

A. Classifications and Grouping of Related Lesions

Grouping of related lesions, particularly those sharing common feature or features may aid their diagnosis and hence will be helpful in selecting the appropriate treatment plan. Some of these lesions are presented herein. However, some of these classifications or grouping may lack comprehensive consensus and some to them may need further modifications in the future.

A.1. Giant Cell Lesions

Are lesions in which multinucleated giant cells constitute a hallmark making their characterization by microscopy alone very unreliable and thus need further investigations to differentially diagnosis. These lesions should not be confused with other lesions which may contain giant cells as for example TB. The latter lesions are usually easy to diagnose as they show some other pathognomonic features.

List of giant cell lesions

1. Peripheral giant cell granuloma
2. Central giant cell granuloma
3. Giant cell tumor of bone (osteoclastoma)
4. Giant cell fibroma

5. Aneurysmal bone cyst
6. Familial fibrous dysplasia (cherubism)
7. Brown nodes of hyperparathyroidism

Other lesions which may contain giant cells

1. Infections:
 - ◆ TB granulomas
 - ◆ Syphilitic granulomas
 - ◆ Actinomycosis
 - ◆ Periapical granulomas
2. Foreign body granulomas
3. Tumors:
 - ◆ Benign osteoblastoma
 - ◆ Benign chondroblastoma
 - ◆ Benign cementoblastoma (true cementoma)
 - ◆ Benign fibrous histiocytoma
 - ◆ Malignant fibrous histiocytoma
 - ◆ Verruciform xanthoma
 - ◆ Intradermal naevi
4. Developmental conditions:
 - ◆ Facial fibrous dysplasia
 - ◆ Cheilitis granulomatosa
5. Conditions of obscure nature:
 - ◆ Sarcoidosis
 - ◆ Paget's disease of bone

A.2. Types of Giant Cells

1. Physiologic:

- a) Osteoclasts
- b) Odontoclasts
- c) Megakaryocytes

2. Pathologic:

- a) Foreign body giant cell
- b) Langhans giant cell, found in TB
- c) Touton giant cell, Found in histiocytosis Y (verruciform xanthoma)
- d) Aschoff giant cell, Found in rheumatic carditis
- e) Dorothy Reed giant cell, Found in Hodgkin's disease
- f) Giant cells found in malignancy
- g) Giant cells found in viral infection

A.3. Granulomas of the Oral Cavity

Granulomas are lesions which consist of granulation tissue. They usually result from failure of the body to eradicate the infection. This failure may be attributed to:

Peculiar characteristic of some organism (some bacteria e.g. TB bacilli parasitize macrophages and inhibit lysosome-phagosome fusion thus cripple or paralyze macrophages)

- ◆ Decreased body resistance
- ◆ Persistence of the irritant and failure of the body to get rid of it.

However, granulomas may form under some poorly understood conditions and they will be mentioned later on. Conditions in which granulomas are found could be classified into:

1. Infections:
 - a) Specific:
 - i. TB granuloma
 - ii. Syphilis
 - iii. Leprosy
 - iv. Actinomycosis
 - v. Histoplasmosis
 - vi. Blastomycosis
 - vii. Coccidioidomycosis
 - b) Non-specific:
 - i. Pyogenic granuloma
 - ii. Periapical granuloma
2. Foreign body granuloma
3. Hyperplastic and/or neoplastic:
 - a) Peripheral giant cell granuloma
 - b) Central giant cell granuloma
 - c) Giant cell tumor
 - d) Aneurysmal bone cyst
4. Developmental granulomas:
 - a) Cherubism
 - b) Chelitis granulomatosa

- c) Melkersson-Rosenthal syndrome
- 5. Epidermal Langerhan's histiocytosis:
 - a) Eosinophilic granuloma
 - b) Hand-Schouler-Christian disease
 - c) Leterer-Swies disease
- 6. Idiopathic granulomas:
 - a) Sarcoidosis
 - b) Crohn's disease
 - c) Midline lethal granuloma (Wagener's granulomatosis and nasopharyngeal T-cell and NK-cell lymphomas)

A.4. Granular Cell Lesions

Are lesions which consist of granular cells (cells showing granules in their cytoplasm). Care should be taken not to confuse them with granulomas of the oral cavity. The nature of the granules should be mentioned whenever possible. These lesions are:

1. Rhabdomyoma: zymogen granules
2. Rhabdomyosarcoma: zymogen granules
3. Granular cell myoblastoma: lysosomes
4. Congenital epulis of newborn: lysosomes
5. Granular cell ameloblastoma: lysosomes
6. Oncocytoma (oxyphilic adenoma): mitochondria

A.5. Lymphoepithelial Lesions

Are lesions which consist of lymphoid and epithelial element. These are:

1. Lymphoepithelial cyst (branchial cleft cyst)
2. Lymphoepithelioma (transitional cell carcinoma)
3. Papillary cystadenoma lymphomatosum
4. Sjogren's syndrome
5. Mickulicz disease
6. Hashimoto's disease

A.6. Fibro-osseous Lesions

Are lesions which consist of bone and fibrous tissue.

