

CLEAR CELL ODONTOGENIC CARCINOMA OF MAXILLA: CASE REPORT OF A RARE ENTITY

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ABSTRACT:

Clear Cell Odontogenic Carcinoma (CCOC) is a rare odontogenic tumor and is most commonly seen in the posterior mandible. It mainly affects females in their fifth to seventh decades of life. CCOC is an aggressive tumor with both local invasive and distant metastatic properties. This tumor is also known to recur. CCOC of maxilla is rarer and only few cases have been reported so far.

We, therefore, report a case of 55-year-old male patient complaining of a hard swelling on the right cheek of 2 ½ months duration. Fine needle Aspiration of the same was performed followed by histopathological evaluation of the resected maxillectomy specimen.

Due to its aggressive and recurring nature, this entity demands a nodal dissection along with adjuvant radiotherapy.

Keywords: Clear cell, Clear cell odontogenic carcinoma, CCOC, Maxilla

INTRODUCTION

Hanset et al.^[1] and Waldron et al.^[2] were first to describe Clear Cell Odontogenic Carcinoma (CCOC) in 1985^[3,4,5]. It is a rare aggressive intraosseous jaw tumor predominantly seen in females of 40-60 years of age^[3,6,5]. Mandible, mainly the posterior part, is the most commonly affected site^[3,7].

Formerly, known as Clear Cell Odontogenic Tumor or Clear Cell Ameloblastoma, it was classified as a benign entity under World Health Organization (WHO) classification (1992)^[3,5,7]. Due to its locally invasive nature and much more aggressive behaviour as compared to Ameloblastoma,

classification of odontogenic tumors was revised in 2005 by WHO. Since then CCOC is considered a malignant tumor with an increased tendency of recurrence, metastasis to regional lymph nodes and other distant sites^[3-6]. Distant pulmonary metastasis was reported by Bang et al.^[8] whereas Kumar et al.^[9] reported a case metastasizing to 5th lumbar vertebrae and to the hip 3 years after initial diagnosis.

We, hereby, report a case of Clear Cell Odontogenic Carcinoma, a rare entity in a rarer site, i.e., maxilla in a 55-year-old male patient.

CASE DETAIL

55-year-old male patient came to ENT OPD with complaints of rapidly increasing

painless right sided cheek swelling after a tooth extraction 2 ½ months back. He also complained of nasal discharge from the right nostril after applying pressure on it. On physical examination, swelling measured 3x2 cm, was firm in consistency and was immobile (Figure 1). Patient was a chronic tobacco smoker and alcoholic because of which clinicians thought it to be squamous cell carcinoma. However, examination of the oral cavity did not show any mucosal lesion.

CT PNS was performed which showed an abnormal soft tissue mass in the right maxillary, ethmoid, sphenoid and frontal sinus with hyperdense areas within along with smooth expansion of the sinuses. Cortical breach and extension into the pre-maxillary region, right masticator space and extra cortical portion of right orbit was noted. Right osteomeatal unit was widened along with blockage and rarefaction of the ethmoidal trabeculae. Both radiologists and the clinicians thought it to be right maxillary sinus abscess along with allergic fungal sinusitis. However, malignancy was not ruled out.

Followed by which Fine Needle Aspiration (FNA) of the swelling was performed which revealed highly cellular smears. The cell clusters were arranged in papillary configuration with a fibrovascular septae surrounded by mild inflammatory cells along with plenty of cyst macrophages. Individual cells were round to elongated and showed cellular as well as nuclear pleomorphism, hyperchromatic nuclei and scant to moderate amount of cytoplasm (Figure 2 & 3). FNA report was given out as High Grade Epithelial Malignancy most probably Adenocarcinoma.

Patient underwent right hemimaxillectomy procedure and subsequently the resected specimen was

sent for histopathological evaluation. We received a right hemimaxillectomy specimen which included the right maxilla, the frontal process, part of hard palate and 3 attached teeth. A firm to hard, grey-white well circumscribed tumor mass was seen sitting on the hard palate measuring 5x5x4 cm. Specimen also consisted of friable, soft to firm grey-brown tissue bits (Figure 4).

