Indiana Association of Pathologists
February 2016 Case of the Month

A 70 year-old female with a recurrent left pleural cyst
Contributed by: Dr. Kristen Partyka and Dr. Shaoxiong Chen

Clinical History:

The patient is a 70 year-old female with a past history significant for a heart transplant secondary to viral cardiomyopathy in 1999. She initially presented for percutaneous coronary intervention, and preoperative imaging showed an incidental left pleural cyst. It was described as a large cystic cavity with septations and solid components, measuring 16.6 x 13.6 cm. It seemed to arise from the mediastinum with the appearance of a bronchogenic cyst. The cyst was drained, cultures were negative, and cytology showed mixed inflammation.

Five months later, the patient presented with complaints of progressive shortness of breath and pain in her chest. CT imaging showed the complex cystic mass with an increased size and accumulation of fluid. A left thoracotomy was performed, and the cyst was found to be extensively adherent to the medial side of the lung, the pericardium, and the mediastinum. The lesion was only partially resected, and the cyst wall was sent to Pathology.

Gross Examination:

The specimen consisted of an aggregate of irregular, ragged, gray-tan to red-brown, focally hemorrhagic and focally cauterized fibrous tissue, having dimensions of 9 x 8 x 3 cm. It was serially sectioned to reveal a gray-yellow to red-brown densely fibrous to somewhat fatty cut surface. There was also some hemorrhage, degeneration, and suspicious granularity present.

Microscopic Examination and Immunohistochemistry:

Microscopic examination shows atypical cells with marked nuclear enlargement, hyperchromatism, and irregular nuclear contours (Fig. 1 and 2). Dense, pink, lace-like intercellular osteoid is present (Fig. 1 and 2). Bone formation is also noticed.

SMA and CD31 showed focal patchy positive staining. AE1/AE3 highlighted rare scattered positive staining cells. S100, desmin, CK7, ERG, CD34, Fli-1, and CD117 were negative in the tumor cells.

Fig 1 and 2: The lesion is hypercellular with marked nuclear atypia and osteoid deposition;
Fig. 3: Bone formation.

