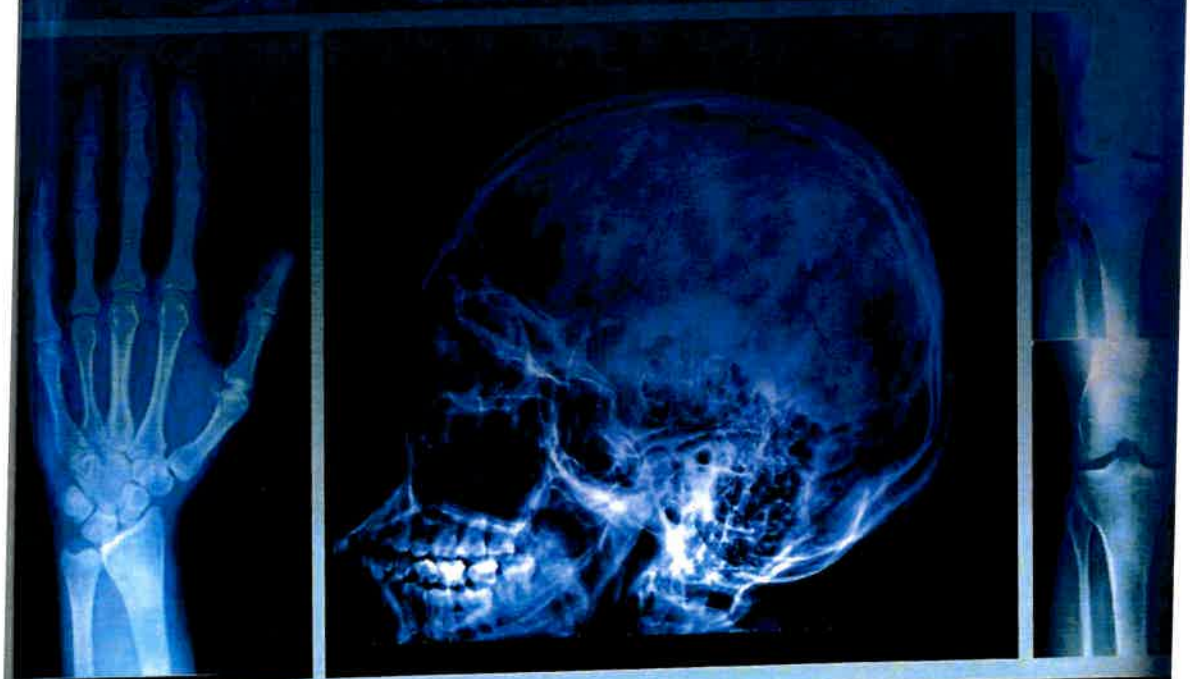
Conceptual Radiology

DNB Master Solutions Radiology (2023-21)



Vol. 1

Authored By The Faculty of Conceptual Radiology

Solved DNB Theory Papers
Volume - 1
(2023 - 21)

HOW TO APPROACH THIS BOOK

This book is structured to provide a comprehensive guide to mastering the DNB as well as MD Radiology exam. Here is a suggested approach to make the most of this resource:

1. **Familiarize Yourself with the Exam Format:** Begin by understanding the structure of the DNB as well as MD exams. Knowing the types of questions, the marking scheme, and the areas of focus will help you tailor your study plan effectively.
2. **Systematic Study:** Tackle each section of the book methodically. Start with the topics you find most challenging, as this will give you more time to understand and absorb the material.
3. **Practice Regularly:** Regular practice is key to success. Use the model questions provided to test your knowledge and identify areas that need further review. Time yourself to simulate exam conditions and improve your time management skills.
4. **Review and Reflect:** After attempting the questions, carefully review the answers and explanations. Reflect on any mistakes and ensure you understand the rationale behind the correct answers.
5. **Utilize Additional Resources:** While this book is comprehensive, supplementing your study with additional book on lecture notes as well as the video lectures, textbooks, journals, and online resources can provide a broader understanding of complex topics.
6. **Group Study and Discussion:** Studying in groups can be highly beneficial. Discussing questions and answers with peers can provide new insights and reinforce your understanding.
7. **Seek Guidance:** Do not hesitate to seek guidance from mentors and senior colleagues. Their experience and expertise can provide valuable perspectives and tips.

