



SQUAMOUS CELL CARCINOMA IN DENTAL PULP: A RAREST POSSIBILITY

Medical Science

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ABSTRACT

Oral squamous cell carcinoma is the most common oral malignancy. It can spread locally, loco regionally and can metastasize to distant sites. However, Involvement of dental pulp is a very rare finding. It can occur via periodontal ligament space or hematogenous route. Here we report a case of OSCC involving dental pulp confirmed by histopathological evidence. The authors have also tried to explain the reasons for non existence of primary dental pulp malignancy along with different pathways of dental pulp invasion by SCC. After extensive search of various articles we have reached at conclusion that globally this is the second case of OSCC invading dental pulp with photomicrograph evidence.

KEYWORDS

squamous cell carcinoma, dental pulp, pulp invasion, predentin, metastasis.

INTRODUCTION:

Dental pulp is the inner most part of the tooth, consist of fibroblast, endothelial cells, lymphocytes, neural elements and stem cells. Since it contains every tissue capable of mitosis it should have the potential to undergo neoplastic alterations¹. However, till date not even a single case of primary dental pulp malignancy has been reported so far. In literature very few case reports are available showing metastasis of neoplastic cells into the dental pulp¹. Here we report a very rare case of oral squamous cell carcinoma (OSCC) metastasizing in dental pulp. This is the second case report with histological evidence of dental pulp metastasis by OSCC. Here we also tried to divulge the reasons behind non-existence of primary dental pulp malignancies and its exceptionally rare involvement by other malignancies.

Case Report:

A 37 year old male patient visited our hospital with a chief complaint of pain and ulcer in right lower teeth region since 3 months. He was a chronic smoker. On clinical examination, there was an ulcer of size 3.5x1.1cm on right lower gingivobuccal sulcus (GBS) with indurated borders extending from right 1st premolar to 3rd molar region. The surrounding teeth were mobile and tender on percussion. No lymphadenopathy was observed. The overlying skin was normal in color and texture. His family and medical history were non-significant. Under local anesthesia incisional biopsy was performed and diagnosis of moderately differentiated squamous cell carcinoma was given.

On computed tomography, an enhancing soft tissue attenuation of size 21x10x26 mm identified on right lower GBS with erosive changes in mandibular alveolus. No cervical lymphadenopathy was evident (Figure 1).



(Figure 1: computed tomography shows soft tissue attenuation in right gingivo buccal sulcus area with bone erosion).

Following multidisciplinary team discussion, wide excision of the lesion along with segmental mandibulectomy and modified neck dissection type II was performed. Histopathological examination revealed a moderately differentiated squamous cell carcinoma, infiltrating into muscle tissue with perineural invasion. Lymphovascular invasion was not identified. The worst pattern of invasion (WPOI) was 5. The tumor was infiltrating into underlying bone and periodontal tissue. All the surgical bony and soft tissue margins were negative for malignancy. Total 35 lymph nodes were harvested and all were found to be negative for malignancy.

Very interestingly, we identified few dysplastic squamous cells infiltrating the pulp chamber of the right first molar tooth. The dysplastic squamous cells with keratin pearls were identified in pulp tissue surrounded by odontoblastic layer. The pulp was surrounded by predentin and dentin (Figure 2a-b).

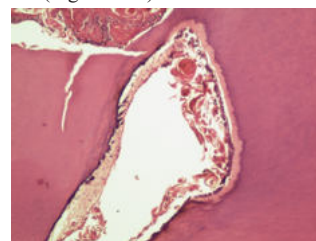


Figure 2a: H & E stained section show dysplastic squamous cells with keratin pearl in dental pulp surrounded by odontoblastic layer, Predentin and dentin. (10x view)

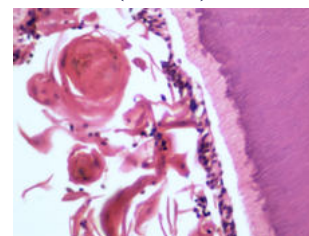


Figure 2b: Dysplastic squamous cells with keratin pearl in dental pulp along with predentin and dentin (40x view).

Tumor was staged according to the CAP guidelines and categorized under pT4aN0. Considering stage of tumor (stage IV), perineural

invasion and WPOI 5; six cycles of chemotherapy containing cisplatin along with twenty seven cycles of radiotherapy was given to the patient. The patient is under regular follow up.

DISCUSSION:

OSCC is the most common oral malignancy. It can spread locally, loco regionally to cervical lymph nodes and can metastasize to distant sites². There are several factors affect the overall prognosis of OSCC such as; differentiation, perineural invasion, lymphovascular invasion & worst pattern of invasion etc³. Our case showed WPOI pattern 5, defined as tumor dispersion ≥ 1 mm between tumor satellites. WPOI pattern 5 is significantly associated with higher recurrence rate and poor prognosis⁴.

Whilst mechanism of tumor spread into bone is well described, the mechanism for dental pulp involvement is not well understood. Infiltration into bone by OSCC can occur via certain routes such as; from upper surface of mandible, mental foramen, Lower border of mandible, cortical bone defect in edentulous ridge, periodontal ligament, attached gingiva and mandibular foramen⁵.

Study on dental pulp regarding malignancy is very difficult and impractical. Since it is very difficult to extirpate the complete pulp and moreover there are high chances of microbiological contamination of the same during extirpation¹. The involvement of dental pulp by OSCC can occur directly by tumor invasion through periodontal ligament. Periodontal ligament is one of the most preferred pathways for tumor entry into the dentate mandible, chronic periodontitis leads to weaken the periodontal ligaments and forms a route to ingress malignant epithelial cells into bone and also invade dental pulp. The other explanation of dental pulp involvement by OSCC is via hematogenous route⁶. Our case was an advanced stage malignancy showing WPOI 5, perineural invasion and moderate differentiation. In our view the nature of the tumor itself could also be responsible for dental pulp metastasis, needs further investigation.

Although, the dental pulp consists of connective tissue, endothelial cells, neural cells and stem cells all are capable to undergo neoplastic alterations; primary tumor arising from dental pulp is not reported so far. The main reason could be the restricted space of dental pulp. Any clonal growth leads to increase intrapulpal pressure which result in formation of hard tissue and strangulation of pulpal tissue. Another hypothesis states that neoplasm of dental pulp leads to pulpitis which later on treated by root canal treatment or extraction, so it remains unobserved¹. However, the primary pulp malignancy is nonexistent but handful cases of intrapulpal metastasis of extraodontal tumors were reported, such as medulloblastoma, Ewing's sarcoma etc¹. Recently, Leov F & Nguyen E claimed the first case in which patient visited dentist for teeth extraction following pain and mobility and subsequently it turned out to be OSCC with involvement of dental pulp⁷. After extensive search of various articles we have reached at conclusion that globally our case is the second case showing OSCC metastasizing in dental pulp with histopathological evidence.

CONCLUSION:

We conclude that primary dental pulp malignancies do not exist conceivably because of its self limiting environment. All tooth pain should be cautiously examined as they can present as initial clinical presentation of oral malignancies. Past studies on malignancies of dental pulp contains high theoretical importance however further research is required to answer few questions: Why we don't get primary dental pulp malignancies? What is the mechanism of dental pulp involvement by other malignancies? Is the involvement of dental pulp effects the overall prognosis of OSCC? Should we consider incorporating dental pulp involvement in staging of OSCC? Both oncopathologists and maxillofacial pathologists should be involved in further research to give answer of these unusual questions.

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