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KARNATAKA RADIOLOGY EDUCATION PROGRAM

Giant cell tumor: A rare condition in the immature skeleton

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Introduction

- Giant cell tumor (GCT) of bone is a benign but locally aggressive and destructive lesion generally occurring in skeletally mature individuals.
- GCTs are exceptionally rare in children.
- Typically involving the epiphysiometaphyseal region of long bones.
- Most are eccentric and surrounded by a circumscribed non sclerotic border. There is no mineralized tumor matrix.
- Giant cell tumor can produce wide-ranging appearances depending on site, complications such as hemorrhage or pathological fracture and after surgical intervention.

Objectives

- To highlight the role of histopathological and magnetic resonance imaging in GCT.

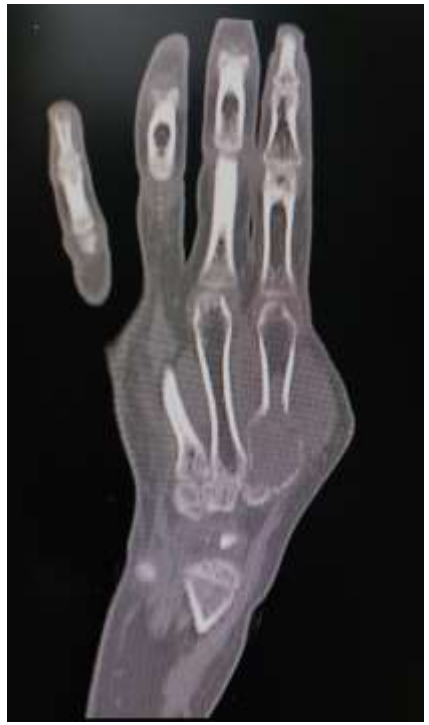
Diagnostic criteria according to the WHO classification of soft tissue and bone tumors (5th edition) :

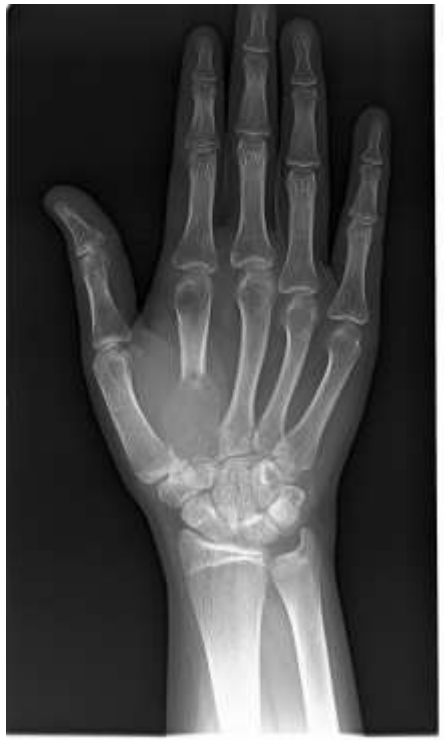
- Circumscribed osteolytic bone tumor involving the epiphysis
- Usual occurrence in a skeletally mature person
- Histological evidence of numerous non-neoplastic osteoclastic giant cells and fewer neoplastic mononuclear cells usually without atypia

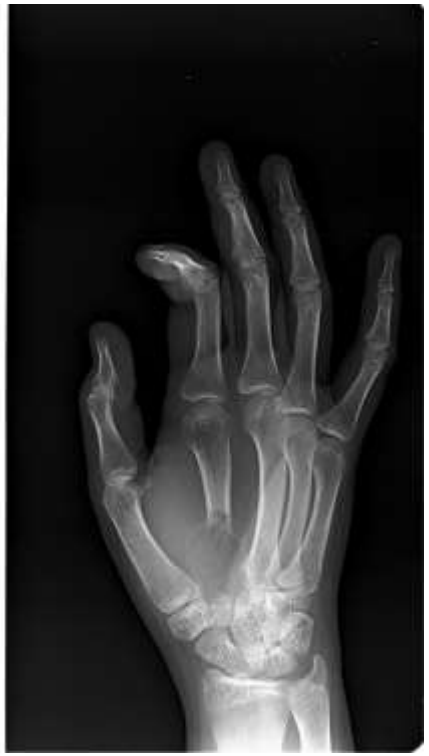
The following molecular criterium is desirable:

- cells with H3.3 p.Gly34 mutation

Findings







15-year-old patient presented with C/o swelling in right palm with focal tenderness and reduced range of motion.

