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Exam Preparatory Manual for Undergraduates

ORTHOPEDICS



HIGHLIGHTS

Fractures, Diseases, Short Notes, Long & Short Cases, X-rays, Implants and Instruments

Sandip Ghosh

2nd Edition

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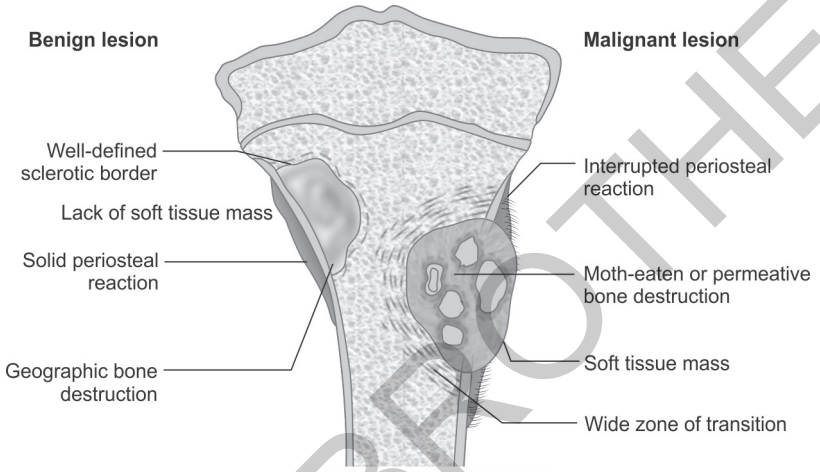
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CHAPTER 8

Bone Tumors



Q Enumerate benign and malignant bone tumors.

Benign:

- Osteoid osteoma
- Fibroma
- Osteochondroma (exostosis)
- Giant cell tumor
- Eosinophilic granuloma and hemangioma

Malignant:

- Osteosarcoma
- Chondrosarcoma
- Ewing's sarcoma
- Multiple myeloma
- Malignant giant cell tumor (GCT)

OSTEOCHONDROMA OR EXOSTOSIS

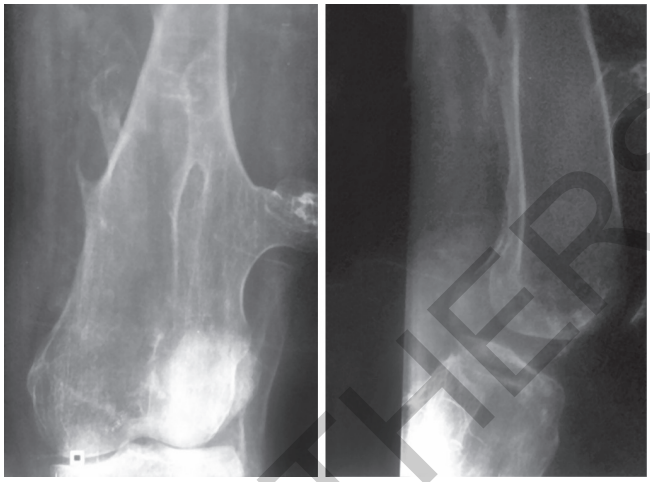
Q Describe clinical features, investigation, pathology, investigation and treatment of osteochondroma.

- Benign tumor arising from diaphysis long bone of a nearby joint.
- Most common site—long bone of knee, wrist, elbow, ankle.

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Clinical features:

- Teenage/young adult
- No pain
- Only swelling (insidious onset)
- May result deformity
- Palpation of mass:
  - Cauliflower-like swelling
  - Round or oval solid mass
  - Grow away form joint



Investigation:

Plain X-ray:

- Pedunculated bony mass arising from cortex of a diaphysis.
- Metaphyseal junction with calcification of cartilage cap.

Pathology:

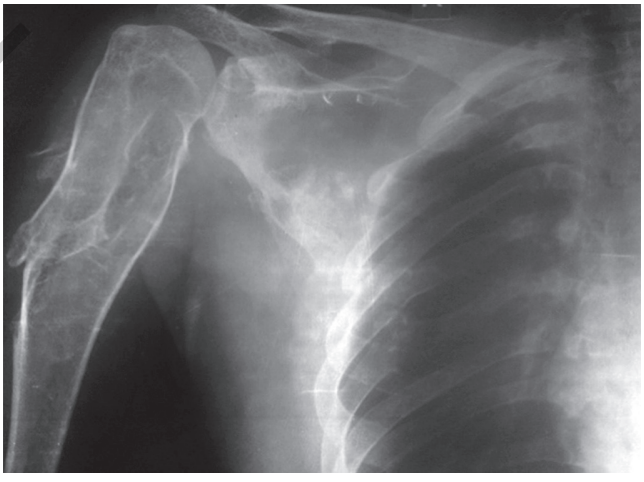
- History and physical examination—cap of hyaline cartilage over the bony mass.
- MRI—to rule out neurovascular compression by mass.

