

**Review Article****Primary intraosseous carcinoma of the jaws – A review***Jane Belinda¹**Consultant Periodontist & Oral Implantologist¹, Chennai*

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*Received: 30.08.2022**Accepted: 12.09.2022**Web published: 28.09.2022***ABSTRACT:**

Primary intra osseous carcinoma of the jaws is a rare tumour supposedly originating from odontogenic epithelial residues. It is one among few odontogenic carcinomas arising in the jaws. Others include malignant ameloblastoma, malignant changes in odontogenic cysts and malignant variants of other odontogenic tumours arising from epithelium. The mandible has a greater propensity for involvement than the maxilla. Although certain lesions have been reported as having a well-defined border, most do not. There is no sign of new bone formation and just a very little amount of remaining bone in the lesion's centre, making the internal structure completely radiolucent. This review highlights the aetiology, features and treatment of PIOC.

Keywords: Oral Cancer, Intraosseous Carcinoma, Epidermoid, Squamous, Odontogenic epithelium

Address for Correspondence:*Dr. Jane Belinda,**Consultant Periodontist & Oral Implantologist,**81/18, B Block, Flat no 18, R E Apartments, Avadhana Pappiar Road, Choolai, Chennai, India – 600112**Email- janelinda123@gmail.com***INTRODUCTION**

Primary intraosseous carcinoma is a Squamous cell carcinoma arising within the jaws. They have no initial relation with oral mucosa and has its origin from the residues of the odontogenic epithelium or odontogenic cyst or tumor. These lesions primarily occur in the jaw bones and according to the new classification, they should include carcinoma arising de novo, arising from keratocytic odontogenic tumors or cysts [1-3]. Waldron and Mustoe's

classification are widely accepted, according to which PIOC have various origins – Type 1- PIOC ex odontogenic cyst, Type 2a - Malignant ameloblastoma, Type 2b - Ameloblastoma carcinoma arising de novo, Type 3 - PIOC arising denovo, Type 4 - Intraosseous mucoepidermoid carcinoma [4].

To define a lesion in the jaws as PIOC, 3 criteria should be fulfilled

- a) Histological evidence of squamous cell carcinoma;
- b) Absence of ulcer formation on the overlying mucosa; c) Absence of a distant primary tumor at the time of diagnosis [5-7]

Primary intraosseous cancer is a rare disorder that has previously received a lot of attention. Its origin could be the subject of unique speculations. The sources of epithelial cells include reduced enamel epithelium, the cell rests of Malassez, and the dental lamina rests. There have been a few reports of odontogenic tumors developing malignancies, and there have also been a few examples of primary intraosseous carcinoma recurrence in the literature. A 3:1 ratio of male to female adults who are in their sixth to seventh decade of life are more likely to have PIOC. Typically, the posterior mandible is where it is found. Pain and edema are the two most often reported complaints. Sensory abnormalities such as numbness and paresthesia are also possible. They generate pressure or invasion on the alveolar nerve, which explains why pain and paresthesia are present. Occasionally, but not frequently, PIOC is linked to metastases to nearby lymph nodes. In the current case, there was no surface ulceration and the overlying mucosa showed a typical pinkish coloration. No other unusual development could be found.

ETIOLOGY

The etiology is not clear, although cellular source comes from the cell rests of Malassez which is present within the periodontal ligament, reduced enamel epithelium found around the crown of erupted tooth, remnants of dental lamina in the gingiva or within the bone [8]. It may also arise from previous odontogenic cyst.

CLINICAL FEATURES

The affected area's discomfort and edema are frequent clinical symptoms of PIOC [9]. Both tooth loosening and jaw swelling progress with time [5]. In some circumstances, patients may have a history of earlier dental operations intended to treat the neoplasm's symptoms [10 –12]. The majority of instances develop in the posterior mandible, where the dental lamina remains serve as the epithelium's source. In the anterior mandible, there are very few [3]. Although the clinical characteristics of PIOC are non-specific, the main de novo signs of the disease are sensory disturbances such parenthesis and numbness, mimicking facial neurological disorders, and inferior alveolar nerve compression in severe cases [3].

In a case described by Kirty Nandimath et al. [9], a 54-year-old female patient presented to the hospital with pain in the right jaw for the past three months. A localized swelling developed after the patient initially experienced tooth pain in the fourth jaw quadrant. A month later, the teeth started to move, necessitating extraction, but the swelling continued and grew worse. On examination of the extraction socket, there was evidence of granulation tissue

covered with necrotic slough. The surrounding mucosa and the mandibular tumor were not obviously connected. Little cerebral extension and tenderness and induration could be felt in the edema. The vertical space between the first and second premolars could be constricted. Because of its potent makeup and intensifying progression, intraosseous cancer was included in the differential diagnosis.

In a case described by Geetha P et al, a 76-year-old man reported having pain and swelling in the area of his right lower back teeth for 15 days. The patient's present sickness revealed that he had been asymptomatic for six months before experiencing pain and swelling around his right lower back tooth that gradually grew to the size it is today. The patient described a 15-day progression of the jaw's rightward deviation. Additional oral clinical examination revealed significant facial asymmetry and a right-sided deviation of the jaw. Condyle was not palpable on the right side of the temporomandibular joint (TMJ) and condylar developments were not sensed. One firm, non-tender, palpable submandibular lymph node on the right side of the mouth. Upon intraoral inspection, a diffuse swelling on the right buccal vestibule was discovered. It was palpable as being slightly delicate and delicate in nature. In respect to 46, the corresponding tooth was cracked with grade II mobility. In light of this, it was temporarily concluded that 46 had a dento-alveolar abscess. Radiographic examinations must be performed for additional assessment. [13].