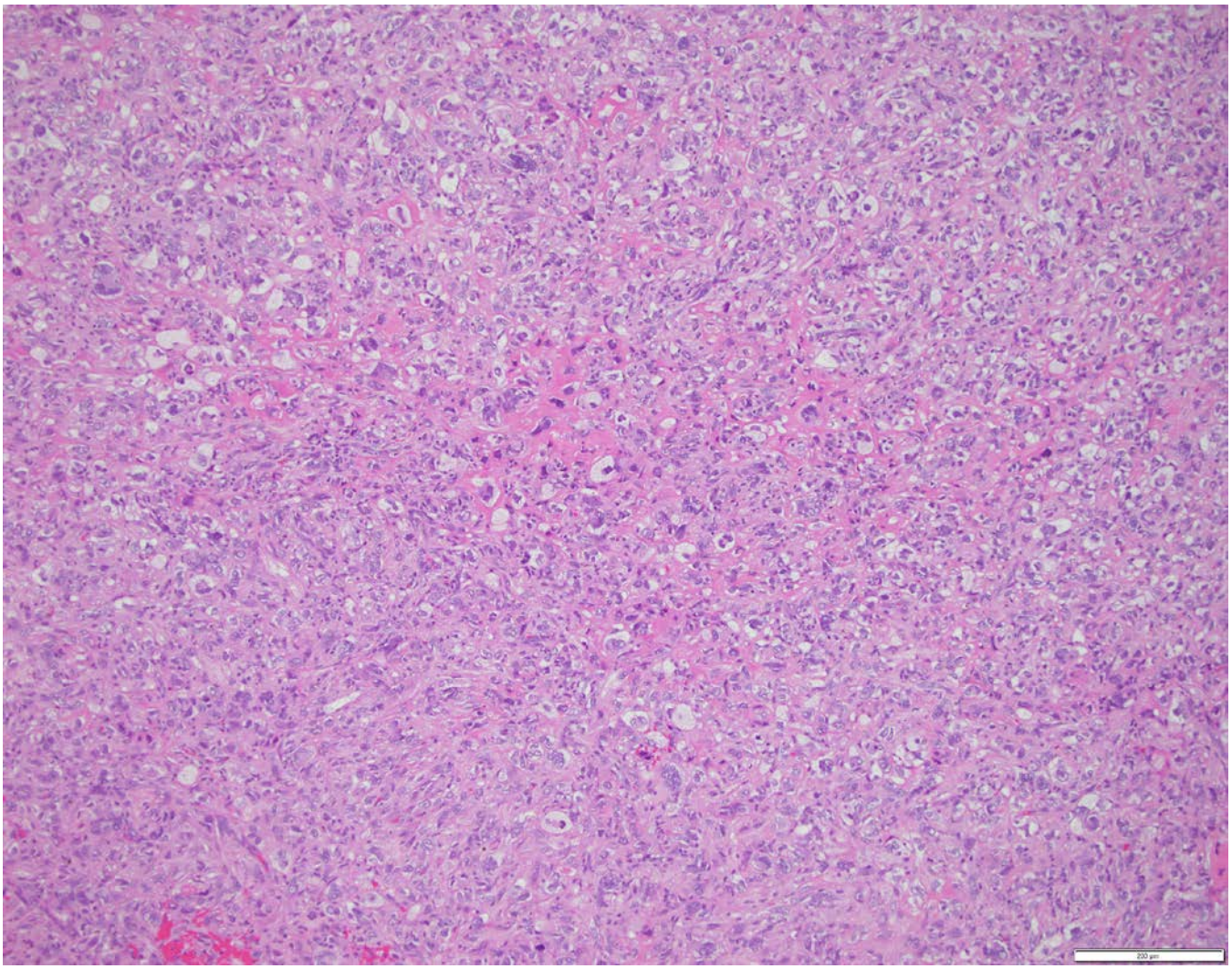

Fig.1

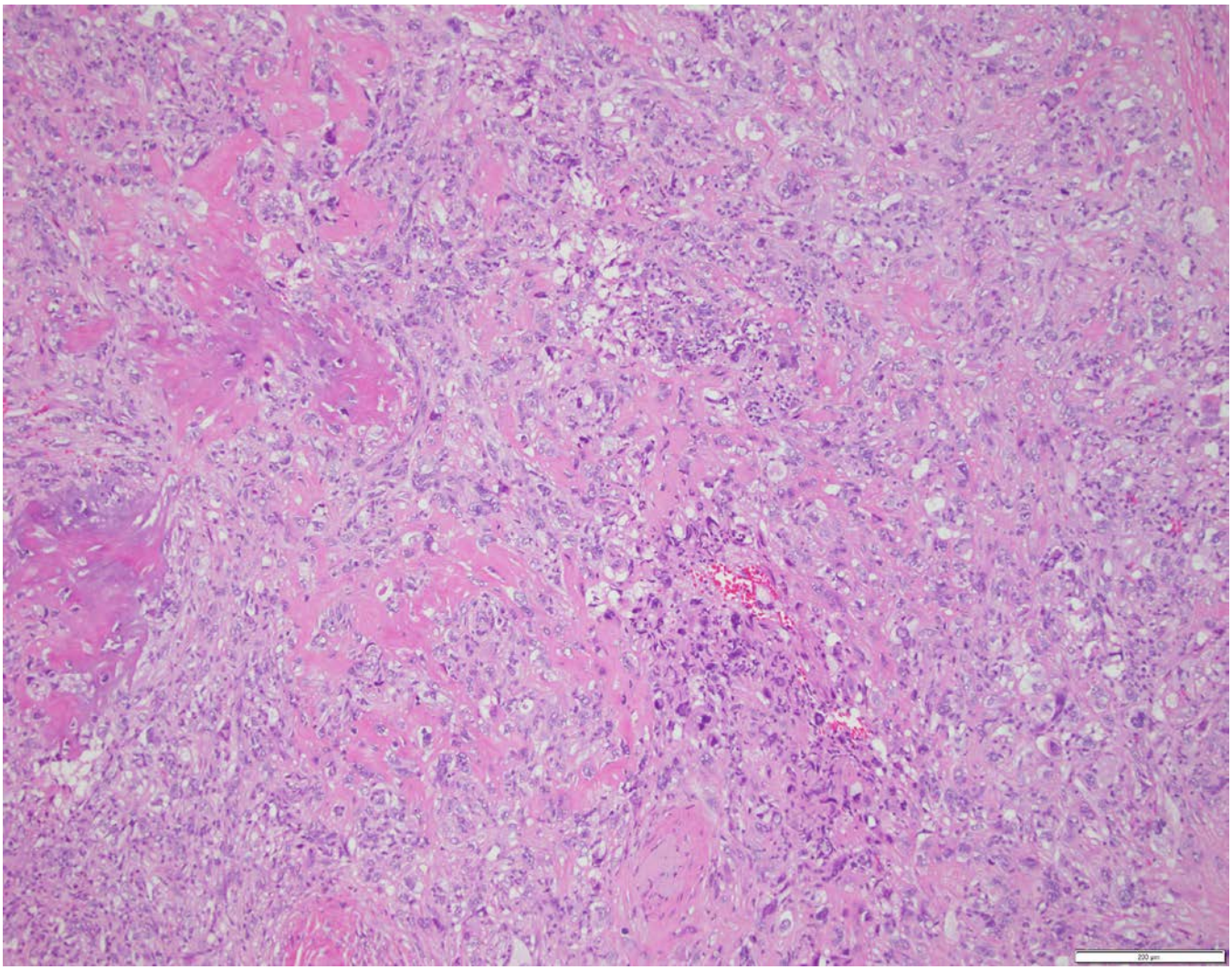
Fig.2

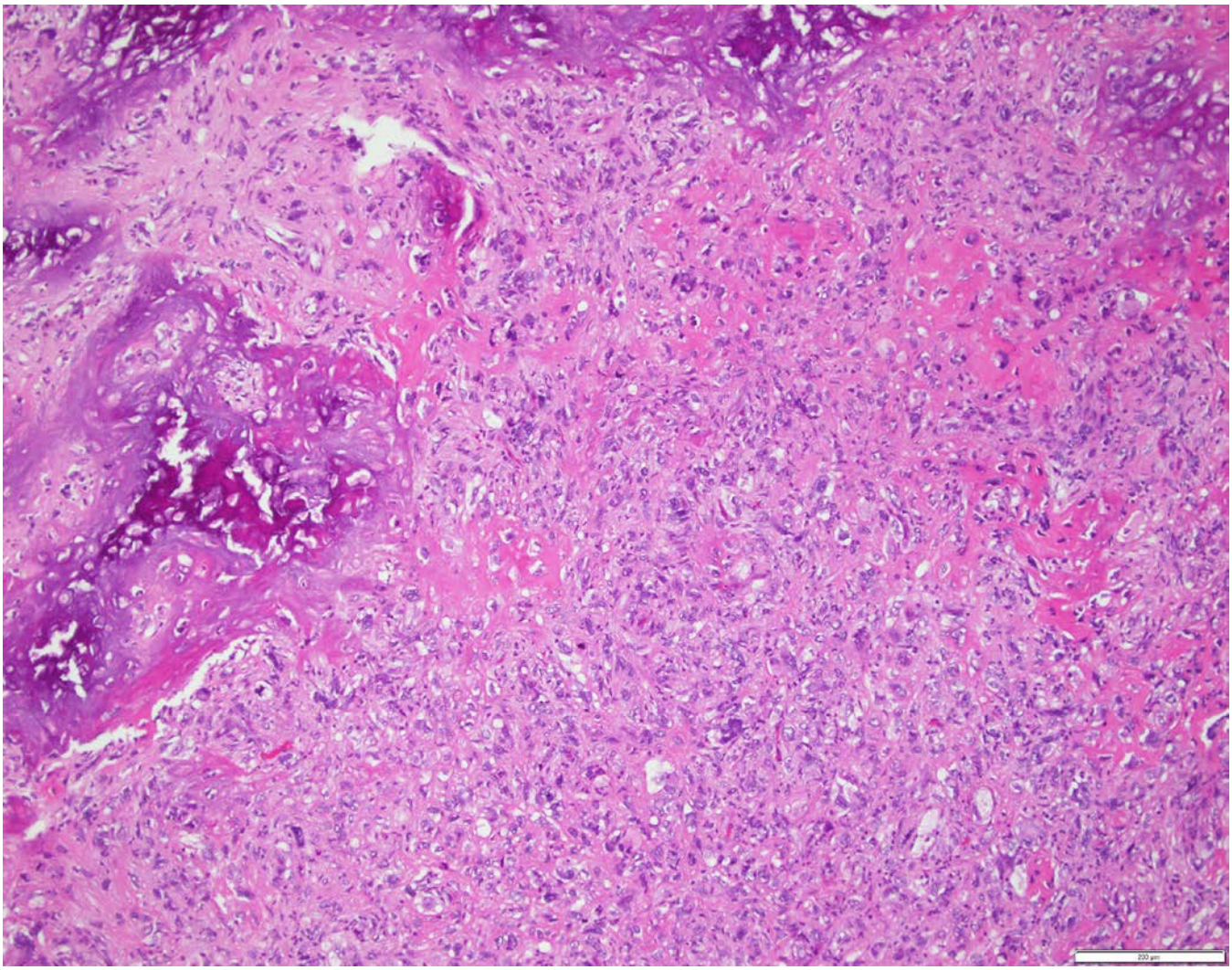
Fig.3

Final Diagnosis:

Extraskeletal Osteosarcoma, High-grade

Discussion:

Extraskeletal osteosarcoma is a rare malignant mesenchymal neoplasm in the soft tissue. By definition, the tumor is composed of neoplastic cells that synthesize bone, but it has no attachment to the skeleton. Some cases also show deposition of cartilaginous and fibroblastic elements. Extraskeletal osteosarcoma accounts for 1-2% of soft tissue sarcomas and 2-4% of all osteosarcomas. It typically presents in mid to late adulthood, and most patients are in the age range of 50-70. It has shown a slight male predominance with a M:F ratio of approximately 2:1. The majority of tumors are found in the deep soft tissues, and fewer than 10% are superficial in the dermis or subcutis. Rare reports describe the neoplasm arising within the mesentery, mediastinum, omentum, and esophagus.

Signs and symptoms are nonspecific. Patients generally present with a progressively enlarging soft tissue mass, and these symptoms vary from a few weeks to many years. The mass has been reported to cause pain in about one-third of patients. Conventional imaging with radiographs, CT, or MRI demonstrates a large deep-seated soft

