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## **CT Scan of the Chest 09/4/24**

**Indication:** Follow-up evaluation for metastatic disease secondary to high-grade osteosarcoma.

**Technique:**

- CT imaging of the chest was performed without contrast due to concerns regarding renal function following chemotherapy.

**Findings:**

- **Lungs:**
  - A 1.5 cm rounded lesion in the left lower lobe, characterized by irregular margins and a spiculated appearance, suggestive of a metastatic deposit.
  - Several small nodules (up to 5 mm) in both lung fields, consistent with potential metastatic disease.
- **Mediastinum:**
  - No significant lymphadenopathy is noted in the mediastinal or hilar regions.
- **Pleura:**
  - No pleural effusion or thickening noted.

**Conclusion:**

- The findings are concerning for metastatic pulmonary lesions consistent with recurrent osteosarcoma. Further evaluation and correlation with clinical findings are recommended.

## **MRI of the Left Femur 9/4/24**

**Indication:** Follow-up for evaluation of the primary osteosarcoma site following initial treatment and surgical resection.

**Technique:**

- MRI of the left femur was performed using T1-weighted, T2-weighted, and STIR sequences.

## **Findings:**

- **Distal Femur:**
  - There is evidence of a new, irregular mass at the site of the previous osteosarcoma resection, measuring approximately 4.0 cm in greatest dimension.
  - The mass exhibits heterogeneous signal intensity, with hyperintense areas on T2-weighted images indicating edema and potential necrosis.
  - The tumor appears to extend into the surrounding soft tissues, with irregular margins and associated edema in the adjacent musculature.
- **Bone Edema:**
  - Extensive bone marrow edema surrounding the lesion is noted, indicating possible local recurrence.
- **Soft Tissues:**
  - Thickening of the surrounding soft tissues is observed, consistent with a desmoplastic reaction.
- **No New Bone Lesions:**
  - No new suspicious lesions are identified in the proximal femur or surrounding structures.

## **Conclusion:**

- The imaging findings suggest a recurrence of the osteosarcoma at the distal femur site with aggressive local behavior. This is concerning for failure of initial treatment and may warrant further intervention.

## **X-ray Findings 3/1/24:**

- **Views Obtained:** Anteroposterior (AP) and lateral views of the left knee.
- **Impression:**
  - There is an aggressive-appearing, lytic bone lesion in the distal femur, approximately 5 cm in greatest dimension.
  - The lesion is characterized by cortical destruction and a soft tissue mass extending into the adjacent knee joint.
  - There is associated periosteal reaction noted, with a "sunburst" pattern indicative of aggressive bone formation.
  - No significant joint effusion is seen, but the surrounding soft tissues are thickened.
  - No evidence of metastatic disease in the surrounding bones or soft tissues is noted at this time.

## **MRI Findings 3/2/24:**

- **Sequence:** T1-weighted, T2-weighted, and STIR sequences were obtained.
- **Impression:**
  - The MRI confirms the presence of a large, heterogeneous mass in the distal femur, measuring approximately 5.5 cm x 6.2 cm.
  - The mass demonstrates mixed signal intensity with areas of high signal on T2-weighted images and low signal on T1-weighted images, consistent with fluid and necrotic tissue.
  - The tumor extends into the surrounding soft tissue and exhibits infiltrative margins, with evidence of local muscle invasion.
  - No significant bone marrow edema is observed in the adjacent femoral head or tibia.
  - No evidence of lymphadenopathy or distant metastatic lesions is identified within the imaged regions.

**Conclusion:** The imaging findings suggest a high-grade bone tumor, likely osteosarcoma, characterized by aggressive local invasion and soft tissue extension. Further evaluation via biopsy is warranted to confirm the diagnosis.

## **PATHOLOGY REPORT 3/3/24**

- **Date of Biopsy:** March 3, 2024
- **Type of Biopsy:** Core needle biopsy of the distal femur

### **Specimen Description:**

- Multiple core biopsy samples were obtained from the distal femur lesion.

### **Gross Description:**

- The specimens are received in formalin, consisting of multiple fragments of soft tissue, measuring up to 2.0 cm in greatest dimension. The tissue is gray-tan, firm, and shows areas of necrosis.

### **Microscopic Description:**

- Histological examination reveals a highly cellular neoplasm composed of pleomorphic spindle cells and irregular, hyperchromatic nuclei.

- The tumor exhibits significant nuclear atypia and a high mitotic index, with numerous atypical mitotic figures present.
- Areas of osteoid production are identified, indicating the osteoblastic differentiation of tumor cells.
- Focal necrosis is present within the tumor, and the surrounding stroma shows a desmoplastic reaction.
- Immunohistochemical staining shows positivity for:
  - **Osteocalcin** (indicating osteoblastic differentiation)
  - **Vimentin**
  - **Ki-67** (high proliferation index, approximately 40%)

**Diagnosis:**

- The histological features are consistent with high-grade osteosarcoma.

**Conclusion:** The biopsy confirms the diagnosis of high-grade osteosarcoma of the distal femur. The aggressive nature of the tumor, along with the imaging findings, warrants prompt initiation of a comprehensive treatment plan, including chemotherapy and surgical resection.