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CLINICO-PATHOLOGIC STUDY OF BONE AND JOINT TUMOURS AND TUMOUR -LIKE CONDITIONS CONTAINING GIANT CELLS

THESIS

Submitted by

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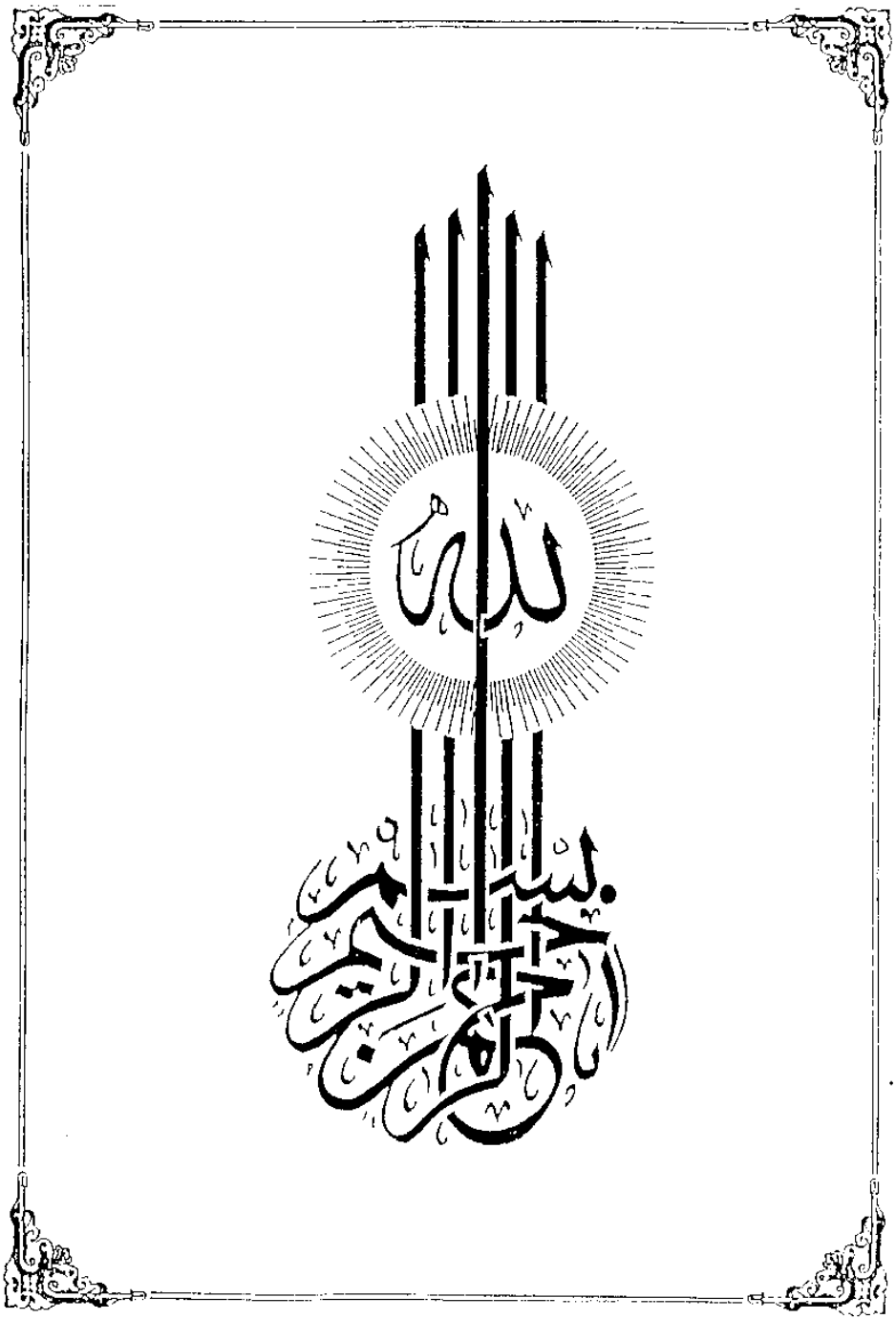

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INTRODUCTION

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The lesions most commonly misdiagnosed as osteoclastoma on the basis of their histological features alone are :

i) aneurysmal bone cyst;

ii) intra-osseous villonodular synovitis;

iii) brown tumour of hyperparathyroidism; and

iv) giant-cell reaction in response to haemorrhage of various causes within cancellous tissue.

