

Conclusion

Our experience with these two cases in tandem with other published series suggests the aggressive behavior of ameloblastoma by showing local recurrence. The possibility of recurrence is much more when the lesion is dealt with conservative modality of treatment. Also, we suggest the potential for malignant transformation in recurrent lesion. We advocate the radical resection by taking adequate three-dimensional safety margins for recurrent lesion with suitable reconstructive options to minimize morbidity. The role of long-term follow-up in these cases cannot be underestimated.

List of Abbreviation

CT Computed tomography

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

None.

Consent for publication

Written consent was obtained from the patient.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

Author details

Rohit Bhardwaj[1], Himani Lade[1], Akriti Sharma[2], Sandeep Trehan[1], Sabarirajan Ponnusamy[1]

1. Department of Otorhinolaryngology, Safdarjung Hospital, New Delhi, India
2. Department of Otorhinolaryngology, SGT Medical College, Hospital and Research Institute, New Delhi, India

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Summary of the case

1	**Patient (gender, age)**	38-year-old male; 20-year-old female
2	**Final diagnosis**	Recurrent ameloblastoma (unicystic variety), ameloblastoma with atypia (desmoplastic variety)
3	**Symptoms**	Swelling over right mandibular region, swelling around left nasal dorsum and ala of nose
4	**Medications**	NA
5	**Clinical procedure**	Radical resection and free fibular reconstruction, radical resection and suitable reconstruction
6	**Specialty**	Otorhinolaryngology