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CASE REPORT

Ameloblastic Carcinoma of Maxilla

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ABSTRACT

Ameloblastic carcinoma (AC) of maxilla is a very rare malignancy of head and neck region with only fewer than 50 cases reported in English literature till now. The tumor cells resemble that of ameloblastoma but show atypia. It is of odontogenic origin and has varying clinical presentation due to the aggressive nature and various sites of origin. It has a high tendency to recur and metastasize. Early identification and complete excision of the tumor is indicated as the recurrence is associated with a very high mortality. Its rare occurrence has made it difficult to come to a consensus on management of the disease. Yet, surgery with or without radiotherapy has been advocated in most of the reported cases. We are reporting a case study of one such patient with AC of maxilla who was treated with excision with wide margins with postoperative radiotherapy.

Keywords: Ameloblastic carcinoma, Head and neck region, Management, Maxilla.

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INTRODUCTION

Odontogenic tumors arise from the odontogenic epithelium. Most of them are benign with most common tumors being odontoid tumors and ameloblastoma.[1] While ameloblastoma is well documented and studied, its malignant variant has been relatively rare and its classification is still controversial. It is broadly classified into primary ameloblastic carcinoma (AC), if it arises *de novo* and secondary AC, if it arises from a benign ameloblastoma. This carcinoma occurs in a wide range of age groups, but the mean age is 55.2 years, according to a recent case study by Uzawa et al.[2] The most common site of origin is the posterior portion of the mandible. It is very rare in the maxillary region. Almost two-thirds of the cases arise from mandible, rest from maxilla. There is a slight predominance in males 3:1. The most common symptom described has been swelling, although other symptoms like pain, rapid growth, trismus and dysphonia can also occur. Radiological features are similar to ameloblastoma with radiolucent intraosseous lesion and focal opacities due to necrosis of bone followed by dystrophic calcification. The tumor metastasizes most commonly to lungs and hence imaging is needed to rule that out before starting treatment. The basic form of treatment for localized ameloblastoma is radical surgery. The only treatment option in metastatic disease appears to be chemotherapy, although the outcome is not favorable. Radiotherapy modalities are limited in the literature.

Here we report a case of AC of *de novo* type, which recurred after surgical excision with postoperative radiotherapy. The tumor was more aggressive after recurrence with local metastasis for which patient was started on chemotherapy.

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CASE REPORT

A 35-year-old male, tailor by occupation coming from Uttar Pradesh, presented to ear, nose and throat outpatient department (ENT OPD) with chief complaints of left sided nasal obstruction for 6 months along with epistaxis for 4 months. He also had swelling around the left eye and chin for 10 days duration (Fig. 1). He was a chronic smoker (10–12 cigarettes/day for 10 years) and an occasional alcoholic (less than 14 gm alcohol per week for 10 years). There was pinkish nontender soft rubbery fleshy mass in left nasal cavity which bled profusely on touch. Rest of the systemic examination was normal. No cervical

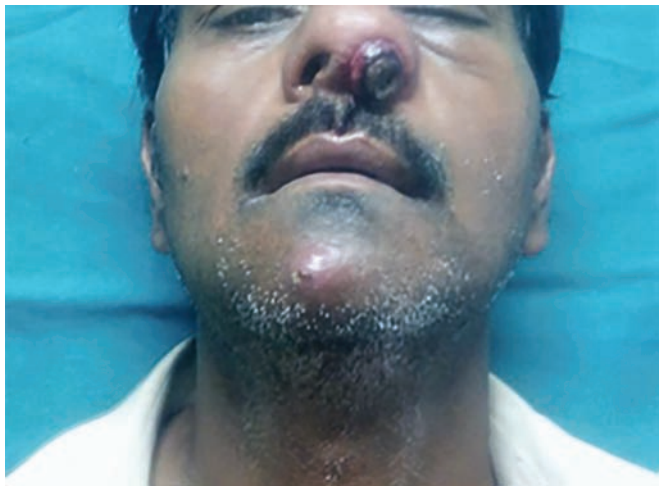

Fig. 1: Clinical photograph of the patient

lymph nodes were palpable. Routine investigations were normal. A biopsy was taken from nasal mass and sent for histopathology examination. Contrast-enhanced computed tomography (CECT) paranasal sinus and orbit showed heterogenous enhancing soft-tissue mass filling the left nasal cavity eroding into septum, left maxillary, ethmoid and sphenoid sinus and extending into nasopharynx (Fig. 2). Electromagnetic radiation (X-ray) chest and ultrasonography (USG) abdomen were normal.