Adequate sections were taken from the tumor mass and revealed nests of clear cells with thin delicate cell membrane, hyperchromatic nuclei and cytoplasmic clearing. Cells also showed peripheral nuclear palisading or basaloid appearance giving an ameloblastomatous picture. These nests were separated by fibrocollagenous stroma. (Figure 5 & 6)

Impression: Clear cell Odontogenic Carcinoma of Maxilla

DISCUSSION

Clear cells may result from several reasons like fixation artifacts, intracellular storage of substances like glycogen, mucin or lipid, and can be seen in many other tumors. In maxillofacial area, clear cell tumors are either salivary or odontogenic in origin or occasionally metastatic from a primary elsewhere [10]. Odontogenic neoplasms showing predominantly clear cells are rare and include odontogenic cysts, clear cell variants of calcifying epithelial odontogenic tumor (CEOT), Ameloblastoma and clear cell odontogenic carcinoma (CCOC) [4].

Clear cell odontogenic carcinoma (CCOC) is a rare and unusual tumor and most of these cases are seen in the anterior region of the mandible followed by maxilla with mandible: maxilla ratio of

3:1 [6]. Females are predominantly affected as compared to males with a ratio of 1.5-2:1, usually in the 5th to 7th decade of life [7,10]. The presenting case is unusual as this was diagnosed in a 55-year-old male patient and the site affected was the right maxilla. Although few cases have been recently reported by Siraj *et al.* [4], Keswani *et al.* [3], Dhariwal *et al.* [5] and Surej Kumar LK *et al.* [9].

Clinically, these patients present with a painless swelling of the mandible or maxilla [3,5]. Sometimes, they also present with loosening of teeth or gingival swelling [4]. Our patient complained of an enlarging painless swelling after extraction of tooth.

Radiologically, these lesions are radiolucent and ill-defined with irregular margins often associated with root resorption [3,4,10]. Kwon *et al.* [6] has mentioned that the radiolucent picture of such lesions can be misdiagnosed as an infected cyst. Similar thing was noticed in the present case as the radiologists and clinicians thought it to be an abscess along with fungal sinusitis.

Histologically, CCOC show 3 different patterns –

- Common of all is a biphasic pattern which shows nests of clear cells admixed with polygonal cells and eosinophilic cytoplasm.
- A monophasic pattern that is composed purely of clear cells.

- The least common pattern shows nests of clear cells with an ameloblastomatous pattern [3,4,7].

The case presented here shows the third pattern histologically.

These tumors show a strong PAS positivity and is also immunoreactive to cytokeratins mainly CK8, 13, 18 & 19 due to presence of glycogen in these cells [3,4,5]. Occasional EMA, S-100 and Antiameloblastoma Antigen are present [3,10].

Since CCOC is difficult to diagnose histopathologically, the differential diagnosis of jaw tumors with cytoplasmic clearing should always be kept in mind and ruled out with adequate sampling of the tumor and use of appropriate special stains and IHCs [6].

Table 1 below provides a list of differential diagnosis of malignant clear cell tumors of oral cavity [4].

Treatment options for CCOC depend on the size of the lesion, its location, soft tissue involvement and lymph node metastasis [4]. Due to its aggressive behaviour and increased affinity of recurrence, treatment of this tumor includes complete excision, curettage or enucleation or surgical resection with atleast 1 cm of tumor-free margins with or without lymph node dissection [3,6,7].

It has been mentioned that an en bloc resection of the bone and any other soft tissue involvement reduces the risk of recurrence [4]. It is also advised that ultrasonographic evaluation of the liver,

kidneys and spleen should also be carried out to rule out metastasis [9].

Adjuvant radiotherapy has also proved to be beneficial especially in patients with extensive soft tissue and perineural invasion and in which tumor-free margins are not possible and with positive nodes [5,7]. Our patient underwent a hemimaxillectomy procedure and was put on radiotherapy.

CONCLUSION

Diagnosis and treatment of CCOC are challenging for surgeons due to the rarity

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TABLE:

Differential diagnosis	Histopathologic features	Special stains/immunohistochemical features
Clear cell variant of calcifying epithelial odontogenic tumour (pindborg tumour)	Prominent amyloid deposition and calcifications in the stroma	PAS Stains for amyloid
Mucoepidermoid carcinoma	Intermediate cells, squamous differentiation, and mucin production	Alcian blue
Epithelial-myoepithelial carcinoma	Biphasic tubular structure- outer clear and inner cuboidal cells	SMA in nonluminal cells Calponin PAS
Hyalinizing clear cell carcinoma of salivary glands	Hyalinising stroma	
Metastatic renal cell carcinoma	Typical sinusoidal vascularity	Vimentin, EMA, CD10 and RCC
Metastatic liver, prostate, and thyroid carcinomas	Histopathological features characteristic of the primary tumour	Metastasis from liver - HepPar, AFP From prostate - PSA, PSAP, AMACR From thyroid - TTF-1, CK19, thyroglobulin
Malignant melanoma	Prominent eosinophilic nucleoli	S-100, HMB-45, Melan A
Clear cell odontogenic carcinoma	Nests of clear cells, cells with eosinophilic cytoplasm and ameloblastoma like pattern	PAS CK14 and CK19 EMA Calretinin

