Oral Pathology

Lec.7 د.عادل

Giant cell lesions

Giant cell lesions :

1-Central giant cell granuloma

2-Peripheral giant cell granuloma

3-Brown tumor of hyperparathyroidism

4-Cherubism

5- Aneurysmal bone cyst

Central giant cell granuloma

The giant cell granuloma is considered widely to be a non neoplastic lesion. Some lesions demonstrate aggressive behavior similar to that of a neoplasm.

Clinical and radiographic features:

Giant cell granulomas may be encountered in patients ranging from 2 to 80 years of age, although more than 60% of all cases occur before age 30. Although the sex ratio varies in different reviews, a majority of giant cell granulomas are noted in females, and approximately 70% arise in the mandible. Lesions are more common in the anterior portions of the jaws, and mandibular lesions frequently cross the midline.

Most giant cell granulomas of the jaws are asymptomatic and first come to attention during a routine radiographic examination or as a result of painless expansion of the affected bone. A minority of cases, however, may be associated with pain, paresthesia, or perforation of the cortical bone plate, occasionally resulting in ulceration of the mucosal surface by the underlying lesion.

Central giant cell lesions of the jaws may be **divided** into two categories:

1. Nonaggressive lesions make up most cases, exhibit few or no symptoms, demonstrate slow growth, and do not show cortical perforation or root resorption of teeth involved in the lesion.

2. Aggressive lesions are characterized by pain, rapid growth, cortical perforation, and root resorption. They show a marked tendency to

recur after treatment, compared with the non-aggressive types.

Radiographic features:

Central giant cell lesions appear as radiolucent defects, which may be unilocular or multilocular. The defect is usually well delineated, but the margins are generally non corticated. The lesion may vary from an incidental radiographic finding of 5 ×5 mm to a destructive lesion greater than 10 cm in size . The radiographic findings are not specifically diagnostic. Small unilocular lesions may be confused with periapical granulomas or cysts.

Histopathologic Features:

Giant cell lesions of the jaw show a variety of features. Common to all is the presence of few to many multi-nucleated giant cells in a background of ovoid to spindle-shaped mesenchymal cells and round monocyte-macrophages . There is evidence that these giant cells represent osteoclasts, although others suggest the cells may be aligned more closely with macrophages. The giant cells may be aggregated focally in the lesional tissue or may be present diffusely throughout the lesion. These cells vary considerably in size and shape from case to case. Some are small and irregular in shape and contain only a few nuclei. In other cases, the giant cells are large and round and contain 20 or more nuclei. In some cases the stroma is loosely arranged and edematous; in other cases it may be quite cellular.

Areas of erythrocyte extravasation and hemosiderin deposition often are prominent. Older lesions may show considerable fibrosis of the stroma. Foci of osteoid and newly formed bone are occasionally present within the lesion.

Treatment and Prognosis:

Central giant cell lesions of the jaws are usually treated by thorough curettage. Most studies indicate a recurrence rate of about 15% to 20%. Those lesions considered on clinical and radiologic grounds to be potentially aggressive show a higher frequency of recurrence. Many investigators have noted a propensity for recurrence among lesions in younger patients. Recurrent lesions often respond to further curettage, although some aggressive lesions require more radical surgery for cure. In patients with aggressive tumors, three alternatives to surgery—(1) corticosteroids, (2) calcitonin, and (3) interferon alfa-2a—are being investigated. In spite of the reported recurrence rate, the long-term prognosis of giant cell granulomas is good and metastases do not develop.

2-Peripheral giant cell granuloma(giant cell epulis)

The peripheral giant cell granuloma is a relatively common tumorlike growth of the oral cavity. It probably does not represent a true neoplasm but rather is a reactive lesion caused by local irritation or trauma. In

the past, it often was called a peripheral giant cell reparative granuloma, but any reparative nature appears doubtful. Some investigators believe that the giant cells show immunohistochemical features of osteoclasts, whereas other authors have suggested that the lesion is formed by cells from the mononuclear phagocyte system. The peripheral giant cell granuloma bears a close microscopic resemblance to the central giant cell granulom, and some pathologists believe that it may represent a soft tissue counterpart of this central bony lesion.