Team Conceptual Radiology

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Paper

1

DNB Radiology (Dec 2023)

Question - 1

What are the risk factors for osteoporosis? Discuss the imaging differential diagnosis of osteoporotic vertebral fracture and their distinguishing features.

Answer 1.

Risk factors for osteoporosis

Non-modifiable Risk Factors

1. **Age:** The risk of osteoporosis increases with age, especially after menopause in women and after the age of 70 in men.
2. **Sex:** Women are at a higher risk than men, particularly postmenopausal women due to lower estrogen levels.
3. **Family History**
4. **Ethnicity:** People of Caucasian and Asian descent are at higher risk.
5. **Body Frame Size:** Smaller, thinner individuals have a higher risk

Modifiable Risk Factors

1. **Dietary Factors:**
   - **Low Calcium Intake**
   - **Vitamin D Deficiency**
   - **High Salt Intake**
   - **Caffeine and Alcohol Consumption**
2. **Lifestyle Factors:**
   - **Physical Inactivity:** Lack of weight-bearing and muscle-strengthening exercises can lead to weaker bones.
   - **Smoking:** Tobacco use contributes to weaker bones.
   - **Excessive Alcohol Consumption:** Alcohol can interfere with the balance of calcium in the body and affects bone formation.
3. **Hormonal Imbalances:**
   - Sex Hormones: Low estrogen levels in women and low testosterone levels in men can lead to osteoporosis.
   - Thyroid Problems: Excessive thyroid hormone can cause bone loss.

- Other Hormonal Conditions: Disorders of the adrenal glands or pituitary gland can impact bone health.

4. Medications:

- Corticosteroids: Long-term use of corticosteroid medications can lead to bone loss.
- Other Medications: Certain medications for cancer, epilepsy, and other conditions can increase the risk of osteoporosis.

5. Chronic Diseases:

- Rheumatoid Arthritis: Inflammatory conditions can affect bone health.
- Gastrointestinal Diseases: Conditions like celiac disease can affect nutrient absorption, impacting bone density.
- Kidney Disease: Chronic kidney disease can affect calcium and phosphate balance, leading to bone loss.

6. Low Body Weight:

Being underweight increases the risk of bone fractures and osteoporosis.

Osteoporotic vertebral fracture differential diagnosis

1. Osteoporotic Vertebral Fracture

Radiographic Features:

- Loss of vertebral height, typically affecting the anterior portion of the vertebral body (wedge-shaped deformity).
- Increased radiolucency due to loss of bone density.
- Preservation of the posterior vertebral body height.
- Possible presence of step-like cortical disruption.
- Often involves multiple levels, especially in the thoracolumbar spine.

2. Pathologic Fracture due to Metastasis or Primary Bone Tumor

Radiographic Features:

- Vertebral body collapse can be similar, but often associated with a more generalized or "moth-eaten" appearance due to bone destruction.
- Lesions may appear lytic (destructive) or blastic (sclerotic) or mixed on radiographs.
- Involvement of the posterior elements of the vertebra, which is less common in osteoporotic fractures.
- Associated soft tissue mass or paravertebral mass may be seen.
- Multiple lesions with variable appearances across different vertebral levels.

3. Multiple Myeloma

Radiographic Features:

- Diffuse osteopenia (generalized bone loss) is common.
- "Punched-out" lytic lesions without sclerotic borders.
- Vertebral body collapse can be present but tends to be more uniform rather than wedge-shaped.
- Skull radiographs may show characteristic "raindrop" skull with multiple lytic lesions.
- Absence of significant periosteal reaction.

4. Infectious Spondylitis (Osteomyelitis/Discitis)

Radiographic Features:

- Destruction of adjacent vertebral bodies and intervertebral disc space narrowing.
- Often involves the anterior corners of vertebral bodies initially.
- Endplate irregularities and erosion.
- Paravertebral soft tissue mass or abscess formation can be seen.

MRI: Increased signal on MRI T2-weighted images and enhancement after gadolinium administration.

5. Traumatic Vertebral Fracture

Radiographic Features:

- Similar appearance to osteoporotic fractures but typically occur in younger patients with a history of significant trauma.
- Often involves more substantial disruption of the vertebral body and posterior elements.
- Acute fractures show sharp cortical margins, bone fragments, and potentially associated soft tissue injury.
- May be associated with other traumatic injuries, such as rib fractures.

