# Rad-path Conference

## Expansile Rib Lesions

## 9.24.12

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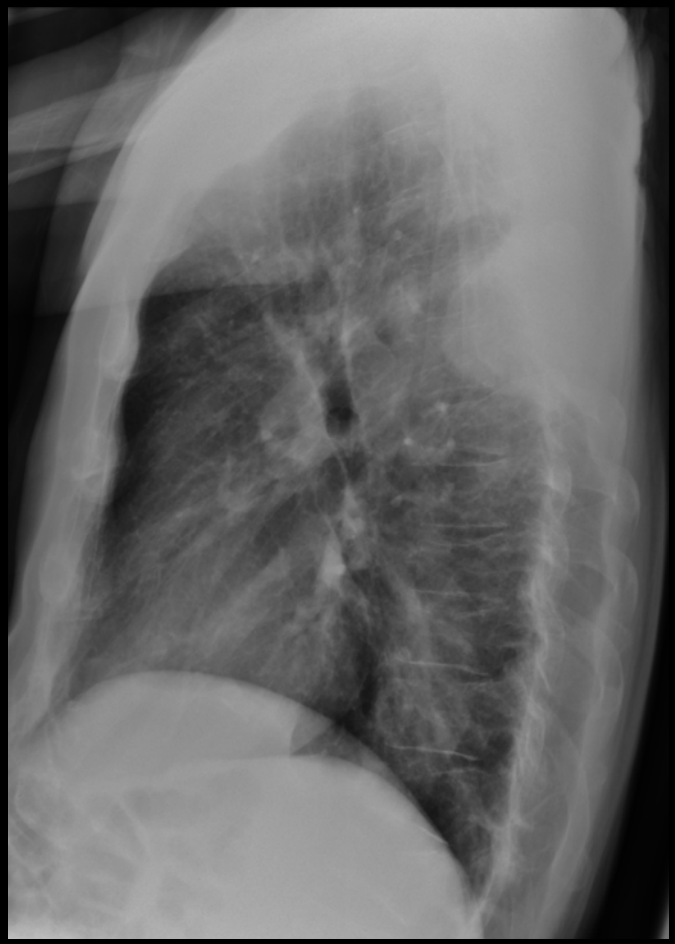
# Case 1

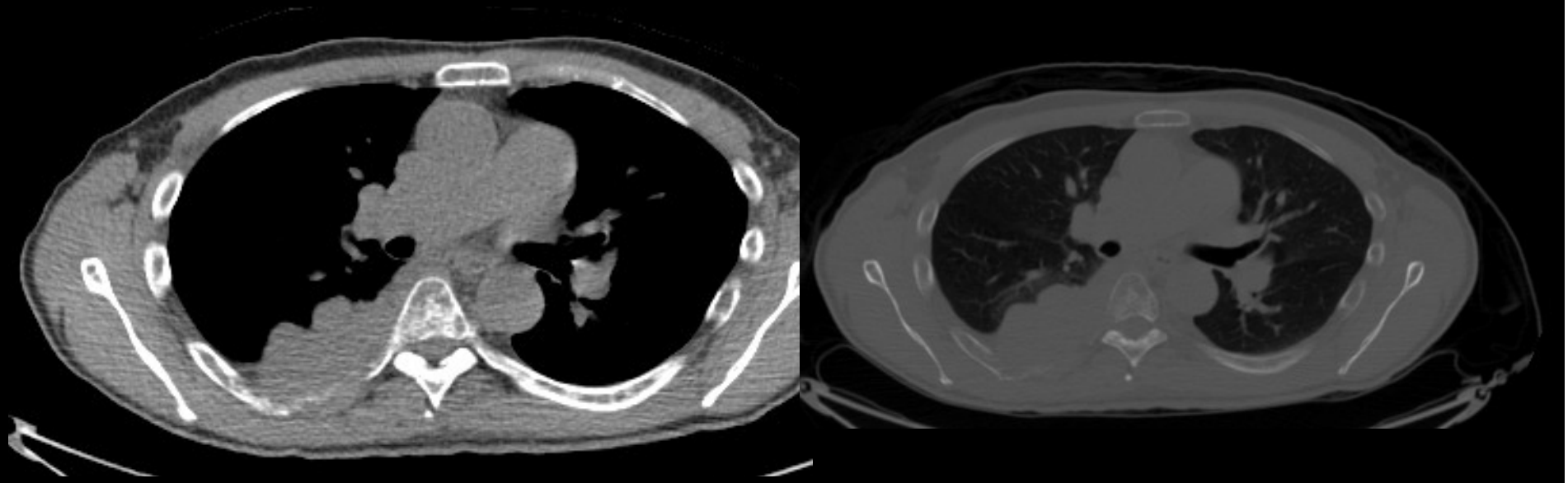
50 year-old-male with a history of chronic back pain with recent progressive worsening, hoarseness, and anorexia leading to unintentional 15-lb. weight loss.