Giant-cell reactions may be found in solitary cysts, non-osteogenic fibromas, osteoblastomas, chondroblastomas, condromyxoid fibromas, fibrosarcomas and osteosarcomas. Although the osteoclastoma is accepted as a separate entity, the exact diagnosis still remains very difficult and frequently has to be based on a process of exclusion (Du Toit, 1983).

Aim of the work is to write an essay on the differential diagnosis of tumours and tumour-like conditions of bones and joints containing giant cells on the basis of a combined clinical, radiographic and pathologic evaluation.

REVIEW OF LITERATURE

DIAGNOSIS AND CLASSIFICATION OF BONE TUMOURS

Diagnosis of Bone Tumours

Schajowicz (1981) stated that all those dedicated to the study of skeletal disorders agree that a combined clinical, radiologic and pathologic study, supplemented whenever necessary by biochemical and haematologic investigations, is essential in order to arrive at the precise diagnosis of an osseous lesion.

As to radiology, Schajowicz (1981) stated that bone reacts to the presence of neoplastic, metabolic, inflammatory, or other processes in two different ways: by new bone formation or by bone resorption. The two processes are often combined, one predominating over the other. The following points should be ascertained from a radiographic examination of a bone lesion :

(1) Whether the lesion is monostotic or polyostotic.

(2) The type of bone affected (tubular or flat)

(3) The site of the lesion with reference to the epiphysis, growth plate, metaphysis, or diaphysis, and with reference to its medullary, cortical, or juxtacortical location.

(4) An estimate of how much of the total length and circumference of the bone is affected.

(5) The presence or absence of adjoining soft tissue changes with particular mention of fascial planes,

tumour tissue, etc.

(6) The nature of any bone changes present (destructive or radiolucent of moth-eaten, permeative, or geographic type, proliferative or mixed).

(7) The character of the bony margins of the lesion (sharp, ill-defined, thick, thin, increased or decreased density).

(8) The nature of any cortical bone changes, such as the involvement of medullary or periosteal surfaces, cortical invasion,pressure atrophy.

(9) The density of tumour tissue, with particular regard to the presence of calcification and its roentgenographic characteristics (solid, punctate, smoky).

(10) The character of periosteal reaction (laminated or "onion peel", sunburst, or Codman's triangle).

As to pathology, Schajowicz (1981), stated that a biopsy can be carried out in two ways:

1) Surgical biopsy (incisional or excisional) and

2) Needle biopsy (aspiration or trocar biopsy). Regardless of the procedure used, it should be interpreted by a pathologist who has a good basic knowledge of bone pathology. He must know the exact site of the material submitted, together with the clinical and radiologic information.

Classification of Bone Tumours

The W.H.O. classification of bone tumours (Schajowicz et al., 1972).

This classification is based on histological criteria, particularly the type of differentiation, shown by the tumour cells and the type of the intercellular material they produce. The classification includes benign and malignant neoplasm primary in bone, together with certain "tumourlike" lesions that are included because of their frequent clinical and histologic similarity to bone tumours, and because of uncertainty with regard to the neoplastic and nonneoplastic nature of some of them.

(1) Bone-forming tumours:

a- Benign.

1. Osteoma
2. Osteoid osteoma and osteoblastoma .

b- Malignant.

1. Osteosarcoma (osteogenic sarcoma).
2. Juxta-cortical osteosarcoma (parosteal sarcoma)

(2) Cartillage-forming tumours

a- Benign.

1. Chondroma
2. Osteochondroma (Osteocartilaginous exostosis)
3. Chondroblastoma (benign chondroblastoma, epiphyseal chondroblastoma).