6. Spondylitis Ankylopoietica (Ankylosing Spondylitis)

Radiographic Features:

- Vertebral fractures in the setting of ankylosing spondylitis (carrot-stick fractures) often involve the cervical spine.
- Syndesmophytes (bridging bony growths between vertebrae) and bamboo spine appearance due to fusion of the vertebral bodies.
- Fractures can occur with minor trauma due to the rigid and brittle nature of the fused spine.

MRI: may show inflammation and fat signal changes at the fracture site.

7. Paget's Disease of Bone

Radiographic Features:

- Enlarged and deformed vertebral bodies with cortical thickening.
- Mixed lytic and sclerotic patterns within the same vertebral body.
- "Picture frame" vertebrae appearance due to thickened cortical margins.
- Bowing deformities in long bones and pelvis may be present.
- Bone scans typically show increased uptake in affected areas.

Question - 2

a) Describe the anatomy of the subarachnoid spaces. How will you investigate a case suspected of acute subarachnoid haemorrhage?

b) Describe in brief endovascular management of intra-cranial aneurysm.

Answer 2a.

The subarachnoid space is an anatomical feature of the central nervous system located between the arachnoid mater and the pia mater.

Structure and Boundaries

- Arachnoid Mater: The outer boundary of the subarachnoid space is formed by the arachnoid mater, a thin, web-like membrane that lies just beneath the dura mater.
- Pia Mater: The inner boundary is the pia mater, a delicate membrane that closely adheres to the surface of the brain and spinal cord, following their contours.

Contents

- Cerebrospinal Fluid (CSF): The subarachnoid space is filled with CSF, which cushions the brain and spinal cord, provides buoyancy, and helps maintain homeostasis by removing waste products.
- Blood Vessels: Numerous blood vessels, including arteries and veins, traverse the subarachnoid space, supplying the brain and spinal cord with oxygen and nutrients.
- Arachnoid Trabeculae: These are thin strands of connective tissue that extend from the arachnoid mater to the pia mater, giving the space a spongy, web-like appearance and helping to stabilize the brain within the cranial cavity.

Enlargements

- **Cisterns:** In certain areas, the subarachnoid space widens to form cisterns, which are larger pockets of CSF. Some notable cisterns include:
  - **Cisterna Magna (Cerebellomedullary Cistern):** Located between the cerebellum and the dorsal surface of the medulla oblongata.
  - **Pontine Cistern:** Situated anterior to the pons.
  - **Interpeduncular Cistern:** Located between the cerebral peduncles at the base of the brain.
  - **Lumbar Cistern:** Found in the lower part of the spinal canal, it is the site where lumbar punctures (spinal taps) are often performed to collect CSF samples.

Suspected case of acute subarachnoid haemorrhage

Initial Clinical Evaluation

1. History and Symptoms:

- Headache: Sudden, severe headache often described as "the worst headache of my life."
- Neurological Symptoms: Nausea, vomiting, photophobia, neck stiffness, and altered mental status.
- Risk Factors: History of hypertension, smoking, family history of aneurysms, or previous SAH.

2. Physical Examination:

- Vital Signs: Check for hypertension and signs of increased intracranial pressure.
- Neurological Exam: Assess for focal neurological deficits, nuchal rigidity, altered consciousness, and signs of meningeal irritation (e.g., Brudzinski's sign, Kernig's sign).

Diagnostic Tests

1. Non-Contrast Computed Tomography (CT) Scan:

- **Purpose:** The initial test of choice to detect acute bleeding in the subarachnoid space.
- **Timing:** Best performed within the first 6-12 hours of symptom onset for highest sensitivity.

2. **Lumbar Puncture (LP):**
   - **Indication:** If the CT scan is negative but clinical suspicion remains high.
   - **Findings:** Presence of xanthochromia (yellowish CSF due to bilirubin from broken-down red blood cells) and elevated red blood cell count in the CSF.
   - **Timing:** Perform after 12 hours from symptom onset for xanthochromia to develop.
3. **Magnetic Resonance Imaging (MRI) and Magnetic Resonance Angiography (MRA):**
   - **Use:** MRI can detect smaller bleeds not seen on CT. MRA is useful for identifying aneurysms and vascular malformations.
   - **Alternative:** When CT is inconclusive or if there is a contraindication to CT.
4. **Digital Subtraction Angiography (DSA):**
   - **Gold Standard:** For identifying and characterizing cerebral aneurysms or arteriovenous malformations.
   - **Use:** Often performed if a vascular lesion is suspected on non-invasive imaging.

