Abstract

Osteogenic Sarcoma is a common cancer in children under age of 15yrs, second peak in incidence occurs in the elderly, usually associated with underlying bone pathology such as Paget's disease, medullary infarct, or prior irradiation. The present case deals with a 65-year-old male patient suffering from an exophytic growth on the right-side of maxillary alveolar ridge. Past dental history revealed that a mobile tooth was extracted in relation to this growth, which after extraction displayed unstoppable bleeding for 7 days. The recommended excision of the tumor was declined by the patient’s relatives because of his debilitated condition as he suffered from Parkinson’s Disease since last 5yrs. The patient died after 4 days of histopathological diagnosis of osteosarcoma showing both fibrogenic and osteogenic patterns.
Introduction

Osteosarcoma is the 3rd most common cancer in adolescence, occurring less frequently than lymphomas and brain tumors. It is thought to arise from a primitive mesenchymal bone forming cell and is characterised by production of osteoid\(^1\). Their partial differentiation leading to the production of tumor bone from a malignant cellular stroma is what defines them as osteosarcoma rather than any other malignant mesenchymal tumor that can arise from mesenchymal stem cells.\(^2\)

Till date no case of osteogenic with fibrogenic sarcoma has been reported in a Parkinson’s Disease patient, and this case is one of this type.

Case Report

A 65yr old male patient reported to a multi speciality hospital in India with a chief complaint of bleeding from an extraction socket since last 7 days. The patient presented with a history of extraction of loose permanent maxillary right canine 10 days back, after 3 days of which bleeding started. The patient was suffering from Parkinson's disease for the last 5yrs, his upper limbs showed slight movements. The patient was in a severe debilitated condition, was not able to walk and speak properly and was on liquid diet since 5-6 yrs.

Extraoral examination showed no perceptible asymmetry but bilaterally submandibular lymphnodes were enlarged, tender but non-fixed.

Intraoral examination revealed a reddish swelling 2 x 2cm in size, oval in shape, firm in consistency, smooth surfaced, present on alveolar mucosa with relation to right maxillary lateral incisor, canine and first premolar. The overlying mucosa was ulcerated and the growth was nontender and fixed to the underlying bone.

An excisional biopsy was performed under LA. On excision the underlying bone appeared as fragile and soft to feel. One hard and two soft tissues were routinely processed and stained with Hematoxylin & Eosin.

Histologic Features:

**Hard Tissue Section:** H & E stained section showed areas of osteoid formation by malignant osteoblasts which appeared large, round, vacuolated with pyknotic nuclei in the centre. These were arranged in a disorderedly fashion about the irregularly formed bony trabeculae which demonstrated change in nucleocytoplasmic ratio and high mitotic activity (Figure 1). Stromal cells were spindled with irregularly shaped nuclei. Extravasated red blood cells and mild chronic inflammatory cell infiltrate was also noted (Figure 2).
Soft Tissue Sections: H & E

stained section showed stratified squamous epithelium with underlying connective tissue presenting proliferation of oval, stellate to spindle shaped fibroblasts with change in nucleo-cytoplasmic ratio, prominent nucleoli, mitotic figures and atypical mitosis (Figure 3). Some parts of the connective tissue showed plump endothelial lined capillaries of variable calibres, extravasated red blood cells and chronic inflammatory cells(Figure 4). Areas of bony trabeculae undergoing resorption and areas of osteoid formation lined by round to spindle shaped malignant osteoblasts were also observed.

Thus the above mentioned features were suggestive of mixed (fibroblastic and Osteoblastic) pattern of Osteosarcoma.

Figure 1: Malignant osteoid tissue, pleomorphic fibroblasts and dilated blood vessels (20X : H & E)

Figure 2: Stellate and spindle shaped osteogenic cells showing abnormal mitosis (40X : H & E)

Figure 3: Pleomorphic fibroblasts with hyperchromatism and change in N:C ratio (20X : H & E)

Figure 4: Plum endothelial cell lined capillaries (40X : H & E)
**Discussion**

Osteosarcoma is the most common bone malignancy. This disease is thought to arise from primitive mesenchymal bone-forming cells, and its histologic hallmark is the production of malignant osteoid. Other cell populations may also be present, as these types of cells may also arise from pluripotential mesenchymal cells, but any area of malignant bone in the lesion establishes the diagnosis as osteosarcoma.\(^3\)\(^4\)

In 1805, the French surgeon Alexis Boyer (personal surgeon to Napoleon) first used the term “osteosarcoma.” Boyer realized that osteosarcoma is a distinct entity from other bone lesions, such as osteochondromas.\(^3\)

Osteosarcoma is a deadly form of musculoskeletal cancer that most commonly causes patients to die from pulmonary metastatic disease. Not all osteosarcomas arise in a solitary fashion, as multiple sites may become apparent within a period of about 6 months (synchronous osteosarcoma), or multiple sites may be noted over a period longer than 6 months (metachronous osteosarcoma). Such multifocal osteosarcoma is decidedly rare, but when it occurs, it tends to be in patients younger than 10 years.\(^3\)

Osteosarcoma of the jaw (JOS) constituting 5% to 13% of all osteosarcomas is a locally aggressive malignant mesenchymal tumor with high tendency for local recurrence. Compared to osteosarcoma of the remaining skeleton (SOS) JOS metastasizes relatively late and rarely.\(^5\)

The exact cause of osteosarcoma is unknown. However, a number of risk factors are apparent, as follows:

- **Rapid bone growth:** Rapid bone growth appears to predispose persons to osteosarcoma, as suggested by the increased incidence during the adolescent growth spurt, the high incidence among large-breed dogs (eg, Great Dane, St. Bernard, German shepherd), and osteosarcomas typical location in the metaphyseal area adjacent to the growth plate (physis) of long bones.