1. Fibrous dysplasia
2. Cemento-osseous dysplasia (osseous dysplasia)
 - a) Focal cemento-osseous dysplasia
 - b) Periapical cemento-osseous dysplasia (periapical cemental dysplasia)
 - c) Florid cemento-osseous dysplasia (florid cemental dysplasia)
 - d) Familial gigantiform cementoma
3. Ossifying fibroma, cementifying fibroma and cemento-ossifying fibroma
4. Juvenile ossifying fibroma (Juvenile aggressive ossifying fibroma)
5. Paget's disease of bone??

A.7. Pseudoepitheliomatous Hyperplasia

Means hyperplasia of the epithelium which mimics that of epithelioma but with pseudo-invasion of the connective tissue.

1. Keratoacanthoma
2. Granular cell myoblastoma

A.8. Hamartoma

The term hamartoma by definition is a developmental malformation appearing in a tumor like condition due to presence of normal cells in normal sites but in an exaggerated amount. The most known examples are:

Skin

1. Junctional nevus
2. Compound nevus
3. Juvenile melanoma (Spitz nevus)
4. Intradermal nevus
5. Blue nevus and Mongolian spots

Oral mucosa

- ◆ White spongy nevus

Vascular system

1. Capillary hemangioma
2. Cavernous hemangioma
3. Lymphangioma

Intestine

1. Peutz-Jehger's syndrome
2. Gardner's syndrome (adenomatous polyposis coli)

Nervous tissue

- ◆ Multiple neurofibromatosis (Von-Recklinghausen's disease of skin)

Bone tissue

1. Torus palatinus
2. Torus mandibularis
3. Multiple exostosis

Dental tissues

1. Supplemental teeth
2. Supernumerary teeth

A.9. Recurrent Ulcers

1. Ulcers recurring at the same site:
 - ◆ Traumatic ulcers
2. Ulcers recurring at different sites:
 - a) Erythema multiforme
 - b) Vesiculobullous lesions
 - c) Recurrent viral infection, herpes simplex, herpes zoster
 - d) Lichen planus
 - e) Crohn's disease
 - f) Behcet's disease
 - g) major recurrent aphthous stomatitis (RAS)
 - h) Oral ulceration in HIV infection

- i) Iron deficiency
- j) Folate deficiency
- k) Overt anemia
- l) Neutropenia

A.10. Bilateral Parotid Swelling

1. Mumps
2. Sjogren's syndrome
3. Sarcoidosis
4. Heerfordt's syndrome
5. Sialoadenosis
6. HIV-associated salivary cystic diseases
7. Papillary cystadenoma lymphomatosum

A.11. Verrucous-Papillary Lesions

1. Infections:
 - a) *Verruca vulgaris* (warts)
 - b) Focal epithelial hyperplasia
 - c) Papillary hyperplasia
 - d) *Condyloma latum*
 - e) *Condyloma acuminatum*
2. Neoplastic-Hyperplastic:
 - a) Squamous cell papilloma

- b) Verruciform xanthoma
- c) Verrucous carcinoma

A.12. Important causes of cervical lymphadenopathy

1. Infections

- a) Bacterial
 - i. Dental, tonsils, face or scalp infections
 - ii. Tuberculosis
 - iii. Syphilis
 - iv. Cat-scratch disease
- b) Viral
 - i. Herpetic stomatitis
 - ii. Infectious mononucleosis
 - iii. HIV infection
- c) Parasitic
 - ◆ Toxoplasmosis

2. Neoplasms

- a) Primary
 - i. Hodgkin's disease
 - ii. Non-Hodgkin's lymphoma
 - iii. Leukemia – especially lymphocytic
- b) Secondary

- i. Carcinoma - oral, salivary gland or nasopharyngeal
 - ii. Malignant melanoma
 - iii. Other mesenchymal tumors
3. Miscellaneous
 - a) Sarcoidosis
 - b) Drug reactions
 - c) Connective tissue diseases

A.13. Tumor-like lesions (appear clinically as swellings)

1. Developmental conditions
 - a) Nevi
 - i. Pigmented nevi
 - ii. Vascular nevi
 - b) Lingual thyroid nodule
 - c) Median rhomboid glossitis
 - d) Tori
 - i. Torus palatinus
 - ii. Torus mandibularis
2. Benign tumor-like lesions
 - a) Verruca vulgaris
 - b) Keratoacanthoma
 - c) Focal epithelial hyperplasia