# Case 1

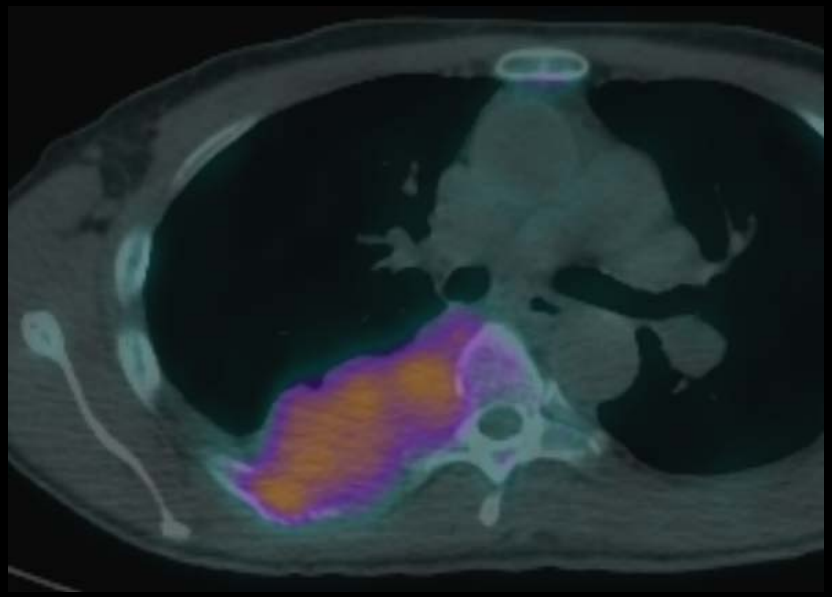
# Case 1



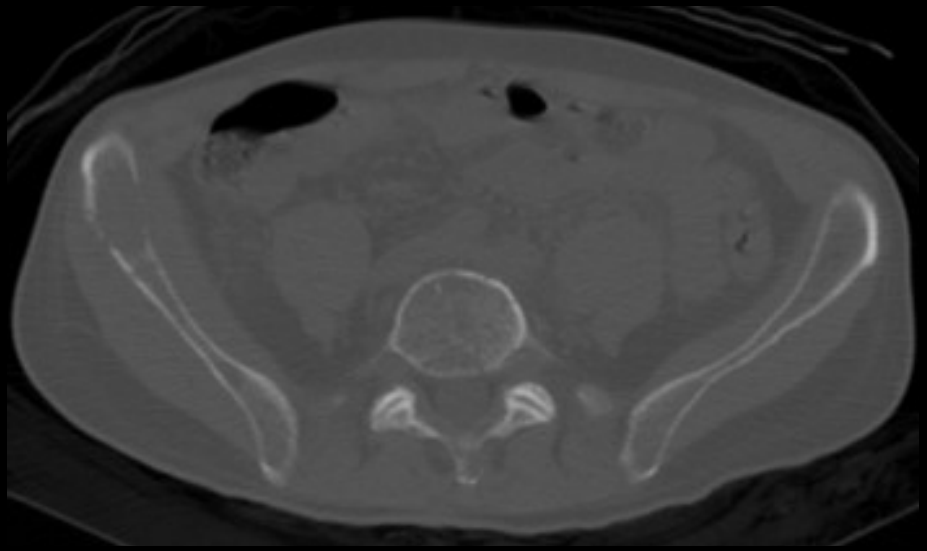
# Case 1

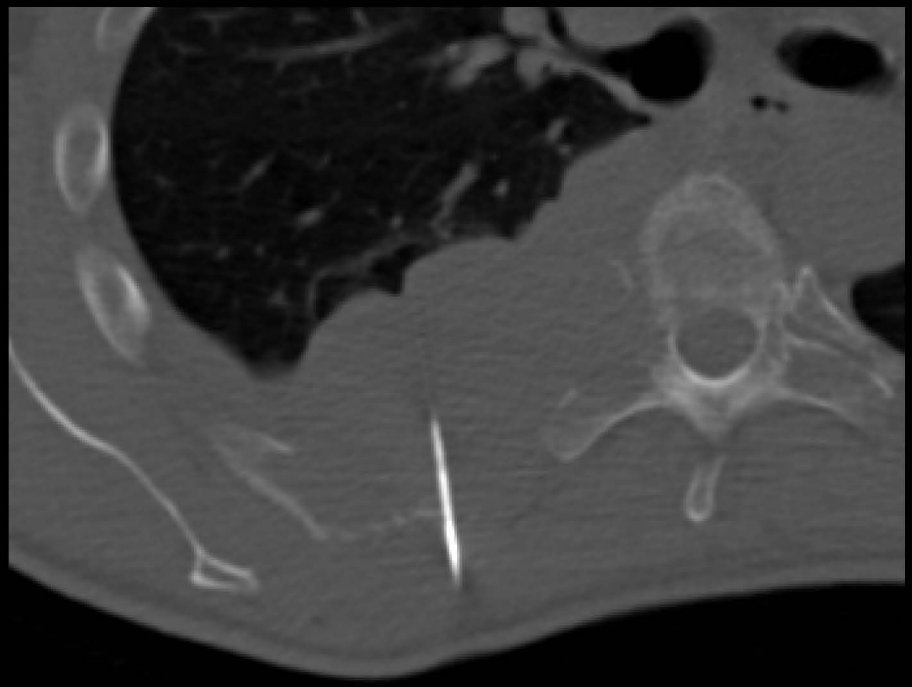


# Case 1



# Case 1





# Summary of Findings

- CXR
- CT
- PET-CT

# Case 1 Differential Diagnosis

- Multiple myeloma
- Metastatic disease
- Lymphoma
- Primary lung carcinoma
- Desmoid tumor

# Appropriateness Criteria

## Low back pain: suspicion of cancer

**Clinical Condition:** **Low Back Pain**

**Variant 3:** **Patient with one or more of the following: suspicion of cancer, infection, and/or immunosuppression.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| MRI lumbar spine without and with contrast | 8 | Contrast useful for neoplasia subjects suspected of epidural or intraspinal disease. See statement regarding contrast in text under "Anticipated Exceptions." | O |
| MRI lumbar spine without contrast | 7 | Noncontrast MRI may be sufficient if there is low risk of epidural and/or intraspinal disease. | O |
| CT lumbar spine with contrast | 6 | MRI preferred. CT useful if MRI is contraindicated or unavailable, and/or for problem solving. | ☢☢☢ |
| CT lumbar spine without contrast | 6 | MRI preferred. CT useful if MRI is contraindicated or unavailable, and/or for problem solving. | ☢☢☢ |
| X-ray lumbar spine | 5 | | ☢☢☢ |
| Tc-99m bone scan whole body with SPECT spine | 5 | SPECT/CT may be useful for anatomic localization and problem solving. | ☢☢☢ |
| CT lumbar spine without and with contrast | 3 | | ☢☢☢☢ |
| X-ray myelography lumbar spine | 2 | | ☢☢☢ |
| Myelography and postmyelography CT lumbar spine | 2 | In some cases postinjection CT imaging may be done without plain-film myelography. | ☢☢☢☢ |

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate — *Relative Radiation Level