Treatment:

- Observation—if small
- If growing—excision of the mass along with stalk.

SIMPLE BONE CYST

Q Write short note of simple bone cyst.



Benign mass occur during childhood form metaphysis of long bone.

Common site: Proximal humerus, distal femur.

Pathology: Straw color yellow fluid, fibrous capsule +/– giant cell.

Clinical features:

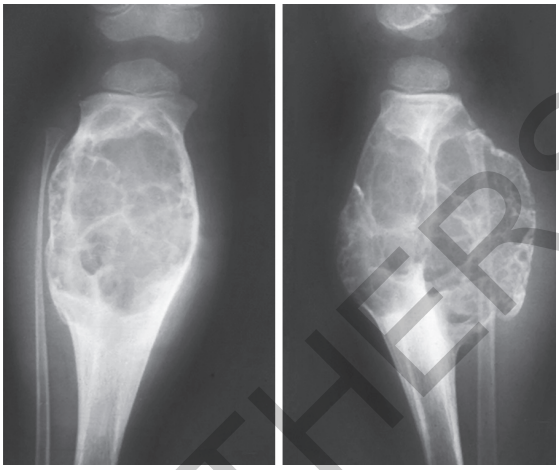
- Swelling, no pain, no local tenderness
- Pathological fracture may happen.

Treatment:

- Usually heal spontaneously
- If increases size gradually—then curettage and bone graft

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ANEURYSMAL BONE CYST



Q Write short note on aneurysmal bone cyst.

These occur in middle age group from metaphysis.

Clinical features:

- Pain, swelling, around a joint
- Common sites of swelling:
  - Proximal tibia, humerus, femur
  - Distal femur and tibia
- Local tenderness +ve

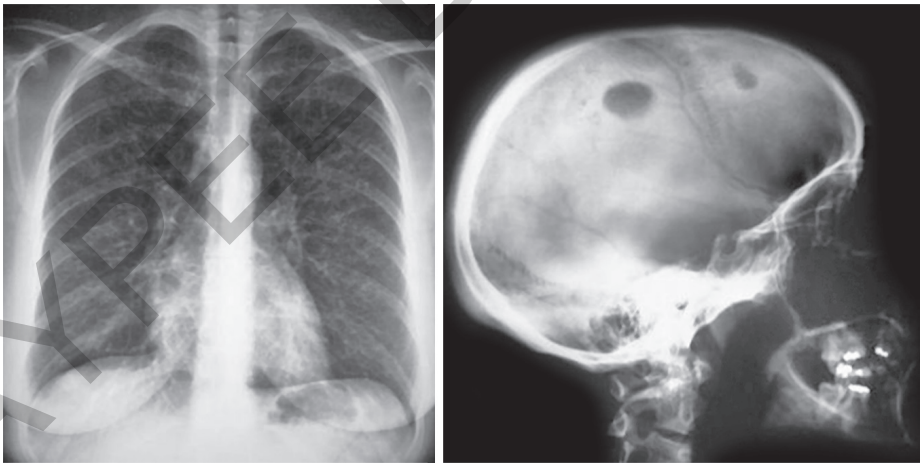
Investigation:

- *X-ray:*
  - Well-defined radiolucent cyst
  - Trabeculated cyst
- *CT/MRI:* To detect cortical break.

Pathology: Contains blood with a fibrous capsule +/– giant cell

Treatment: Curettage + bone graft or bone cement

EOSINOPHILIC GRANULOMA



Q Write short notes on eosinophilic granuloma.

Clinical features:

- Cystic lesions in flat bone or metaphysis of long bone, usually in child.
- Complaining of—pain, swelling
- Pathological fracture may occur

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Investigation:

- *X-ray:* Well demarcated, radiculated area with bone metaphysis with sclerosis, occurring skull vertebrae also.
- *MRI:* To differentiate spinal cord compression.

Treatment:

- Usually heal spontaneously
- Operation
  - To obtain biopsy
  - If lesion increased in size—complete excision.

GIANT CELL TUMOR



Q Write short note on giant cell tumor (GCT).

Clinical features:

- History: 3rd to 4th decade, usually female (2:1)
- Pain and swelling mostly knee, ankle, elbow, shoulder (mild to moderate) and severe restriction of movement.

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Sign:

- Swelling away from joint around joint of a long bone.
- Tenderness positive—egg cell crackling sound.