4. Chondromyxoid fibroma

b- Malignant

1. Chondrosarcoma

2. Juxta-cortical chondrosarcoma

3. Mesenchymal chondrosarcoma

(3) Giant-cell tumour (Osteoclastoma)

(4) Marrow tumours:

1- Ewing's sarcoma.

2- Malignant lymphoma (reticulosarcoma and lymphosarcoma).

3- Myeloma

(5) Vascular tymours:

a- Benign

1. Haemangioma

2. Lymphangioma

3. Glomus tumour (glomangioma)

b- Intermediate

1. Haemangioendothelioma

2. Haemangiopericytoma

c- Malignant

- Angiosarcoma

(6) Uther Connective Tissue Tumours:

a- Benign

1. Desmoplastic fibroma

2. Lipoma

b- Malignant

1. Fibrosarcoma

2. Liposarcoma

3. Malignant mesenchymoma

4. Undifferentiated sarcoma

(7) Other Tumours:

1- Chordoma

2- "Adamantinoma "of long bones

3- Neurilemmoma (Schwannoma, neurinoma).

4- Neurofibroma.

(8) Tumour-like lesions:

1- Solitary bone cyst.

2- Anueurysmal bone cyst

3- Juxta-arcitular bone cyst (intraosseous ganglion).

4- Metaphyseal fibrous defect (nonossifying fibroma).

5- Eosinophilic granuloma

6- Fibrous dysplasia

7- Myositis ossificans

8- "Brown tumour" of hyperparathyroidism

GIANT-CELL TUMOUR OF BONE

Bloodgood (1910) proposed the term "benign giant cell tumour" Stewart (1922) introduced the term osteoclastoma into the British orthopaedic literature. Jaffe et al. (1940) attempted to define what should be properly regarded as genuine giant cell tumour as a basis for more accurate diagnosis. Giant-cell tumour of bone was interpreted as a distinctive neoplasm arising apparently from the non-bone-forming supporting connective tissue of the marrow which could be readily identified. They maintained that the presence of giant cells even in considerable numbers was not sufficient to establish the diagnosis, which can only be based on all clinical, radiological and pathological features of the tumour. Barnes (1972) stated that the most satisfactory term and the one which has found general acceptance is giant-cell tumour of bone.

Mnaymneh et al. (1964) found cases of 12 years old, which indicates that this tumour can occur before skeletal maturity. They stated that females outnumbered males to about 2:1.Dahlin et al.(1970) also found predominence in females.Goldenberg et al. (1970) and Mc Grath (1972) stated that all patients are skeletally mature as evidenced by the closure of the epiphysis. Lichtenstein (1972) and Larsson et al. (1975) reported cases under the age of 18

years. According to Aegerter and Kirkpatrick (1975), the greatest incidence is between 20-40 years.

The common sites, according to Jaffe (1958), are the lower end of femur, upper end of tibia and lower end of radius in that order of frequency. Mnaymneh et al. (1964) stated that the knee region was the common site: distal end of femur, proximal end of tibia and the third is the sacrum. Wilkerson and Cracchiolo (1969) recorded cases of giant-cell tumour involving the diaphysis of left tibia which is not characteristic. Goldenberg et al. (1970) stated that occasionally giant cell tumour is also observed in jaw bones, upper end of femur, upper end of humerus, upper end of fibula, lower end of tibia, the patella, metacarpal heads and even phalanges. Tornberg et al.(1975) recorded cases of multicentric giant cell tumour in long bones, but the occurrence of more than one primary giant-cell tumour is rare.

Radiologically, as stated by Huvos (1979), small lesions, and those arising in long tubular bones, have a characteristic presentation. They are slightly eccentric to the long axis of a tubular bone, showing an expanding central area of radiolucency appearing in the epiphyseal end with a slight suggestion of fine trabeculation. The presence or absence of trabeculae is related to the rapidity of tumour growth. The center of the lesion is more lucent,