Clinical and radiographic features:

The peripheral giant cell granuloma occurs exclusively on the gingiva or edentulous alveolar ridge, presenting as a red or red-blue nodular mass . Most lesions are smaller than 2 cm in diameter, although larger ones are seen occasionally. The lesion can be sessile or pedunculated and may or may not be ulcerated. The clinical appearance is similar to the more common pyogenic granuloma of the gingiva , although the peripheral giant cell granuloma often is more blue-purple compared with the bright red of a typical pyogenic granuloma. Peripheral giant cell granulomas can

develop at almost any age, especially during the first through sixth decades of life. The mean age in several large series ranges from 31 to 41 years. Approximately 60% of cases occur in females. It may develop in either the anterior or posterior regions of the gingiva or alveolar mucosa, and the mandible is affected slightly more often than the maxilla. Although the peripheral giant cell granuloma develops within soft tissue, "*cupping*" *resorption* of the underlying alveolar bone sometimes is seen. On occasion, it may be difficult to determine whether the mass arose as a peripheral lesion or as a central giant cell granuloma that eroded through the cortical plate into the gingival soft tissues.

Histopathologic Features:

Microscopic examination of a peripheral giant cell granuloma shows a proliferation of multinucleated giant cells within a background of plump ovoid and spindle-shaped mesenchymal cells . The giant cells may contain only a few nuclei or up to several dozen. Abundant hemorrhage is characteristically found throughout the mass, which often results in deposits of hemosiderin pigment, especially at the periphery of the lesion.

The overlying mucosal surface is ulcerated in about 50% of cases. A zone of dense fibrous connective tissue usually separates the giant cell proliferation from the mucosal surface. Adjacent acute and chronic inflammatory cells are frequently present. Areas of reactive bone formation or dystrophic calcifications are not unusual.

Treatment and Prognosis

The treatment of the peripheral giant cell granuloma consists of local surgical excision down to the underlying bone. The adjacent teeth should be carefully scaled to remove any source of irritation and to minimize the risk of recurrence. Approximately 10% of lesions are reported to recur, and reexcision must be performed.

GIANT CELL TUMOR

Although most central giant cell lesions can be distinguished histopathologically from the long bone tumors, a number of jaw lesions are indistinguishable microscopically from the typical giant cell tumor of long bone . Despite the histopathologic similarity, these jaw lesions appear to have a biologically different behavior from long bone lesions, which have higher recurrence rates after curettage and show malignant change in up to 10% of cases.

CHERUBISM

Cherubism is a rare developmental jaw condition that is generally inherited as an autosomal dominant trait.

The name cherubism was applied to this condition because the facial appearance is similar to that of the plump -cheeked little angels (cherubs).

Clinical and radiographic features:

the disease usually occurs between the ages of 2 and 5 years. In mild cases the diagnosis may not be made until the patient reaches 10 to 12 years of age. The clinical alterations typically progress until puberty, then stabilize and slowly regress. The cherub like facies arises from bilateral involvement of the posterior mandible that produces angelic chubby cheeks. The mandibular lesions typically appear as a painless, bilateral expansion of the posterior mandible that tends to involve the angles and ascending rami.

Radiographically, the lesions are typically multilocular, expansile radiolucencies . The appearance is diagnostic as a result of their bilateral location.

Histopathologic Features:

The microscopic findings of cherubism are essentially similar to those of isolated giant cell granulomas, and they seldom permit a specific diagnosis of cherubism in the absence of clinical and radiologic information. The lesional tissue consists of vascular fibrous tissue containing variable numbers of multinucleated giant cells. Foci of

extravasated blood are commonly present. In some cases, cherubism reveals eosinophilic, cufflike deposits surrounding small blood vessels throughout the lesion. The *eosinophilic cuffing* appears to be specific for cherubism. However, these deposits are not present in many cases, and their absence does not exclude a diagnosis of cherubism.

Treatment and Prognosis:

The prognosis in any given case is unpredictable. In most instances the lesions tend to show varying degrees of remission and involution after puberty . By the fourth decade, the facial features of most patients approach normalcy. Excellent results have been obtained in some cases by early surgical intervention with curettage of the lesions. Conversely, early surgical intervention sometimes has been followed by rapid regrowth of the lesions and worsening deformity. Radiation therapy is contraindicated because of the risk of development of postirradiation sarcoma. The optimal therapy for cherubism has not been determined.

Aneurysmal bone cyst

Aneurysmal bone cyst is an intraosseous accumulation of variable-sized, blood-filled spaces surrounded by cellular fibrous connective tissue that often is admixed with trabeculae of reactive woven bone. The cause and pathogenesis of the aneurysmal bone cyst are poorly understood. Several investigators have proposed that aneurysmal bone cyst arises from a traumatic event, others have suggested that aneurysmal bone cyst and giant cell granuloma are closely related. It is likely that the aneurysmal bone cyst may occur either as a primary lesion or as a result of disrupted vascular dynamics in a preexisting intrabony lesion.