Investigation:

- Radiology—X-ray and MRI—soap bubble appearance
- Bony mass with enlarged cortex, i.e., seepage test +ve
- Confirm by MRI—due to any breakage or soft tissue involvement or any neurovascular involvement, area of osteolysis and sclerosis
- Confirm by bone biopsy—wide bore needle biopsy
- Incisional biopsy confirm—at the junction of malignant bone and healthy tissue—should be done by an expert.

Histopatholgy: Multi nucleated osteoclast type giant cells, sheets of uniform oval mononuclear cells.

Treatment: Curettage and bone cement to fill the tumor cavity.

MALIGNANT TUMOR OF BONE

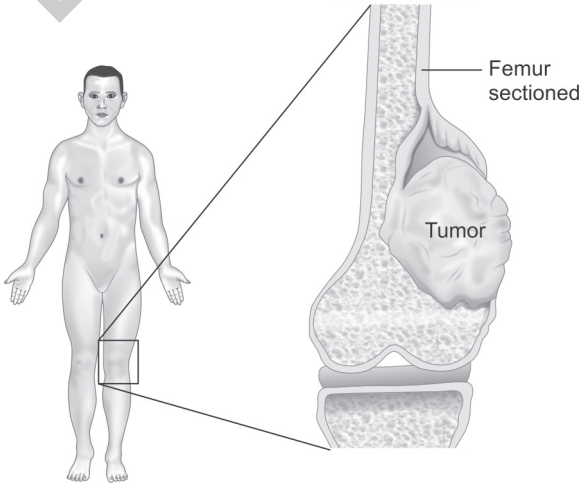
Enumerate malignant bone tumor with their occurrence age.

- Osteosarcoma (2nd decade)
- Ewing sarcoma (1st decade)
- Chondrosarcoma (4th–5th decade)
- Multiple Myeloma (6th–7th decade)
- Malignant giant cell tumor (3rd–4th decade)

Symptoms:

- Rapidly growing mass
- Severe pain
- Restriction of movement grossly

OSTEOSARCOMA



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Q Write clinical features, investigations and treatment of osteosarcoma.

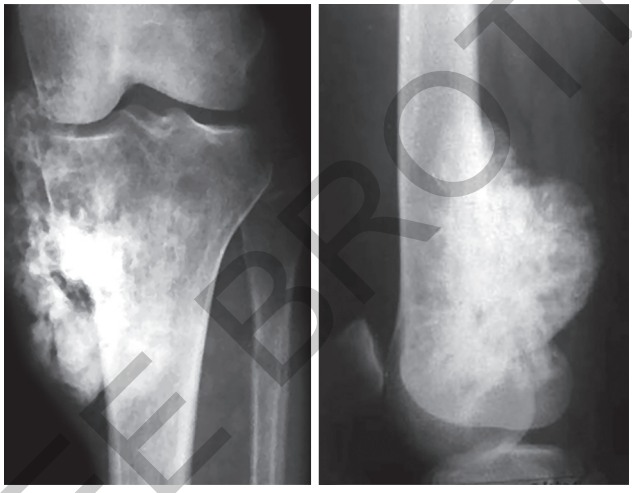
Clinical features:

Symptoms:

- Age—2nd decade usual presentation
- Rapidly growing mass
- Origin—diaphysis
- Severe pain with huge swelling

Signs (common for all malignancy):

- Local tenderness
- Shiny skin
- Engorgement of veins with local venous prominence.
- Variegated feeling of the mass.



Investigaions:

- X-ray:
  - Differential diagnosis—osteosarcoma, Ewing's sarcoma, chondrosarcoma, chronic osteomyelitis for onion peel appearance.
  - Malignant tumor mass will never have discharge of pus, i.e., discharging sinus—it is a diagnostic sign of chronic osteomylelitis may get healed sinus.
- MRI: T2 signal followed by area of osteolysis, osteosclerosis and osteonecrosis.
- History and physical examination: Osteoid lined by malignant osteoblast +/– tumor giant cells. Formation of bone by the tumor cells are characteristic.

Treatment:

- After confirmation of diagnosis, chemotherapy should be started—vincristine, vinblastine, methotrexate, cyclophosphamide, etc.
- Reconstructive surgery followed by arthroplasty by custom made prosthesis or arthrodesis**.**
- Paliative surgery
- Amputation—one joint above the tumor location.
- Radiotherapy if necessary

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EWING'S SARCOMA

Q Write clinical features, investigations and treatment of Ewing's sarcoma.



Clinical features:

- Origin: Metaphysis of long bone
- Common site: Around knee joint or pelvic bone
- Pain and sudden onset swelling, with severe tenderness.

Investigation:

- X-ray—periosteal reaction, onion peel appearance, Codmann's triangle.
- Pathology: History and physical examination—small round malignant tumor cell +/– rosette

Treatment

- Most radiosensitive (6,000–8,000 rads/per cycle) with combination of chemotherapy and palliative surgery.
- Reconstructive surgery followed by arthroplasty by custom-made prosthesis or arthrodesis.
- Amputation—one joint above the tumor location.

