Radiology: Approach to Bone Tumors and Bone Tumor Differential Diagnoses
Stephanie Bernhard, MD

Objective:
1. Be able to objectively evaluate the aggressiveness of a bone lesion based on the radiographic appearance.
2. Be able to differentiate the types of matrix in tumors radiographically.
3. Be able to formulate a reasonable differential diagnosis from the imaging.

Video lectures:
Part I: Radiographic approach to bone tumors
https://www.youtube.com/watch?v=v00J-9FML4A

Part II: Bone tumor differential diagnoses
https://www.youtube.com/watch?v=soXMeBvFM3U

Content:
1. Imaging features determining aggressiveness – Margins supplemented by periosteal reaction
2. Differential diagnoses – Know how to apply the features that can help you
   a. Patient Demographic: Age and Race of the patient dramatically change differentials
   b. Location: Tumors develop where the originating cell lines are active (ie. Lent Johnson – Field theory).
      i. Learn common differentials based on longitudinal location (epiphyseal, metaphyseal, diaphyseal).
      ii. Some tumors occur in specific bones (ie Adamantinoma-tibia). Learn some of the common differentials for individual bones and axial locations (cortical, juxtacortical)
   c. Imaging appearance
      i. Matrix forming tumors – Osteoid, Chondroid, Fibrous (be able to identify the matrix)
      ii. Non-Matrix tumors
         1. Small round blue cell tumors (Ewing family / PNETs, lymphoma
         2. Lytic lesions – Including the subset of expansile tumors (“alphabet soup lesions”)
         3. Vascular lesions of bone (hemangioma, hemangiopericytoma, angiosarcoma)
         4. Tumor mimics
   d. Additional Differentials
      i. Tumors with secondary ABCs on MRI
      ii. Tumors with surrounding “edema” on MR
      iii. Polyostotic lesions