- d) Fibroepithelial polyp
 - e) Pyogenic granuloma
 - f) Pregnancy tumor
 - g) Peripheral giant cell granuloma
 - h) Traumatic neuroma
3. Bone lesions
- a) Fibrous dysplasia
 - b) Cherubism
 - c) Garre's osteomyelitis
4. Odontogenic tumor-like lesions
- a) Enamelomas
 - b) Florid cementoosseous dysplasia
 - c) Familial gigantiform cementoma
5. Salivary glands lesions
- a) Necrotizing sialometaplasia
 - b) Sialoadenosis
 - c) oncocytosis

A.14. Hereditary diseases characterized by melanin pigmentation

1. Developmental disturbances
- a) Autosomal dominant hereditary ectodermal dysplasia
 - b) Peutz-Jegher's syndrome

- c) Xeroderma pigmentosa
- d) Dysplastic nevus syndrome
- 2. Benign tumors
 - a) Multiple neurofibromatosis I
 - b) Multiple neurofibromatosis II (bilateral acoustic neurofibromatosis\)
- 3. Bone diseases
 - a) Polystotic fibrous dysplasia (not hereditary)

A.15. Hereditary syndromes associated with early loss of teeth

1. Hypophosphatasia
2. Hypophosphatemia
3. Papillon-Lefevre syndrome
4. Chediak-Higashi syndrome
5. Ehlers-Danlos syndrome
6. Down's syndrome ?

A.16. Root Resorption

1. Paget's disease of bone
2. Chronic inflammatory lesions e.g. long standing periapical granuloma
3. Cysts
4. Benign tumors and malignant neoplasms

5. Trauma, excessive mechanical or occlusal forces
6. Reimplantation or transplantation of teeth
7. Impactions
8. Idiopathic external resorption

A.17. Loss of Lamina Dura

1. Osteoporosis
2. Paget's disease of bone
3. Hyperparathyroidism
4. Osteomalacia
5. Rickets
6. Hypophosphatemia (vitamin D resistant form)
7. Hyperphosphatasia
8. Idiopathic

A.18. Widening of Periodontal Ligament Space

1. Periodontal disease (furcation involvement)
2. Periapical inflammation
3. Traumatic occlusion
4. Dental trauma (avulsion or fractured root)
5. Jaw fracture through tooth socket
6. Scleroderma (systemic sclerosis)
7. Re-implantation of avulsed tooth

8. Diabetes mellitus
9. Periodontosis
10. Osteomyelitis
11. Malignant tumors (especially osteogenic sarcoma)

A.19. Pulp Stones

1. Dentin dysplasias
2. Dentinogenesis imperfecta
3. Osteogenesis imperfecta

A.20. Reduced Pulp Space

1. Dentin dysplasias
2. Dentinogenesis imperfecta
3. Osteogenesis imperfecta
4. Teeth in elderly (secondary dentin)
5. Reaction to attrition, abrasion or erosion
6. Normal variant

A.21. Enlarged Pulp Space

1. Shell teeth of Rushton
2. Vitamin D resistant Rickets
3. Hypophosphatasia
4. Pulpal extension into enamel pearl

A.22. Mosaic Appearance

1. Paget's disease of bone
2. Diffuse sclerosing osteomyelitis
3. True cementoma (benign cementoblastoma)

A.23. Juxta-Epithelial Hyalinization

1. Ameloblastic fibroma
2. Ameloblastoma (sometimes)
3. Oral submucous fibrosis

A.24. Cotton Wool Appearance

1. Paget's disease of bone
2. Diffuse sclerosing osteomyelitis

A.25. Onion Skin Appearance¹

1. Ewing's sarcoma
2. Chronic osteomyelitis with proliferative periosteitis (Garre's osteomyelitis)
3. Giant cell tumor of bone (some cases)

¹The so-called classic radiographic findings of certain tumors (eg, punched-out areas of the skull in multiple myeloma, "sun ray" appearance of osteogenic sarcoma, and "onion skin" effect of Ewing's sarcoma), although suggestive, are not pathognomonic. The age of the patient, the duration of complaints, the site of involvement and the number of bones involved, and the presence or absence of associated systemic disease – as well as the histologic characteristics – must all be considered for proper diagnosis.

A.26. Sun Ray Appearance

1. Osteogenic sarcoma
2. Ewing's sarcoma (some cases)
3. Giant cell tumor of bone (some cases)

A.27. Psammoma-Like Bodies

1. Acinic cell tumor
2. Juvenile Ossifying Fibroma

A.28. Delayed Formation of Sequestrum

1. Paget's disease of bone
2. Marble bone disease (osteopetrosis)
3. Osteoradionecrosis (irradiation on bones)