tissue mass with variable calcifications and mineralization. The most common location for extraskeletal osteosarcoma is the thigh, accounting for half of reported cases. The majority of cases occur de novo, but some have been associated with previous radiation or trauma to the area.

On gross inspection, tumors can range in size with an average of 8 to 10 cm in greatest dimension. They are well circumscribed, tan-white to hemorrhagic masses with a focally necrotic and gritty cut surface. They are generally firm on palpation, but they can present as a soft or multi-cystic mass. Microscopically, the tumor shows formation of osteoid and bone. The neoplastic cells are pleomorphic and spindled to polyhedral in appearance. Mitotic activity is high, and atypical mitoses can be identified.

Each of the major subtypes of osteosarcoma of the bone can also be seen with this entity. Osteoblastic osteosarcoma is the most common variant identified. It is characterized as a very cellular lesion composed of highly pleomorphic, mitotically active round to spindle cells. Other variants include fibroblastic, chondroid, telangiectatic, small cell, and well differentiated. The common element with these variants is the deposition of neoplastic bone in a lacy, trabecular, or sheet-like pattern. There is usually prominent deposition of the bone in the center of the tumor, and the proliferation of atypical spindle cells is seen at the periphery. This has been described as a reverse zoning phenomenon.

Differential diagnosis includes myositis ossificans and other sarcomas with metaplastic bone, including undifferentiated pleomorphic sarcoma, synovial sarcoma, and fibrosarcoma. Extraskeletal osteosarcomas are positive for vimentin, and they show variability in staining with other immunohistochemical markers. It has been reported that 68% express smooth muscle actin, 25% desmin, 20% S100, 52% EMA, and 8% keratin. Also, there has been interest in using antibodies to osteocalcin with expression in the malignant cells in 82% of cases and in the matrix in 75% of cases.

Features thought to be associated with a better prognosis include small tumor size (<5 cm), fibroblastic and chondroblastic variants, and diminished proliferative activity with Ki-67 index. However, extraskeletal osteosarcoma has a very poor prognosis, and most patients die of the disease within 2 to 3 years of the diagnosis.

References:

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