The histological sections revealed a fragmented odontogenic tumor of epithelial origin, consisting of solid parenchyma, and showing basal cells resembling ameloblasts, occasionally arranged in palisades showing intense cellular pleomorphism, numerous hyperchromatic cells loss of the nucleolus and cytoplasm, and areas of necrosis (Fig. 3). Hence, diagnosis of primary AC was confirmed and the patient was informed regarding the aggressive nature of the disease and an informed consent

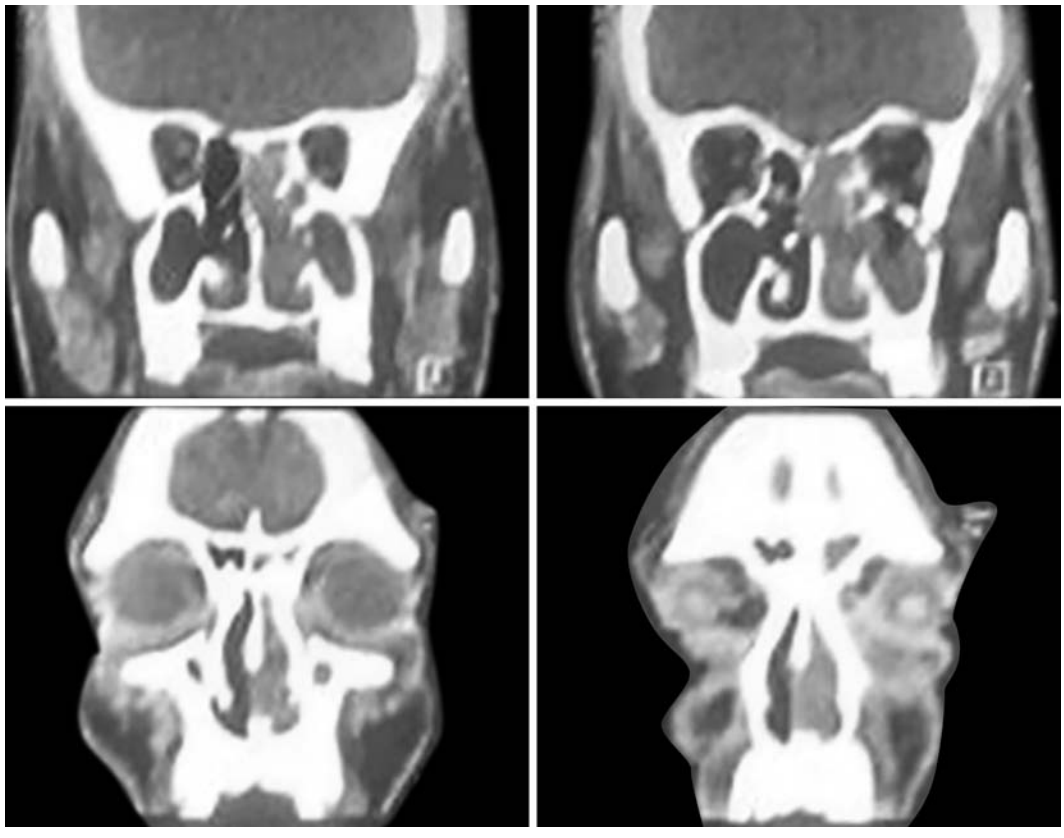

Fig. 2: Contrast-enhanced computed tomography paranasal sinus and orbit showed heterogenous enhancing soft-tissue mass filling the left nasal cavity eroding into septum, left maxillary, ethmoid and sphenoid sinus and extending into nasopharynx