Endovascular Management of Intracranial Aneurysm

- Endovascular therapy involves navigating through the vascular system to treat aneurysms from within the blood vessels, using catheters and specialized devices.
- The goal is to isolate the aneurysm from normal blood circulation, thereby preventing rupture or rebleeding.

Procedures:

1. **Endovascular Coiling:**
   - **Indication:** Primarily used for saccular (berry) aneurysms.
   - **Procedure:**
     - **Access:** Typically, through the femoral artery using a catheter.
     - **Navigation:** The catheter is guided through the arterial system to the site of the aneurysm under fluoroscopic guidance.
     - **Deployment:** Platinum coils are introduced into the aneurysm sac through the catheter. These coils induce thrombosis within the aneurysm, effectively sealing it off from the parent artery.
2. **Stent-Assisted Coiling:**
   - **Indication:** Used for wide-necked aneurysms that are difficult to treat with coiling alone.
   - **Procedure:**
     - **Stent Placement:** A stent is deployed across the neck of the aneurysm, providing a scaffold that helps retain coils within the aneurysm sac.
     - Coiling: Coils are then deployed through the stent into the aneurysm.
3. **Flow Diversion:**
   - **Indication:** Suitable for large or giant aneurysms, particularly those that are difficult to coil or have broad necks.
   - **Procedure:**
     - Flow Diverter Stent: A flow-diverting stent (e.g., Pipeline Embolization Device) is placed across the aneurysm neck. The stent has a fine mesh that redirects blood flow away from the aneurysm, promoting thrombosis within the aneurysm and eventually leading to its occlusion.

4. Balloon-Assisted Coiling:

- **Indication:** Similar to stent-assisted coiling, used for wide-necked aneurysms.
- **Procedure:**
  - **Balloon Placement:** A temporary balloon is inflated within the parent artery across the aneurysm neck.
  - **Coiling:** Coils are introduced into the aneurysm while the balloon provides support to prevent coil prolapse into the parent artery.
  - **Balloon Deflation:** The balloon is deflated and removed after coil placement.

Imaging Guidance

- **Fluoroscopy:** Continuous X-ray imaging is used to guide the catheter and devices to the aneurysm site.
- **Digital Subtraction Angiography (DSA):** Provides detailed images of blood vessels, allowing precise visualization of the aneurysm and the placement of coils or stents.

Question - 3

Discuss the techniques, imaging features & limitations of sonographic evaluation of the rotator cuff?

Answer 3.

Scanning Protocol	Supplementary	Positioning
Long head of biceps tendon –short and long axis		Hand resting and elbow flexed to 900. Sliding the probe distally demonstrates the tendon down to its myotendinous junction.
Subsoapularis long and short-axis	Bices tendon subluxation/ dislocation	Patient extremely rotates the arm with the elbow flexed 900. The subscapularis can be seen emerging inferior to the coracoid process and inserting on the lesser tuberosity
Supraspinatus –long-and short axis	Rotator interval	Patients are asked to put the palm of their hand on the back pocket, which abducts and internally rotates the shoulder and the supraspinatus tendon is assessed in long and short-axis. The injection in to the subacromial subdeltoid bursa can be performed in this position
Infraspinatous –long -axis	Posterior joint space, spinoglenoid notch	Examined from behind the shoulder with the arm in neutral position or across the front of the chest. This is a good position to look at the posterior joint space and aspirate or inject into the joint
Acromioclavicular joint	Dynamic abduction for impingement	Assessed in the coronal plane with the arm in neutral position (hand on thigh). Dynamic abduction to assess for impingement can be done from a similar position and moving the transducer over the lateral edge of the acromion

Normal Sonographic Appearance:

1. Supraspinatus Tendon:

- **Longitudinal View:** Appears as a uniform, hyperechoic (bright) band with a fibrillar pattern extending from the humeral head to the acromion.
- **Transverse View:** Displays a hyperechoic structure over the greater tuberosity, maintaining a homogenous echotexture.