PAS: Periodic acid Schiff, SMA: Smooth muscle actin, EMA: Epithelial membrane antigen, RCC: Renal cell carcinoma, PSA: Prostate specific antigen, PSAP: Prostate specific acid phosphatase, AMACR: Alpha-methylacyl-CoA racemase, TTF-1: Thyroid transcription factor-1, CK: Cytokeratin

Table 1: Differential Diagnosis with their histopathological features and IHC markers

FIGURES:



Figure 1 – Firm to hard mass on the right cheek

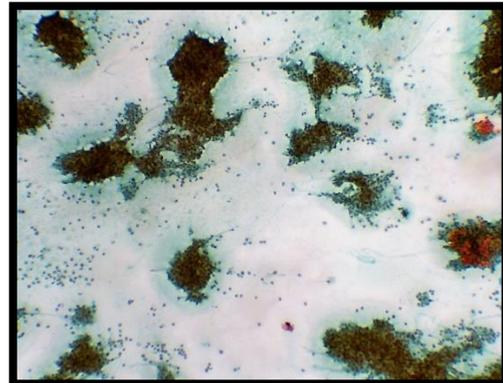


Figure 2 – FNA smears, PAP stain, 10X; showing hypercellularity with clusters arranged in papillary configuration.

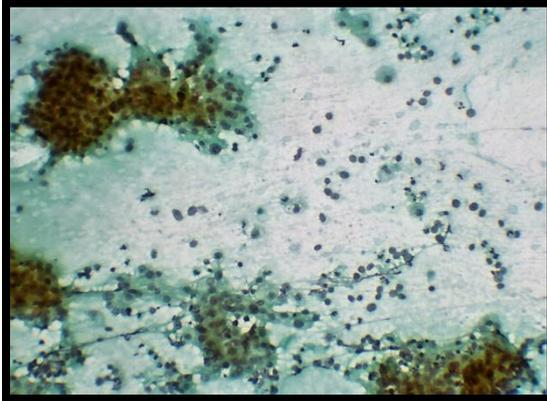


Figure 3 – FNA smears, PAP stain, 40X; showing pleomorphic cells with cyst macrophages



Figure 4 – Gross picture of right hemimaxillectomy specimen with a well circumscribed tumor mass over the hard palate

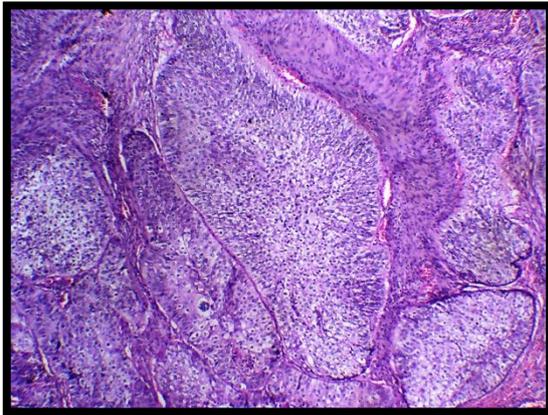


Figure 5 – H&E, 10X showing nests of tumor cells arranged by fibrous septae. Also, shows peripheral nuclear palisading with central clear cells.

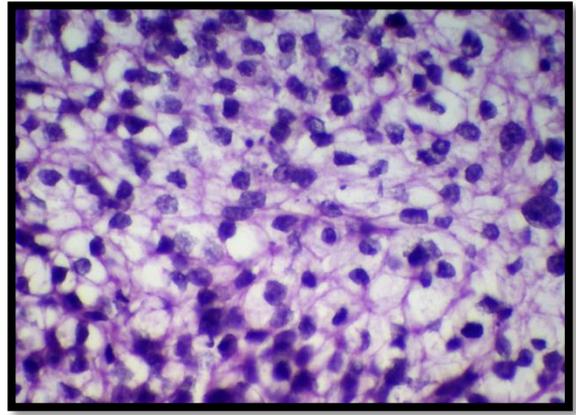


Figure 6 – H&E, 40X showing clear cells with thin delicate cellular membrane and hyperchromatic nuclei