- **Environmental factors:** The only known environmental risk factor is exposure to radiation. Radiation-induced osteosarcoma is a form of secondary osteosarcoma and is not discussed further in this article.

- **Genetic predisposition:** Bone dysplasias, including Paget disease, fibrous dysplasia, enchondromatosis, and hereditary multiple exostoses and retinoblastoma (germ-line form) are risk factors. The combination of constitutional mutation of the RB gene (germline retinoblastoma) and radiation therapy is associated with a particularly high risk of developing osteosarcoma, Li-Fraumeni syndrome (germline p53 mutation), and Rothmund-Thomson syndrome.
syndrome (autosomal recessive association of congenital bone defects, hair and skin dysplasias, hypogonadism, and cataracts).

A number of variants of osteosarcoma exist, including conventional types (osteoblastic, chondroblastic, and fibroblastic, malignant fibrous histiocytoma-like), telangiectatic, multifocal, parosteal, and periosteal. This article only addresses conventional osteosarcoma. Symptoms may be present for weeks or months (occasionally longer) before patients are diagnosed. The most common presenting symptom of osteosarcoma is pain. Our patient did not give any history of pain as he was unable to respond properly.

The osteosarcoma cells can be subdivided into four cell types: anaplastic, chondroblastic, osteoblastic, and osteocytic. In the present case anaplastic, osteoblastic and osteocytic cells predominated.

Often, there is a history of trauma, but the precise role of trauma in the development of osteosarcoma is unclear. Our patient did not present any such history, tooth extraction not being significant in this regard.

The mandibular lesions predominant in female patients, while the maxillary lesions in males. Ours was a male patient with tumor on the right maxillary residual ridge.

Central low-grade osteosarcoma may sometimes show an extended spectrum mimicking Paget’s disease of bone and Fibrous Dysplasia and pose diagnostic difficulties in separating it from benign bone diseases, which may lead to delay in diagnosis, inadequate treatment, and eventually to dedifferentiation. Recognition of this is based on the aggressive radiologic appearance which most often shows large ill-defined densely sclerotic lesion and an adequate tumor sampling for histologic examination revealing proliferation of fibroblast-like cells embedded in a dense collagenous stroma and irregular anastomosing tumor bone trabeculae with an irregular mosaic pattern of cement lines that may closely resemble Paget's disease of bone.

High grade surface osteosarcoma is a rare subtype of surface osteosarcoma that has a prognosis similar to that of conventional osteosarcoma, in contrast to the more common type of osteosarcoma arising on the surface of bone. Wide excision and effective systemic chemotherapy are associated with better clinical results. Here the case was that of a moderate grade surface osteosarcoma.

Bone Morphogenetic Protein (BMP) mainly exists in this tumor cell plasma and some tumor-like bone tissues. Using immunohistochemical methods, we can not only differentiate osteosarcoma...
from fibrosarcoma and other non-bone-derived tumors, but also classify osteosarcoma according to the content and distribution of BMP 13. In our case the histologic picture was clear for osteogenic sarcoma with some fibroblastic element.

Amputation is the prime requisite in case of long bones and radical resection in other sites but this is difficult to perform in jaws as complete excision is very difficult. Primary X-radiation is of no avail. Neoadjuvant (preoperative) chemotherapy has been found to facilitate subsequent removal by shrinking1.

Excision without preoperative chemotherapy was performed for this patient but the patient died after 4 days of surgery as the prognosis depends considerably upon the condition of the patient and the duration of the lesion when the treatment was instituted. Ours was a debilitated patient with Parkinson’s Disease with no known history of duration of its presence.

Parkinson’s disease is a degenerative disorder of the central nervous system that often impairs the sufferer’s motor skills and speech, as well as other functions and belongs to a group of conditions called movement disorders. It is characterized by muscle rigidity, tremor, a slowing of physical movement (bradykinesia) and, in extreme cases, a loss of physical movement (akinesia). The primary symptoms are the results of decreased stimulation of the motor cortex by the basal ganglia, normally caused by the insufficient formation and action of dopamine, which is produced in the dopaminergic neurons of the brain. Secondary symptoms may include high level cognitive dysfunction and subtle language problems.

PD is the most common cause of chronic progressive Parkinsonism, a term which refers to the syndrome of tremor, rigidity, bradykinesia and postural instability. PD is also called "primary parkinsonism" or "idiopathic PD”. The patient reported here was a Parkinson’s disease patient.

References