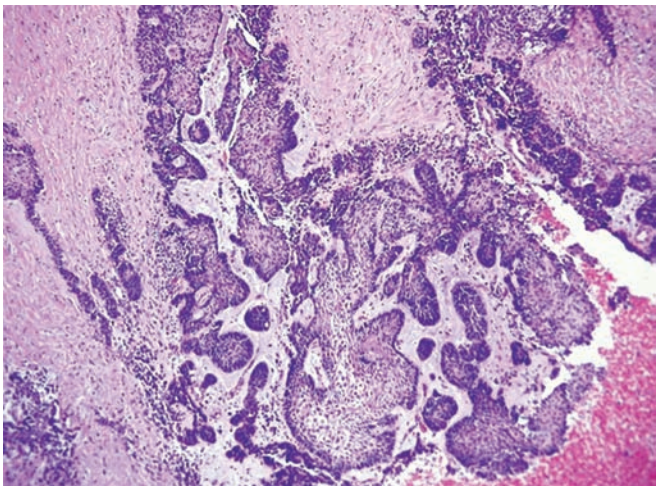

Fig. 3: Histological sections revealing solid parenchyma, and showing basal cells resembling ameloblasts, occasionally arranged in palisades showing intense cellular pleomorphism, numerous hyperchromatic cells loss of the nucleolus and cytoplasm

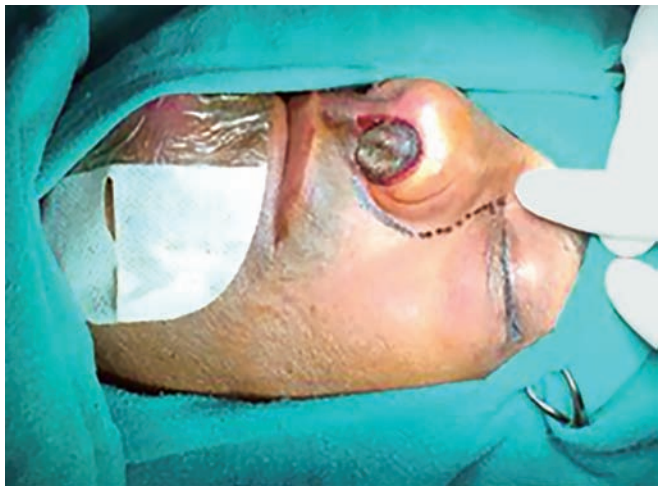

Fig. 4: Lateral rhinotomy incision

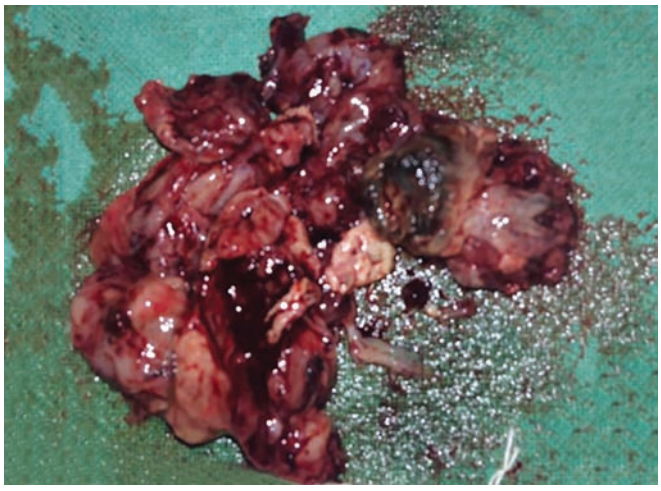

Fig. 5: Gross specimen of the tumor

was taken for surgical excision. The tumor was excised *in toto* via a combined endoscopic and lateral rhinotomy approach (Fig. 4). The sample was sent for HPE (Fig. 5). The HPE report confirmed the primary AC with immunological staining. It was positive for Bcl-2, CAM-5, 6 and MIB-2. Then the patient was started on radiotherapy and was kept on weekly follow-up. Within 2 months of postoperative period, the patient developed recurrence with frontal lobe involvement and personality changes. He was having epistaxis and headaches. The patient was referred to oncology. He was started on chemotherapy and he had a good response to injection Paclitaxel.