2. Infraspinatus Tendon:

- Seen posterior to the supraspinatus, it should also appear as a hyperechoic, fibrillar structure.

3. **Subscapularis Tendon:**
   - Evaluated in the longitudinal plane with the arm in external rotation, it appears as a hyperechoic structure running horizontally.
4. **Biceps Tendon:**
   - Visualized within the bicipital groove, appearing as a hyperechoic oval structure in transverse view.

Pathologic Findings:

1. **Tendinosis:**
   - **Appearance:** The tendon appears thickened with areas of hypoechogenicity (dark regions) and loss of the normal fibrillar pattern.
   - **Calcific Tendinosis:** Hyperechoic foci with possible shadowing indicating calcification within the tendon.
2. **Partial-Thickness Tears:**
   - **Bursal-Sided Tear:** Hypoechoic or anechoic defect seen on the superficial side of the tendon near the subacromial-subdeltoid bursa.
   - **Articular-Sided Tear:** Hypoechoic or anechoic defect seen on the deep side of the tendon near the humeral head.
   - **Intra-tendinous Tear:** Hypoechoic clefts within the tendon substance.
3. **Full-Thickness Tears:**
   - **Appearance:** A complete hypoechoic or anechoic defect spanning from the bursal to the articular surface of the tendon. The tendon edges may be retracted with the gap filled by fluid.
   - **Dynamic Evaluation:** The tear may be more evident with dynamic maneuvers like arm rotation, showing gapping of the tendon edges.
4. **Muscle Atrophy and Fatty Infiltration:**
   - **Appearance:** Muscle belly appears smaller with increased echogenicity, and loss of the normal muscle architecture indicates fatty infiltration.
5. **Biceps Tendon Pathology:**
   - **Dislocation/Subluxation:** The biceps tendon appears out of the bicipital groove.
   - **Tendinosis:** Thickened tendon with loss of the normal fibrillar pattern.
   - **Tear:** Discontinuity in the tendon with hypoechoic or anechoic defects.

Subacromial-Subdeltoid Bursa:

- **Normal:** Should be a thin, anechoic structure.
- **Bursitis:** Thickened with increased fluid and possible internal echoes indicating inflammation.

Dynamic Assessment:

- **Subacromial Impingement:** Evaluated by having the patient perform maneuvers like abduction; the supraspinatus tendon may show compression against the acromion.

Additional Considerations:

- **Transducer Position and Maneuvering**
- **Comparison with Contralateral Side:** Comparing findings with the opposite shoulder can help differentiate pathological findings from anatomical variations.

Limitations

1. **Operator Dependency:** The accuracy is highly dependent on the skill and experience of the operator.
2. **Limited Field of View:** Can make it difficult to visualize the entire extent of large or complex rotator cuff tears.
3. **Bone Shadowing:** Can obscure parts of the rotator cuff, making it difficult to assess the tendons and adjacent structures completely.
4. **Obesity**: Excessive adipose tissue can reduce the quality of the ultrasound images, making it harder to visualize the rotator cuff.
5. **Partial-Thickness Tears**: It can be challenging to differentiate between partial-thickness tears and tendinopathy or tendinosis, leading to potential misdiagnosis.
6. **Limited Ability to Evaluate Intra-articular Structures**: Ultrasound is less effective in visualizing intra-articular structures like the labrum or the articular cartilage, which are better assessed with MRI or arthroscopy.
7. **Artifacts**: Ultrasound images can be affected by artifacts such as anisotropy, which can mimic or obscure pathology, leading to false-positive or false-negative results.
8. **Calcifications**: Small calcifications within the tendon may be difficult to detect, which can be an important finding in certain pathologies.
9. **Concurrent Pathologies**: The presence of other shoulder pathologies, such as arthritis or bursal thickening, can complicate the interpretation of the ultrasound findings related to the rotator cuff.
10. **Dynamic Range**: Ultrasound may have a limited dynamic range for assessing tissue contrast compared to MRI, which can make it harder to distinguish between different tissue types and subtle changes.

Question - 4

Enumerate causes of hypertrophic osteoarthropathy. Describe its imaging findings on plain radiograph and discuss the differential diagnosis.