CHONDROSARCOMA

Q Write clinical feature, investigation, pathology, and treatment of chondrosarcoma.



Clinical features: Progressive swelling, pain around knee, local tenderness at joint line with restricted mobility, increased venous prominence.

Investigation:

X-ray:

- Cotton wool appearance (radiological)
- Chondrocytes are huge in number in history and physical examination.

MRI: Increased T2 signal

Pathology: History and physical examination—malignant chondrocytes, stromal cell.

Treatment:

- After confirmation of diagnosis, chemotherapy should be started—vincristine, vinblastine, methotrexate, cyclophosphamide, etc.
- Radiotherapy sensitive, e.g., Ewing's sarcoma.
- Reconstructive surgery, followed by arthroplasty by custom made prosthesis or arthrodesis.
- Palliative surgery
- Amputation—one joint above the tumor location.

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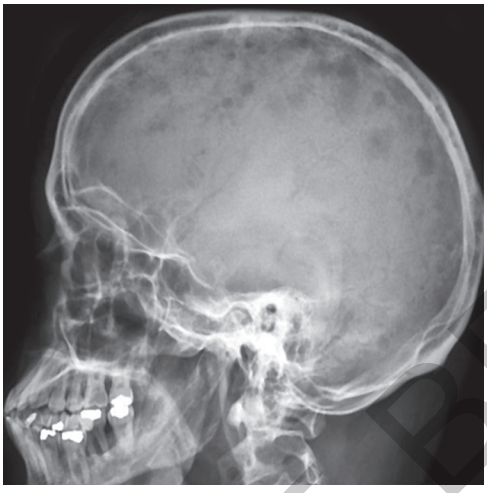
MULTIPLE MYELOMA

Q Write short notes on multiple myeloma.

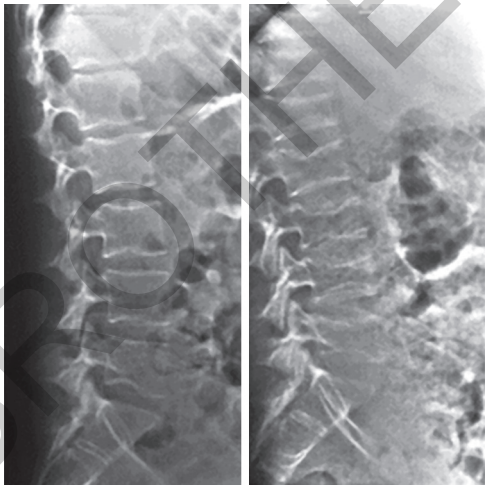
- Most common primary malignant bone tumor
- Occur in elderly

Clinical features:

- Low backache, swelling over spine
- Kyphoscoliosis
- Multiple fracture at spine



Skull X-ray—multiple punched out lesion



Spine—multiple compression fractures

Investigations:

- X-ray:
  - Spine—multiple compression fractures and decreased disc space
  - Skull—multiple punched out lesion
- Blood:
  - Erythrocyte sedimentation rate (ESR)—increased
  - Serum electrophoresis for M band (+ve)
- Urine: For Bence–Jones protein (+ve)
- MRI of spine: To detect cord compression
- History and physical examination: Sheets of malignant plasma cell.

Treatment:

- Rest
- Immobilization
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Spinal brace (Boston's)
- Chemotherapy (vincristine, adriamycin, methotrexate)
- Surgery: Spinal stabilization by pedicle screw fixation

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Exam Preparatory Manual for Undergraduates

ORTHOPEDICS

This book *Exam Preparatory Manual for Undergraduates: Orthopedics* will give a precise idea about different fractures and their treatment, different diseases, congenital disorders and theoretical (short notes) and practical exam-oriented long cases, short cases, instruments, implants and X-rays for undergraduate students and the book is written according to CBME course curriculum of latest NMC guidelines.

Sandip Ghosh MS (Ortho) PGI (Chandigarh) has graduated from RG Kar Medical College and Hospital, Kolkata under University of Calcutta, West Bengal, and has done his Postgraduation in MS (Master of Surgery) in Orthopedics from PGIMER, Chandigarh, India. He got honors mark in Anatomy and Surgery during MBBS study. Presently, he is Principal and Professor, Department of Orthopedics, RG Kar Medical College and Hospital, Kolkata under Department of Health and Family Welfare of Government of West Bengal, India. He has published many national and international papers and delivered CME lectures at national and international levels. He has been awarded with various awards, such as KT Dholakia Fellowship, Ashok Sengupta Memorial Fellowship and AO Trauma Fellowship.

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