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Giant Cell Lesions- A Review

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ABSTRACT

Giant cell lesions are relatively uncommon in oral cavity. The true nature of such lesions is still unknown. However, these giant cells such as Langhan's giant cells, foreign body giant cells, tumour giant cells are seen associated with certain microbial infections, neoplasms and metabolic disorders which include tuberculosis, sarcoidosis, Hodgkin's lymphoma, brown tumour etc. Because of their uncommon nature, they are usually not diagnosed and still remains challenging for most clinicians. This article provides brief information on the different types of giant cells and their associated lesions.

Keywords: Langhan's giant cells, foreign body giant cells, tuberculosis, Hodgkin's lymphoma

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INTRODUCTION

Giant cells are multinucleated cells formed by the union of several distinct cells usually by the division of nuclei without division of cytoplasm. They are believed to arise in various configuration as well as various conditions. They are of various types which includes both physiological and pathological types. Giant cells are most frequently present in infections such as tuberculosis leprosy and they are created by the fusion of macrophages. The formation of giant cells is also thought to be the reaction to endogenous substances such as keratin, fat and cholesterol crystals and to exogenous substances such as suture and talc [1, 2].

TYPES OF GIANT CELLS

Broadly giant cells can be classified as physiologic giant cells and pathologic giant cells.

PHYSIOLOGICAL GIANT CELLS

MEGAKARYOCYTE

It contains nuclear lobes which have coarsely clumped chromatin and are 4- 16 in numbers, measuring 30- 90 micrometer in diameter making it a large cell. Red- purple granules are spread in the abundant cytoplasm of this cell. 4000 platelets are created by a single megakaryocyte [1].

SYNCYTIOTROPHOBLAST

A characteristic feature of this cell is a honeycomb appearance, which is due to the ribonucleic protein present in the cisternae when viewed through an electron microscope. These cells have numerous microvilli. As much as 3 nuclei are present in the cytoplasm of these cells [22].

OSTEOCLAST

These cells play an important role in bone homeostasis and remodelling. Osteoclasts are bone- resorbing cells and are multinucleated [3]. It is stated that receptor activator of nuclear factor κ B ligand and macrophage colony stimulating factor, are the two cytokines that are responsible for the formation of osteoclast [4].

PATHOLOGICAL TYPES OF GIANT CELLS

FOREIGN BODY GIANT CELLS

It is said that interaction of implant medical devices, prostheses and biomaterials with the tissue induces the formation of foreign body giant cells [23]. Giant cells are present in chronic infective granulomas, leprosy and tuberculosis. Cytoplasm contains nuclei spread within them. Nuclei of these cells are similar in size and shape and are similar to the nuclei of macrophages. Up to 100 nuclei are present

LANGHANS GIANT CELLS

Nuclei resemble the macrophages and epithelioid cells. The most commonly seen microbial disease is tuberculosis. The arrangement of nuclei are of two types one is that they form clusters at the two poles of the cell and the other is that they form a horseshoe shape at the periphery eg, tuberculosis, sarcoidosis [1].

TOUTON GIANT CELLS

The cytoplasm of these cells are vacuolated as they contain lipids and are multinucleated eg, xanthoma [1].

ASCHOFF GIANT CELLS

Cardiac histiocytes form these multinucleated giant cells eg, rheumatic nodule [1].

ANAPLASTIC CANCER CELLS

Division of nuclei of the neoplastic cells leads to the formation of these cells. Nuclei differ in size and shape and are large and hyperchromatic. Numerous nuclei are present eg, carcinoma of the liver, various soft tissue sarcoma etc [[1].

REED- STERNBERG CELLS

Binucleated cells and are also malignant tumour giant cells eg, Hodgkin's lymphomas [1].

GIANT CELL TUMOUR OF BONE

Osteoclastic giant cells are spread in the stroma uniformly in this tumour of bones.