Answer 4.

- Causes of Hypertrphic Osteoarthropathy

Pulmonary Causes

1. **Primary lung cancer (especially non-small cell lung cancer)**
2. **Metastatic lung disease**
3. **Chronic pulmonary infections**
   - Tuberculosis
   - Bronchiectasis
   - Lung abscess
   - Cystic fibrosis
4. **Interstitial lung diseases**
   - Idiopathic pulmonary fibrosis
5. **Pulmonary vascular diseases**
   - Pulmonary arteriovenous malformations

Cardiovascular Causes

1. **Cyanotic congenital heart disease**
   - Tetralogy of Fallot
   - Transposition of the great arteries
2. **Bacterial endocarditis**
3. **Atrial myxoma**

Gastrointestinal Causes

1. **Chronic liver disease**
   - Cirrhosis
2. **Inflammatory bowel disease**
   - Crohn's disease
   - Ulcerative colitis
3. **Malabsorption syndromes**
   - Celiac disease

Miscellaneous Causes

1. **Thyroid acropachy**
2. **Familial (primary hypertrophic osteoarthropathy)**
   - Pachydermoperiostosis
3. **Neoplastic syndromes**
   - Thymoma
4. **Other systemic diseases**
   - Sarcoidosis

Idiopathic Causes

- Sometimes, HOA can occur without an identifiable underlying condition, and it is termed as idiopathic hypertrophic osteoarthropathy.

Radiographic features of hypertrophic osteoarthropathy:

1. **Periosteal Reaction:**
   - The most characteristic finding is periosteal new bone formation along the shafts of the long bones, typically seen as layered or lamellar periosteal reactions.
   - The periosteal reaction is usually symmetric and involves the diaphyses and metaphyses of the long bones, such as the tibia, fibula, radius, ulna, and femur.
2. **Soft Tissue Swelling:**
   - Soft tissue swelling may be noted, particularly around the distal extremities, such as the hands and feet.
   - This is often associated with clubbing of the fingers and toes.

3. Joint Effusion:

- Joint effusions may be present, contributing to the overall picture of joint involvement and pain.

4. Subperiosteal Bone Formation:

- In chronic cases, subperiosteal bone formation can become thick and more prominent, leading to cortical thickening.

5. Symmetric Changes:

- The changes are typically bilateral and symmetric, reflecting the systemic nature of the disease.

6. Absence of Bone Destruction:

- Unlike some other arthritic conditions, HOA does not typically feature bone erosions or destructive changes to the bone.

Differential diagnosis

1. Primary Hypertrophic Osteoarthropathy (Pachydermoperiostosis):

- This is a rare hereditary condition.
- Characterized by skin thickening (pachydermia), digital clubbing, and periostitis.
- Typically, it presents in adolescence or early adulthood.
- Radiologically, there is symmetrical periostitis without an associated underlying systemic disease.

2. Acromegaly:

- Overproduction of growth hormone leading to enlarged bones and soft tissues.
- Radiological features include thickened heel pads, widened joint spaces, and periosteal reaction similar to HOA.
- Unlike HOA, acromegaly often presents with other distinctive features such as frontal bossing, enlarged sella tursica, and increased size of hands and feet.

3. Venous Stasis:

- Chronic venous insufficiency can cause periostitis and changes in the soft tissues similar to HOA.
- Often associated with varicose veins, skin changes, and ulcers.

4. Hypervitaminosis A:

- Excessive intake of vitamin A can lead to periostitis, hyperostosis, and soft tissue swelling.
- Radiological changes may resemble HOA, but clinical history helps differentiate.

5. Chronic Osteomyelitis:

- Chronic infection of the bone can lead to periosteal new bone formation.
- Radiographs show irregular periostitis, sequestra, and involucrum, unlike the smooth periosteal reaction in HOA.

6. Thyroid Acropachy:

- A rare complication of Graves' disease.
- Presents with periostitis, particularly of the hands and feet, and soft tissue swelling.
- Usually seen in conjunction with other signs of hyperthyroidism.

7. Hypertrophic Pulmonary Osteoarthropathy (HPOA):

- Subtype of secondary HOA specifically associated with lung diseases.
- Radiologically indistinguishable from other forms of secondary HOA but associated with underlying pulmonary pathology.