# Appropriateness Criteria

## Soft tissue mass, abdominal or chest wall

**Variant 4:** **Soft-tissue mass: abdominal or chest wall.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray abdomen | 9 | Radiographs may not preclude the need for advanced imaging. | ☢☢ |
| X-ray chest | 9 | Radiographs may not preclude the need for advanced imaging. | ☢ |
| CT abdomen or chest with or without contrast | 9 | Use of contrast depends on clinical situation and radiologist discretion. | ☢☢☢ |
| MRI abdomen or chest with or without contrast | 7 | Use of contrast depends on clinical situation and radiologist discretion. See statement regarding contrast in text under "Anticipated Exceptions." | O |
| US abdomen or chest | 3 | | O |
| Tc-99m bone scan abdomen or chest | 1 | | ☢☢☢ |
| FDG-PET/CT abdomen or chest | 1 | | ☢☢☢☢ |
| **Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate | | | *Relative Radiation Level |

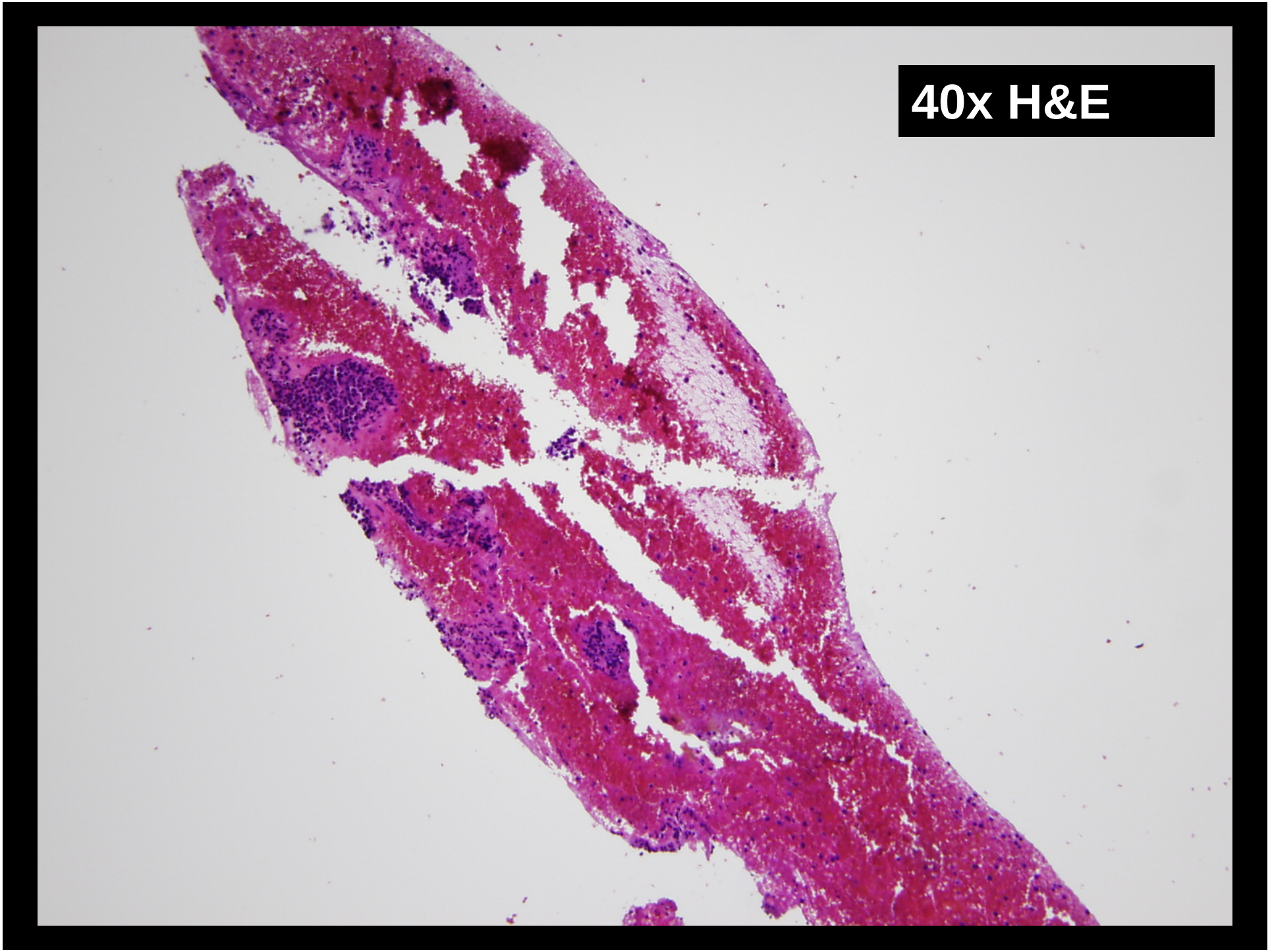
# Case 1 Pathology

Jelena Mirkovic

