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Oral Pathology

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**Oseteogenic Sarcoma**

**Introduction:**

Osteosarcoma is a primary malignant bone tumor characterized by the formation of bone or osteoid tissue by tumor cells. Osteosarcoma (osteogenic sarcoma) appears in the first decade of life, during skeletal growth and development; and it mostly occurs in long bones, particularly in the region of the knee and pelvis. Osteosarcoma of the jaw (OSJ) is uncommon, aggressive, and varies between 5% and 13% of all osteosarcomas. OSJ usually presents in the second, third and fourth decades of life, almost a decade after its presentation in long bones. Earlier studies indicate that more men are affected than women, while recent studies indicate that more women (56%) are affected. The mandible is most involved (61%), and the tumors are mostly located in the molar and ramus regions. Maxillary tumors are commonly located in the alveolar ridge, the sinus floor, and the palate.

**Etiology:**

The etiology is unknown, but OSJ arise secondary to underlying pathologies such as fibrous dysplasia, Paget’s disease, giant cell tumor, multiple osteochondroma, chronic osteomyelitis, osteogenesis imperfecta, aggressive cemento-ossifying fibroma, bone infarcts, and a history of craniofacial radiation exposure.

**Clinical Presentation:**

OSJ can manifest clinically as pain (47%) with variable intensity, tenderness, swelling (81%) of the bone and adjacent soft tissues, bulging/dislocation of the tooth, lack of healing and swelling at the site of tooth extractions, trismus and hypoesthesia or paresthesia with the occurrence of mandibular tumors, nasal obstruction, epistaxis and eye symptoms with the occurrence of maxillary tumors, local heat stimulating an infection, gingival inflammation and ill fitting dentures.

**Age/Sex:**

OSJ occurs between the ages of 11-40, with the mean age being 35 years. Earlier studies indicate that more men are affected than women, while recent studies indicate that more women (56%) are affected.

**Biopsy/Lab tests/Radiographs:**

Biopsy- Microscopic examination reveals varying amounts of mineralized bone or unmineralized osteoid within the tumor formed by atypical cells. OSJ can be subdivided into osteoblastic, chondroblastic, and fibroblastic histologic types, depending on the type of extracellular matrix produced by the tumor cells. Osteoblasts with hyperchromatic nuclei, mitotic figures, sheets of cell showing nuclear and cellular pleomorphism, inflammatory cells (giant cells, mast cells, neutrophils), numerous blood vessels and hemorrhage are seen on biopsy.

Lab tests- Osteocalcin is the only protein exclusively produced by osteoblasts, and is helpful in distinguishing a primary bone malignancy from others. Alkaline phosphatase enzyme is strongly expressed in osteoblastic, chondrablastic, and fibroblastic variants, but it can only be used over fresh cryostat sections or imprint sections. Negative staining for factor VIII and CD31 is an important feature expressed in osteosarcoma.

Radiographs- The images manifest as mixed, radiolucent/radiopaque lesions, periodontal ligament widening, radiopaque masses with moth eaten appearance, Codman’s triangle, and sunburst pattern.

**Treatment:**

Earlier studies indicate that resection, neoadjuvant chemotherapy, and adjuvant radiation was the best treatment with a survival rate of 80%; while recent studies indicate that the best results are obtained by radical surgery with tumor-free margins. According to recent studies, radiotherapy significantly effects prognosis in skeletal OS, but holds no prognostic significance in OSJs; and chemotherapy has shown promising results in both recurrence incidences and survival, but does not improve poor prognosis of metastatic tumors. Treatment also includes orthopedics, and reconstructive plastic surgery.

**Prognosis:**

With treatment, the survival rate at 5 years for patients with follow-up is 68%. Without treatment, a person can die 6 months after diagnosis.

**Differential Diagnosis:**

Includes chondrosarcoma, Ewing’s sarcoma, bone metastasis, fibrous dysplasia, osteomyelitis, and other lesions that do not usually affect the jaw bones, such as fibrosarcomas, leiomyosarcomas, or rhabdomyosarcomas.

**Relevance of Osteogenic Sarcoma to you as a Dental Hygienist:**

As part of the dental team, I could save someone’s life with knowledge and early detection of Osteogenic Sarcoma. As a hygienist, I see the patients who are consistent with their hygiene visits more regularly than any other team member. Therefore, it is imperative for me to know the clinical and radiographic presentations of an aggressive, malignant lesion such as an OSJ. Earlier diagnosis of OSJ, leads to a better prognosis.

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