DISCUSSION

The term 'ameloblastoma' was coined by Churchill in 1933.[3] They are benign odontogenic tumors, which are slow-growing with a high recurrence rate and tendency for local invasion, expansion and destruction in the bone.[4] Etiology includes dental caries, trauma, infection, inflammation, dental disorders, malnutrition and viral pathogens.[5] The most common symptom is a slow-growing painless swelling. Dental malocclusion, pain, paresthesia or anesthesia might also occur. The histological findings based classification of ameloblastoma is as follicular, plexiform, acanthomatous, granular, basal cell and desmoplastic type. The clinicoradiographic types of ameloblastoma are conventional solid or multicystic intraosseous, well-defined unicystic (intraosseous) and peripheral (extraosseous).[4]

Although a benign tumor, ameloblastoma has high tendency to develop recurrence after resection and become clinically more aggressive, while leading to massive local destruction and metastasis. Its metastatic spread incidence has been reported as 1 to 4.5% of all cases.[6] Even though rare, cases with metastases to lungs, pleura, spleen, kidney, heart, skull, spine, brain, and lymph nodes have been reported.[7]

Odontogenic epithelial malignancies classification are numerous to provide a better understanding of the many terms for ameloblastic malignant lesions, Elzay[8] gave the Elzay classification (1982) of malignant odontogenic tumor which remains in use today. The term malignant ameloblastoma was used to describe a tumor that is a histologically ameloblastoma, but which metastasizes. The AC is characterized as a tumor that has certain features of ameloblastoma but demonstrates traditional histological features of malignancy like atypia and acts much more aggressively than ameloblastoma.

However, in 1984, Slootweg and Müller[9] emphasized that ameloblastoma may exhibit malignant features other than metastasis also and suggested the new classification system for malignant tumors with features of ameloblastoma, based on other characteristics of malignancy:

- *Type 1*: Primary intra-alveolar epidermoid carcinoma (PIOC) ex odontogenic cyst
- *Type 2*: (a) Malignant ameloblastoma, (b) ameloblastic carcinoma, arising *de novo*, ex ameloblastoma or ex odontogenic cyst
- *Type 3*: PIOC arising *de novo*—
  (a) Nonkeratinizing and (b) keratinizing

Over years of controversies, it was agreed that the term AC should be used to denote lesions that exhibit histologic features of both ameloblastoma and carcinoma. The tumor could metastasize with the histologic features of malignancy found in the primary tumor, the metastases, or both. The term malignant ameloblastoma should be restricted to those ameloblastomas that metastasize despite typical benign histology in both the primary and the metastatic lesions.

In 2009, Kruse et al[13] based on 60 years of evidence-based literature review of malignancy in maxillary ameloblastomas recommended and presented a novel classification which considers the unknown origin as well as primary ameloblastomas with metastases and their histopathological features of malignancy without previous evidence of malignancy in the primary localization. It separates AC arising in ameloblastoma and arising *de novo* into different groups.

Ameloblastic carcinoma is an rare, aggressive malignant epithelial odontogenic tumor with a poor prognosis. Its commoner than that of malignant ameloblastoma by a 2:1 ratio. Two-thirds of them arise from the mandible while one-third from the maxilla.[9] It occurs in a wide range of age groups (1 to 90); no sex or race predilection has been noted. This lesion may present as a cystic lesion with benign clinical features or as a large tissue mass with rapidly enlarging mass, significant bone resorption, as was in our case. Perforation of the cortical plate, extension

into surrounding soft-tissue, and numerous recurrent lesions and metastasis, usually to cervical lymph nodes, can also be associated,[9] but our case does not have any lymph node involvement. Studies show that both pathways, hematogenous as well as lymphatic, seem to be possible although the latter is rare. The most common site for a distant metastasis is the lung (70–85%), followed by bone, liver, and brain. This high metastatic incidence emphasizes the importance to detect pulmonary metastases either by conventional radiographs, CT, or positron emission tomography scans as well as the need for long-term follow-up. Distant metastasis occurs sometimes even in the absence of a local or regional recurrence[10] and is usually fatal and may appear as early as 4 months or as late as 12 years postoperatively.