Clinical and radiographic features:

Gnathic aneurysmal bone cysts are uncommon, with approximately 2% reported from the jaws. Within the jaws, a wide age range is noted; however, most cases arise in children and young adults, with an approximate mean age of 20 years. No significant sex predilection is noted. A mandibular predominance is noted, and the vast majority arises in the posterior segments of the jaws. The most common clinical manifestation is a swelling that has usually developed rapidly. Pain often is reported; paresthesia, compressibility, and crepitus are rarely seen. On

occasion, malocclusion, mobility, migration, or resorption of involved teeth may be present. Maxillary lesions often bulge into the adjacent sinus; nasal obstruction, nasal bleeding, proptosis, and diplopia are noted uncommonly.

Radiographic features

Shows a unilocular or multilocular radiolucent lesion often associated with marked cortical expansion and thinning . The radiographic borders are variable and may be well defined or diffuse. Frequently, a ballooning or "blow-out" distention of the contour of the affected bone is described.

Histopathologic Features:

Microscopically, the aneurysmal bone cyst is characterized by spaces of varying size, filled with unclotted blood surrounded by cellular fibroblastic tissue containing multinucleated giant cells and trabeculae of osteoid and woven bone. The blood-filled spaces are not lined by endothelium . In approximately 20% of the cases, aneurysmal bone cyst is associated with another pathosis, most commonly a fibro-osseous lesion or giant cell granuloma.

Treatment and Prognosis

Aneurysmal bone cysts of the jaws are usually treated by curettage or enucleation, sometimes supplemented with cryosurgery. Rare cases require more extensive surgical resection. The reported recurrence rates are variable and have been as low as 8% and as high as 60%. Most recurrent examples arise from inadequate or subtotal removal on initial therapy. In spite of recurrences, the long-term prognosis appears favorable.

HYPERPARATHYROIDISM

Excess production of parathyroid hormone (PTH) results in the condition known as hyperparathyroidism. PTH normally is produced by the parathyroid glands in response to a decrease in serum calcium levels. *Primary hyperparathyroidism* is the uncontrolled production of PTH, usually as a result of a parathyroid adenoma (80% to 90% of cases) or parathyroid hyperplasia (10% to 15% of cases). Rarely (approximately

1% of cases), a parathyroid carcinoma may be the cause of primary hyperparathyroidism.

Secondary hyperparathyroidism develops when PTH is continuously produced in response to chronic low levels of serum calcium, a situation usually associated with chronic renal disease. The kidney processes vitamin D, which is necessary for calcium absorption from the gut. Therefore, in a patient with chronic renal disease, active vitamin D is not produced and less calcium is absorbed from the gut, resulting in lowered serum calcium levels.

Clinical features

Most patients with primary hyperparathyroidism are older than 60 years of age. Women have this condition two to four times more often than men do. Typically the condition is identified on routine serologic testing, and the majority of patients are relatively asymptomatic.

Early symptoms include:

fatigue, weakness, arrythemias, polyuria, bone pain and headache.

Radiographic features:

In the jaw bones, osteoporotic appearance of the mandible and maxilla showing *well-demarcated unilocular or multilocular radiolucencies* reflecting a generalized resorption, overall cortical thinning loss of the lamina dura surrounding the roots of the teeth is also seen. Longstanding lesions may produce significant cortical expansion. With persistent disease, other osseous lesions develop, such as the so called brown tumor of hyperparathyroidism.

Histopathologic Features:

Bone trabeculae show osteoclastic resorption .The brown tumor of hyperparathyroidism is histopathologically identical to the central giant cell granuloma of the jaws. Both lesions. are characterized by aproliferation of exceedingly vascular granulation tissue, which serves as a background for numerous multinucleated osteoclast- type giant cells. Accummulation of hemosiderin and extravasated RBCs, as a result the tissue may appear reddish brown accounting for the term(brown tumor).

Diagnosis:
brown tumor of hyperparathyroidism is clinically, radiographically and histopathologically similar to central giant cell granuloma, therefore *a bone chemistry* profiling should reveal *elevation* of serum parathyroid hormone (PTH),serum calcium and alkaline phosphatase, with *decrease* of phosphorus.

Treatment and Prognosis

After diagnosis of hyperparathyroidism the patient should be referred to a surgeon for excision of the parathyroid gland or for kidney function evaluation. The jaw lesion should resolve after treatment.