
KREP
2025
KARNATAKA RADIOLOGY EDUCATION PROGRAM

GIANT CELL TUMOR

- originates from non-bone forming supportive connective tissue of the marrow
- highly vascular lesion is composed of spindle-shaped stromal cells interspersed among multinucleated giant cells.
- primary neoplasm accounting for 5–8% of all primary malignant bone tumors and 15% of all primary benign bone tumors

- **Age and Sex Distribution**
  - tumors predominate in female patients in a proportion of 3:2,
  - age range is 20–40 years

- **Signs and Symptoms**
  - chief complaint is pain of an intermittent, aching nature, with localized swelling and tenderness.
  - restricted movement of the involved adjacent joint.

- **Location**
- most common sites are the distal femur, proximal tibia, distal radius, and proximal humerus,
- Involvement of the distal radius carries a more serious prognosis because most of these lesions are malignant.
- sacrum is the most common spinal site
- usually begins in the metaphyseal end of a long bone in or adjacent to the ossified epiphyseal line.
- extends to the end of a long bone, abutting its joint surface, leaving the lesion subarticular.

- **Radiologic Features**
  - eccentric, metaphyseal, multilobed radiolucent lesion of a long bone
  - located adjacent to the articular surface of the bone (subarticular) once the epiphyseal line has closed.
  - Significant bone expansion with the production of a soap bubble appearance
  - subarticular in flat bones, occurring near the sacroiliac joint.
  - The cortex is thinned and expanded, and the endosteal margins show a wide zone of transition, suggesting a malignant lesion
  - may traverse the entire shaft in a relatively thin bone, such as the fibula or ulna.
  - delicate periosteal reaction may develop.

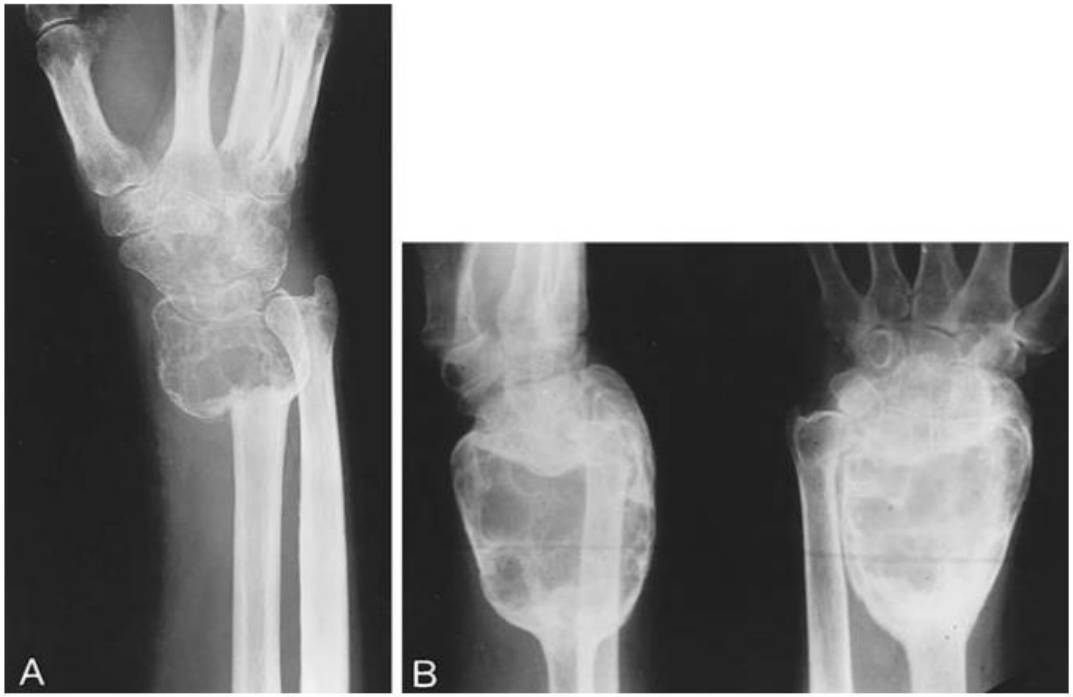

Figure 11-159 **GIANT CELL TUMOR: DISTAL RADIUS.** **A. Oblique Wrist.** Observe the subarticular radiolucent expansile lesion of the entire distal surface of the radius, with a pathologic fracture. Of incidental notation is spotty disuse osteoporosis scattered throughout the carpal bones and the bases of the visualized metacarpals. **B. PA and Lateral Wrist.** Observe the grossly expansile, heavily trabeculated or soap bubble geographic lesion involving the subarticular surface of the distal radius. Owing to the extensive bone expansion, there is posterior and lateral displacement of the ulna. *COMMENT:* Giant cell tumor involving the distal radius carries a sinister prognosis because most of these lesions are malignant.

Figure 11-162 **GIANT CELL TUMOR. Ilium.** Observe the grossly expansile lytic lesion of the middle and posterior surfaces of the ilium. Note also the soap bubble matrix in this large malignant giant cell tumor of the ilium.

Figure 11-164 **GIANT CELL TUMOR. Proximal Tibia.** Observe the well-defined geographic lesion within the lateral portion of the proximal tibia. This lesion is in its classic subarticular location and is eccentrically placed, typical for a giant cell tumor.

Figure 11-167 **GIANT CELL TUMOR. Proximal Tibia.** Note the grossly expansile, heavily trabeculated, geographic lesion involving the entire subarticular surface of the proximal tibia. (Courtesy of Joseph W. Howe, DC, DACBR, Fellow, ACCR, Los Angeles, California.)

Treatment and Prognosis

- Treatment of choice is surgical curettage combined with liquid nitrogen freezing, bone packing, or grafting.
- Recurrence rates of 12–50% are reported
- Spinal lesions are usually inoperable, requiring radiation therapy for cure.
- Prognosis for benign lesions is excellent.