The differential diagnosis of AC should include primary intra-alveolar epidermoid carcinoma, acanthomatous and keratinizing type of typical ameloblastoma, squamous cell carcinoma arising from odontogenic cyst, carcinomas in the jaws metastasizing from other locations, squamous odontogenic tumor, etc.[11]

Diagnosis may be simple in cases where it originates from recurrent ameloblastoma, because most lesions will have malignant transitional area coexisting with benign areas. However, when it arises *de novo*, it has to be differentiated from other PIOC, central high-grade mucoepidermoid carcinoma or tumors with origin from bony invasion from adjacent tissue based on typical histologic features of ameloblastoma like peripheral palisading, reverse polarity, and stellate reticulum-like structures.[10,12]

The two types of typical ameloblastoma, acanthomatous ameloblastoma and keratoameloblastoma, are also considered in the differential diagnosis of AC as the former one exhibits varying degrees of squamous metaplasia and even keratinization of the stellate reticulum portion of the tumor islands; however, peripheral palisading is maintained and no cytologic features of malignancy are found. The latter is a rare variant of ameloblastoma that contains prominent keratinizing cysts that raises a doubt and distracts the pathologist from the otherwise ameloblastomatous feature.[9,10,12]

Carcinomas in the jaws metastasizing from primary locations, such as the lung, the breast and the gastrointestinal tract may mimic AC and must always be ruled out clinically by locating their primary site.[10]

An additional consideration in the differential diagnosis is the squamous cell carcinoma arising in the lining of an odontogenic cyst. The tumor cells resemble the cells seen in ameloblastoma but they show cytological atypia and, moreover, they lack the characteristic arrangement seen in ameloblastoma.[11]

Considering all the differential diagnosis, the term AC can be applied to our case, which showed focal histologic evidence of malignant disease including cytological atypia and mitoses with indisputable features of classic ameloblastoma.

The treatment of AC is controversial, but the recommended surgical treatment usually requires jaw resection with 2 to 3 cm bony margins and consideration of contiguous neck dissection, both prophylactic and therapeutic. In cases of maxillary AC, a neck dissection should only be performed in the presence of clinically positive lymph nodes.[13] Maxillary ameloblastomas should be treated as radically as possible due to the spongy maxillary bone architecture as it may facilitate the spread of the tumor and may lead to infiltration of adjacent vital structures. In contrast to this, in the mandible the speed of growth is decelerated due to the thick and compact bone structure. Hence, it is imperative that radical excision with adequate margins are needed for AC. But in maxilla the nearby vital structures pose difficulty in excising radically with 10 to 15 mm margin as recommended in previous studies. In our case, we excised the tumor *in toto* with adequate margins.

Role of radiation therapy as an adjuvant postoperative radiotherapy improves the likelihood of local control, especially if margins are doubtful.[14] Regular follow-up and CT or magnetic resonance imaging controls, in particular in maxillary ameloblastomas, are vital for early detection of recurrence among clinicians. They can recur locally anytime after definitive therapy, in our case it recurred within 2 months.

CONCLUSION

In summary, the present study reports the case of a 35-year-old male patient with Adenocarcinoma of the maxilla. Since adenocarcinoma is rare disorder, its treatment has always remained controversial. In our case, the patient was treated as per the most recent understanding of the neoplasm by prompt excision and postoperative radiotherapy yet the carcinoma recurred in a more aggressive manner making repeat excision difficult leaving chemotherapy as the only alternate available. Surprising enough, the patient had a good symptomatic recovery with injection paclitaxel paving way for more research into the role of chemotherapy in treating aggressive tumors. Continued and long-term follow-up is mandatory to detect late recurrence and metastasis. In addition, continued research, case studies and treatment experience are necessary to establish more useful treatment and management strategies for this rare tumor.

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