# JS

## 09639626 / BS-09-48061 / (10/14/2009)

**A and B. RIGHT CHEST WALL MASS, CORE BIOPSIES**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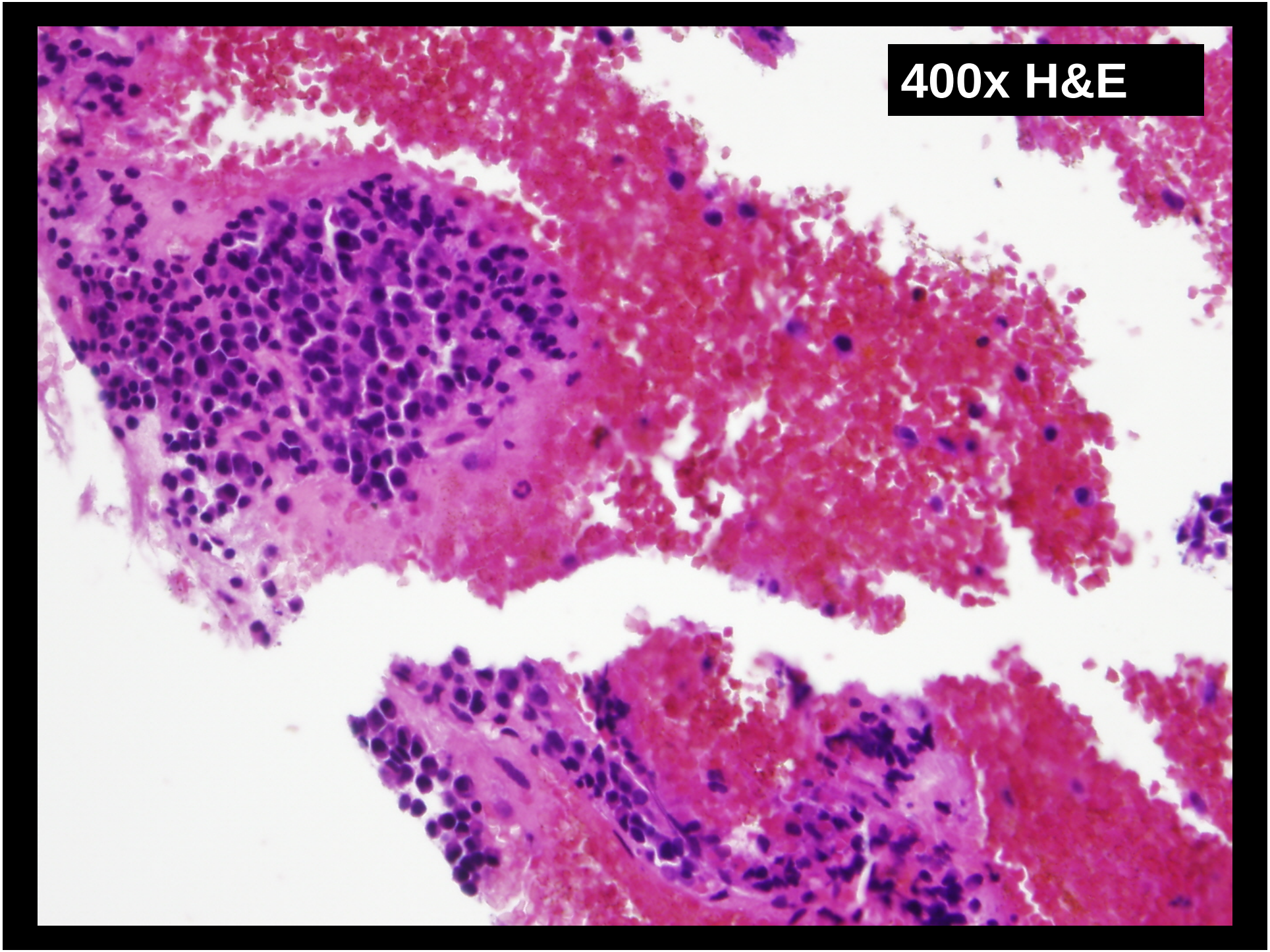
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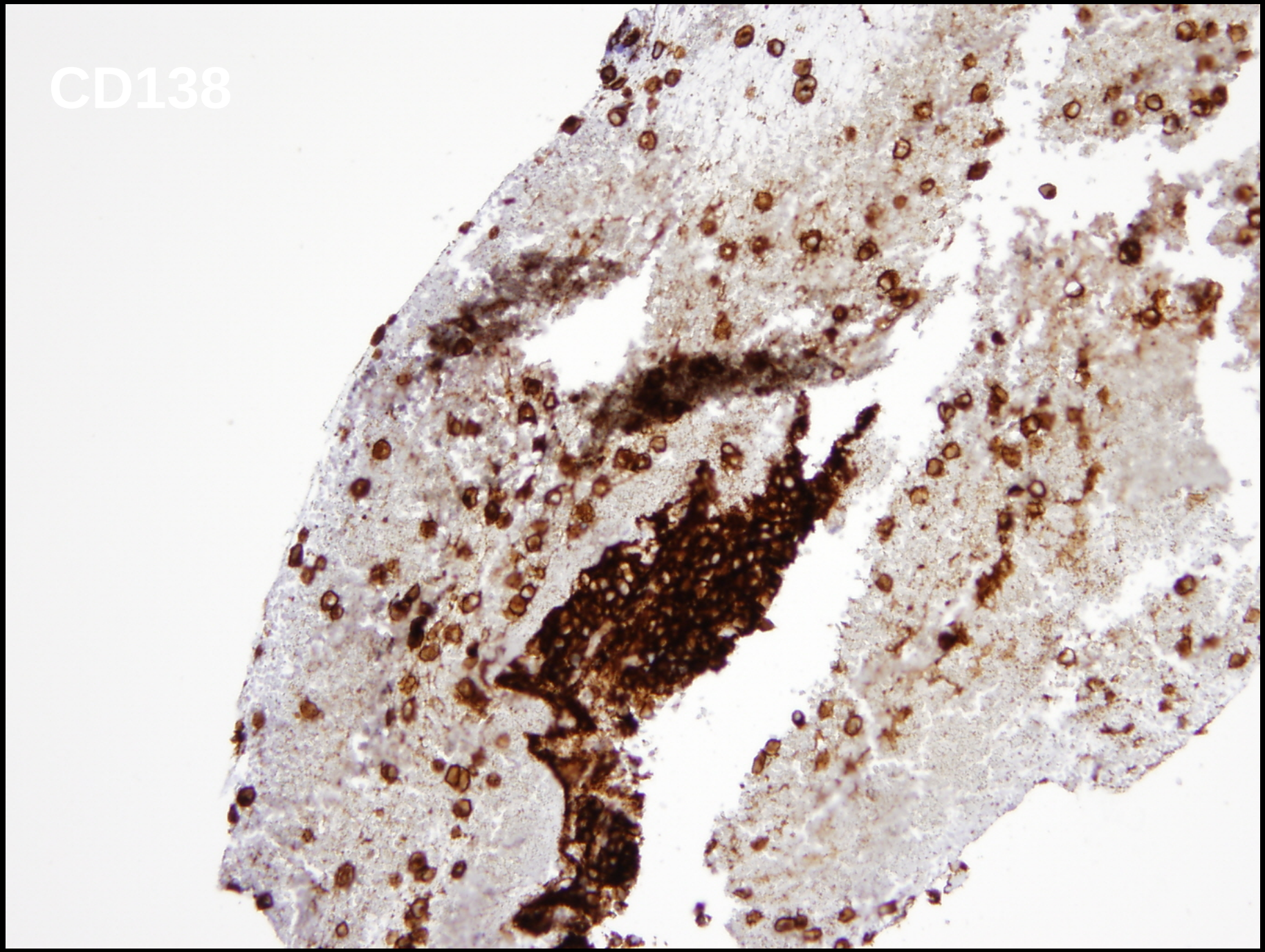
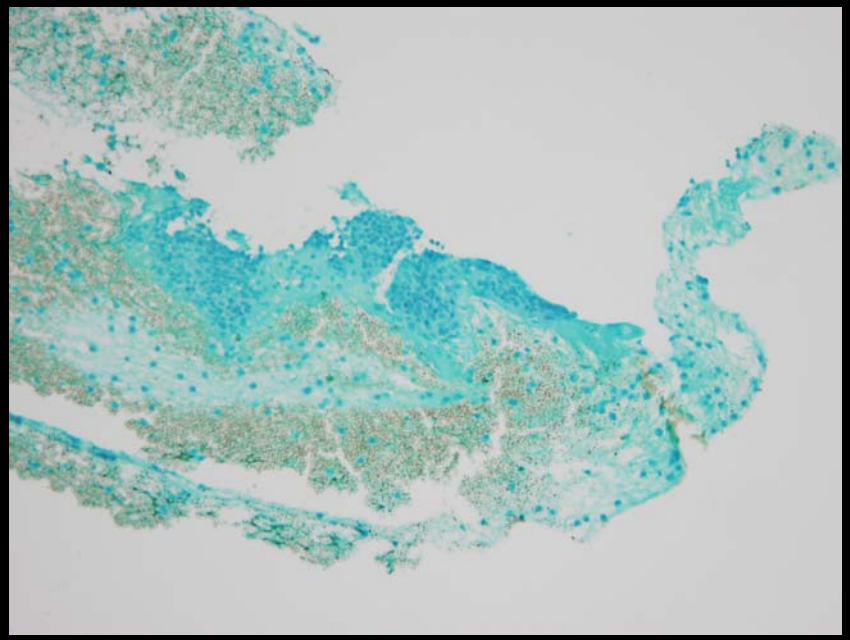
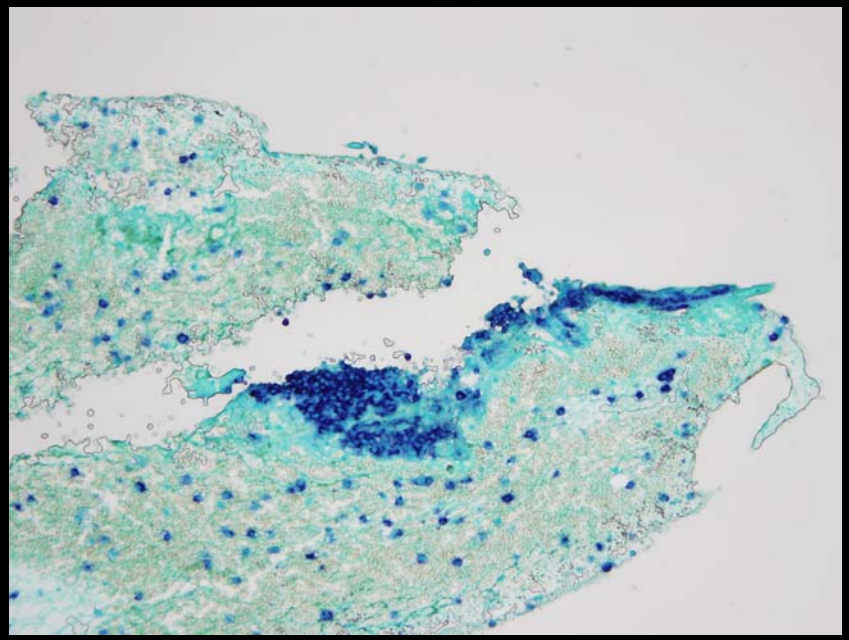