Question - 5

Enumerate the various types of osteosarcoma. Discuss conventional radiographic features of the most common form. What is the role of MRI in its evaluation?

Answer 5.

Types of Osteosarcoma

- Primary osteosarcoma
- Intramedullary/central
  - Conventional osteosarcoma: most common (75-80%)
    - Osteoblastic
    - Chondroblastic
    - Fibroblastic
  - Low grade central osteosarcoma
  - Telangiectatic ostrosarcoma
  - Small cell osteosarcoma
- **Surface**
  - Parosteal osteosarcoma
  - Periosteal osteosarcoma
  - High grade surface osteosarcoma
- **Secondary osteosarcoma**

Radiographic Features of Conventional Osteosarcoma

1. Bone Destruction and New Bone Formation

- **Mixed Osteolytic and Osteoblastic Lesions:** Osteosarcomas often exhibit a mixed pattern of bone destruction (osteolytic) and new bone formation (osteoblastic).
- **Sclerotic Lesions:** In osteoblastic osteosarcoma, the lesion may appear as a densely sclerotic mass.

2. Cortical Involvement

- **Cortical Destruction:** There is often destruction of the cortex of the bone with extension into the surrounding soft tissues.
- **Permeative Pattern:** This pattern of cortical destruction with irregular margins and poorly defined borders is indicative of aggressive tumor growth.

3. Periosteal Reaction

- **Spiculated Periosteal Reaction:** The tumor induces a reactive process in the periosteum, resulting in a spiculated appearance on radiographs.
- **Sunburst Pattern:** A characteristic feature due to the aggressive periosteal reaction and the perpendicular growth of osteoid.
- **Codman's Triangle:** A periosteal reaction where the elevated periosteum forms an angle with the bone, indicative of an aggressive process.

- **Lamellated Periosteal Reaction**: Sometimes, a layered (onion-skin) periosteal reaction can be seen.

4. Soft Tissue Extension

- **Soft Tissue Mass**: There is frequently a large soft tissue mass that extends beyond the confines of the bone, often seen without distinct margins.
- **Calcifications**: The soft tissue component may contain areas of calcification, reflecting osteoid production outside the bone.

5. Other Features

- **Involvement of Epiphysis**: In some cases, the tumor may extend to involve the epiphysis, although this is less common.
- **Pathologic Fractures**: Advanced lesions might lead to weakened bone structure, predisposing the bone to pathologic fractures.

Role of MRI In Evaluation of Osteosarcoma

1. **Local Staging:** Highly effective in assessing the local extent of the tumor This is critical for surgical planning.
2. **Bone Marrow Involvement:** Superior to other imaging modalities in evaluating bone marrow involvement. It helps in determining the intramedullary extent of the tumor, which is essential for accurate staging and treatment planning.
3. **Soft Tissue Involvement:** Can differentiate between tumor tissue and adjacent normal tissues, helping to define the extraosseous spread.
4. **Preoperative Planning:** Guides surgeons in planning limb-sparing surgeries by delineating tumor margins and assessing the proximity to vital structures.
5. **Response to Chemotherapy:** MRI is useful in evaluating the response of osteosarcoma to neoadjuvant chemotherapy. Changes in tumor size, signal characteristics, and necrosis are indicators of treatment efficacy.
6. **Postoperative Surveillance:** MRI is used in postoperative follow-up to monitor for local recurrence.
7. **Differentiation from Other Lesions:** MRI aids in distinguishing osteosarcoma from other bone lesions and benign bone tumors due to its high contrast resolution and ability to provide detailed images of bone and soft tissue.

Question - 6

Describe the imaging features of juvenile nasopharyngeal angiofibroma. Discuss the role of radiological intervention in its management.

Answer 6.

Juvenile nasopharyngeal angiofibroma (JNA) is a rare, benign but locally aggressive vascular tumor that primarily affects adolescent males.

CT (Computed Tomography)

1. Location and Extent:

JNA typically originates in the sphenopalatine foramen, extending into the nasopharynx, nasal cavity, and possibly into the pterygopalatine fossa, infratemporal fossa, and orbit.

2. Bone Involvement:

- Bony remodeling and erosion are common, particularly of the posterior wall of the maxillary sinus, pterygoid plates, and the base of the skull.