RADIOGRAPHIC FEATURES

One of the most effective ways to find PIOC is through radiographic evaluation [7]. The size, form, and look of their boundaries, however, vary greatly. Mandible is where PIOC is more usually found, with a notable preference for the posterior parts. The lesion may also cross the midline or be seen in the anterior part of the maxilla [2–5]. An essential characteristic of PIOC, according to Kaffe et al., is the existence of hazy edges devoid of sclerotic contour [14]. To prove that PIOC is intraosseous, it is ideal for the bone to completely encircle it. However, the majority of cancers also involve the soft tissues beneath and the jawbones. To distinguish between tumors of the surface mucosa and intraosseous carcinomas, it is critical that the width of the alveolar cortical perforation is smaller than that of the concealed tumor when the tumor's alveolar border exhibits discontinuity.

The lack of root resorption in PIOC is a notable trait. Some cancers have a propensity to develop close to the teeth, indicating that tumor invasion follows the path of least resistance. They cause benign odontogenic tumors or cysts to form an unusual characteristic known as the floating teeth pattern [15]. There was obliteration seen along the right mandibular notch, body and ramus of the jaw, with protrusion over the edges. The right lower premolars seemed to be floating teeth with a few radiopaque bone specks dispersed throughout the bone. A mandibular anterior-posterior radiograph showed the connection of the medial and lateral cortical plates.

To determine how far the lesion had spread, a CT scan was taken. It revealed a damaging lesion that extended from the right parasymphyseal area to the right subcondylar region with anteroposterior growth. The boundaries were ill-defined, and a sizable zone of development suggested an intraosseous malignant tumor. Massive muscles that suggested invasion were present in the masseter and pterygoid. A significant oval, clearly defined submandibular

mass with localized putrefaction that may have been a metastatic submandibular lymph node was also seen on the CT scan.

HISTOPATHOLOGICAL EXAMINATION

Multiple areas can be seen in histopathological findings. In an instance that Revati Deshmukh et al. reported Epithelium and connective tissue were noted in segment one. The epithelium displayed dysplastic characteristics such as nuclear hyperchromatism, altered nuclear cytoplasmic proportion, and nuclear and cellular pleomorphism. By all appearances, the basement layer appeared to be in place here. Diffuse inflammatory infiltration, including lymphocytes, plasma cells, and macrophages, was discovered in this area's underlying connective tissue. Additionally, there were several hemorrhagic areas in the connective tissue. determination.

The epithelium appeared as a plexus in section two, with proliferative dysplastic pearl development. The epithelial changes include dysplastic multiplication without the involvement of basement membrane, with insufficient connective tissue. When used as a marker, calretinin, which is used for odontogenic epithelium, did not show positive results. This made ameloblastic carcinoma impossible. A significant local excision was used to treat the patient. In light of the clinicopathological findings, the diagnosis of primary intra alveolar cancer was successful. The overall impression was suggestive of PIOC, or a link between clinicopathology and PIOC [16].

Ameloblastic carcinoma can be ruled out due to absence of detrimental characteristics along with reversal of nuclear polarity. When compared to intraosseous mucoepidermoid carcinoma, PIOC can be distinguished by the absence of a mucous portion, which is confirmed by a negative mucicarminic recoloring. The histopathologic hallmark of clear cell odontogenic cancer is a biphasic pattern made up of clear cells and eosinophilic polygonal cells. On the other hand, PIOC shows foci of malignant epithelial cells with little to no distinct cell component.

TREATMENT

The best course of action is surgery, which frequently entails en bloc extraction or extensive excision of the affected bone. A good alternative might be distraction osteogenesis for mandibular segmental defects. Only lesions that cannot be surgically managed should be considered for radiotherapy and chemotherapy [3-5]. Pre-operative treatment and extensive surgery may be useful in cases of advanced operable malignancies [17].

PIOC are currently under the watchful eye of a thorough resection. Other forms of treatment, such as chemotherapy or radiotherapy, should only be used for lesions that are uncontrollable. Chemotherapy and radiotherapy before the surgery is considered to be effective in treatment of advanced cancers. However, given the low number of cases and documented developments, it is unclear whether these methods are adequate.

PROGNOSIS

Patients with PIOC have a poor prognosis due to frequent regional lymph node metastases, a high rate of recurrence,

and a high fatality rate. The tumor's histologic grade and any localized lymph node metastases may serve as helpful prognostic indications.

CONCLUSION

Primary intraosseous carcinoma (PIOC) lesions can develop from salivary gland remnants, odontogenic tumors, epithelium remnants, or remnants of the odontogenic epithelium [18]. Anaplasia, intrusiveness, and metastasis are characteristics of malignancy [19]. A thorough historical review and comprehensive basic evaluation can completely eliminate the possibility of metastasis [20,21]. This review emphasizes that clinical and radiographic examination is one of the best methods for identifying PIOC's early lesions. If a patient report having extraction wounds in the jaw that have not healed for a long time and has a radiographically poorly characterized osteolytic lesion, PIOC should be excluded before proceeding because it could prolong the patient's life, which is the fundamental responsibility of a dental professional to each individual. The only duty in the early PIOC analysis is on dentists. Therefore, understanding this unusual factor is unquestionably necessary to foresee deferred findings.

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