GIANT CELLS LESIONS OF ORAL CAVITY [5]

- Aneurysmal bone cyst, traumatic bone cyst- Cystic lesions
- Hyperparathyroidism- Metabolic lesions
- Noonan-like multiple giant cell lesion syndrome - Osteodystrophic lesions
- Central giant cell granuloma, Peripheral giant cell granuloma, Giant cell fibroma, Giant cell tumour, Hodgkin's lymphoma, Rhabdomyosarcoma, Osteosarcoma- Tumour and tumour like lesions
- Leprosy, Tuberculosis, Sarcoidosis, Actinomycosis - Microbial lesions
- Fibrous dysplasia, Cherubism, Paget's disease- Miscellaneous lesions

ANEURYSMAL BONE CYST

It is said that about 66% of this cyst occurs in the mandible and only 2% are located in the head and neck [6]. It is a multicystic lesion overloaded with blood, it is destructive as the bone is replaced by the spongy fibro-osseous tissue [7]. Histologically fibroblasts, histiocytes, congested vessels, bone, degenerated calcifying fibromyxoid tissue, osteoblasts

and osteoid constitutes the cyst wall and septa. Large blood filled spaces are also seen. Treatment for aneurysmal bone cyst is surgery and curettage of the cavity [5].

HYPERPARATHYROIDISM

In this condition there is bone modification and development of brown tumour. There is loss of lamina dura in primary and secondary hyperparathyroidism. In the oral cavity it mostly occurs in the mandible [8]. Only 5% of the cases generalised osteopenia, bone cysts, bone resorption and brown tumours develops. Hyperparathyroidism is classified into primary, secondary and tertiary [9]. Radical resection, reconstruction, curettage, enucleation, chemotherapy and radiation therapy are treatment for brown tumour [5].

NOONAN-LIKE MULTIPLE GIANT CELL LESION SYNDROM

Congenital heart diseases such as pulmonary valve stenosis, short stature, cranio-facial dimorphisms' are the characteristic features of Noonan syndrome which is a familiar multiple autosomal dominant congenital disorder. Treatment regarding this syndrome is multidisciplinary [10].

CENTRAL GIANT CELL GRANULOMA

It is divided into nonaggressive and aggressive lesions by some authors. It is defined by WHO as an intraosseous lesion consisting of cellular fibrous tissue that contains multiple foci of haemorrhage, aggregations of multinucleated giant cells and occasionally trabeculae of woven bone. Slow growing and asymptomatic are the features of nonaggressive lesions.¹¹ On the other hand aggressive lesions are large, grow rapidly which causes root resorption and cortical perforation and are very painful. There is a noted reoccurrence of the lesions and it mostly occurs in young adult [12]. Excision and curettage are the treatment plan for this lesion [5].

HODGKIN'S LYMPHOMA

It constitutes 1- 5% of head and neck tumours. Lymphnodes are primarily affected then there is a secondary extranodal spread. In the head and neck region after carcinomas, Hodgkin's lymphomas are the most common malignancies [13].

RHABDOMYOSARCOMA

Frequently occurs in the head and neck region. Tongue, palate and buccal mucosa are the frequent sites in the oral cavity. Varying differentiation degrees of skeletal muscle cells are exhibited in Rhabdomyosarcoma [14].

TUBERCULOSIS

It is presented as stellate ulcers on the dorsum of the tongue [15] and is also seen in gingiva, floor of the mouth, lips, buccal mucosa and palate [16]. Tuberculosis is classified

into primary and secondary [17]. The presence of acid- fast bacilli in the specimen is said to be confirmatory diagnosis for the lesion [5].

FIBROUS DYSPLASIA

It is either monostotic or polyostotic and in non-malignant bone tumours they constitute 7%. As it is a painless expansile lesion, it alters structural functions of bone. Fibrous tissue replaces normal bone [18]. Radiographically it appears radiolucent [5].

PAGET'S DISEASE

It is suggested that in Paget's disease level of alkaline phosphatase is above 1000 IU/ml [19]. There is an increase in the new bone formation as there is an increased bone resorption. Paget's disease is considered to be a localised disorder of bone remodelling [20]. In advanced polyostotic lesions skull involvement was noticed in 65- 70% of cases. Paget's disease can either be polyostotic or monostotic [21].

CONCLUSION

Giant cells are of physiological and pathological types. Generally these cells are multinucleated and are large. Presence of these cells helps the pathologists in diagnosis of the lesions as well as the clinicians for the aggressiveness and prognosis, despite of their common occurrence in those lesions

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