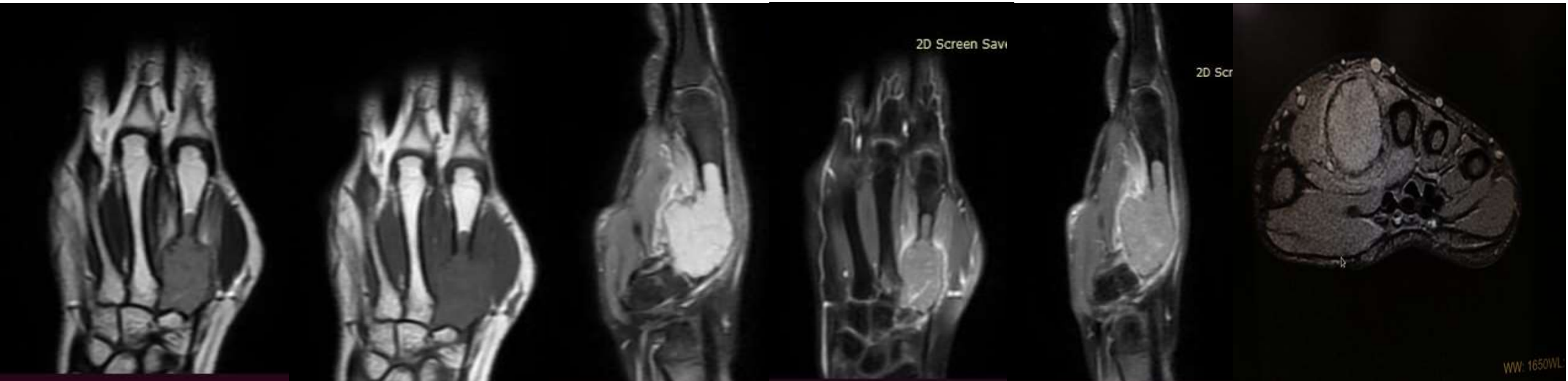
On conventional radiography : solitary expansile lytic lesion in proximal epimetaphysis of 2nd metacarpal of right hand extending up to subarticular location with characteristic soap bubble appearance and narrow zone of transition.

On CT: the lesion measuring 2.3cm in length,1.7cm in width and 1.9cm in depth noted. The lesion scallops and thins the cortex with areas of cortical erosions, no matrix mineralization or associated peri lesional soft tissue masses. No trans articular extension of the lesion. No fracture/ dislocation noted.

Findings

On MRI: Medullary based lesion and shows intermediate signal intensity on T1 and iso to hyperintense on T2 images with no fat suppression. No blooming on gradient images.
Post-contrast images reveal solid relatively homogeneous enhancement of the lesion**.**

Histopathology: Abundant number of osteoclastic giant cells are scattered throughout the lesion.



Conclusion

- **GCT is typically a benign lesion, frequently exhibiting aggressive imaging features.**
- **Though radiographic findings usually suggest the diagnosis of GCT, histological confirmation is mandatory and CT and/or MR are required for accurate tumor assessment.**
- **MR imaging allows precise characterization, staging and monitoring of GCT, which are essential to patient management.**
- **Typical MR features of GCT include hypo intensity on T1WI, heterogeneous hyperintensity on T2WI and avid enhancement after intravenous contrast administration. Some tumors may also show low signal intensity on T2WI due to the presence of hemosiderin or high collagen content.**
- **GCT treatment remains mostly surgical; nonetheless Denosumab has shown excellent results and may be an option for recurrent and surgically unsalvageable GCT.**

References:

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