CD138

# In-situ-hybridization

**Kappa light chain**



**Lambda light chain**



# JS

## 09639626 / BS-09-48061 / (10/14/2009)

**PATHOLOGIC DIAGNOSIS:**

**A and B. RIGHT CHEST WALL MASS, CORE BIOPSIES**

**PLASMACYTOMA**

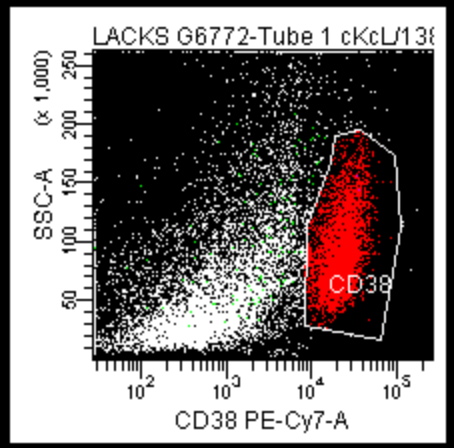
The sections reveal blood clot admixed with clusters of atypical plasma cells. Immunohistochemistry and ISH studies performed on paraffin embedded tissue reveal that **CD138-positive plasma cells exhibit monotypic expression of lambda light chain and are negative for kappa light chain.**

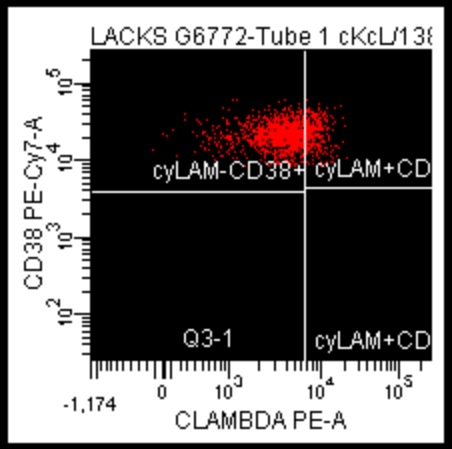
Flow cytometric analysis performed on the specimen B/2 (BL-09-24710) did not show clonal excess of either kappa or lambda light chain and diagnostic features of involvement by a plasma cell disorder were not seen. However, the specimen was paucicellular and may not be representative.

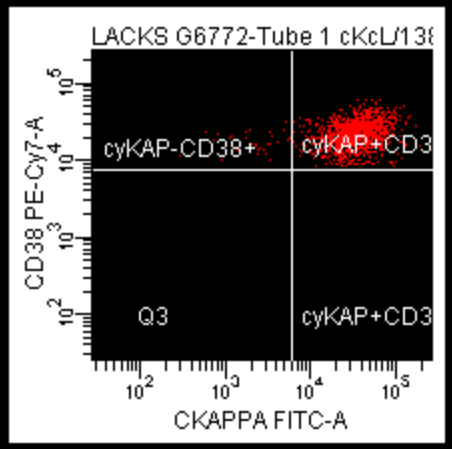
Flow cytometric analysis (BL-09-24634) performed on concurrent fine needle aspiration revealed a population of plasma cells (CD56, CD138, and CD38 positive) that shows cytoplasmic lambda light chain restriction.

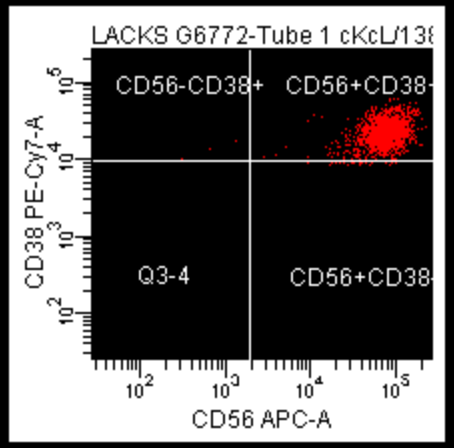

0 1 2 CM 3 4
Ba-12-00105
BWH Pathology

# Flow cytometric analysis (not from this case)



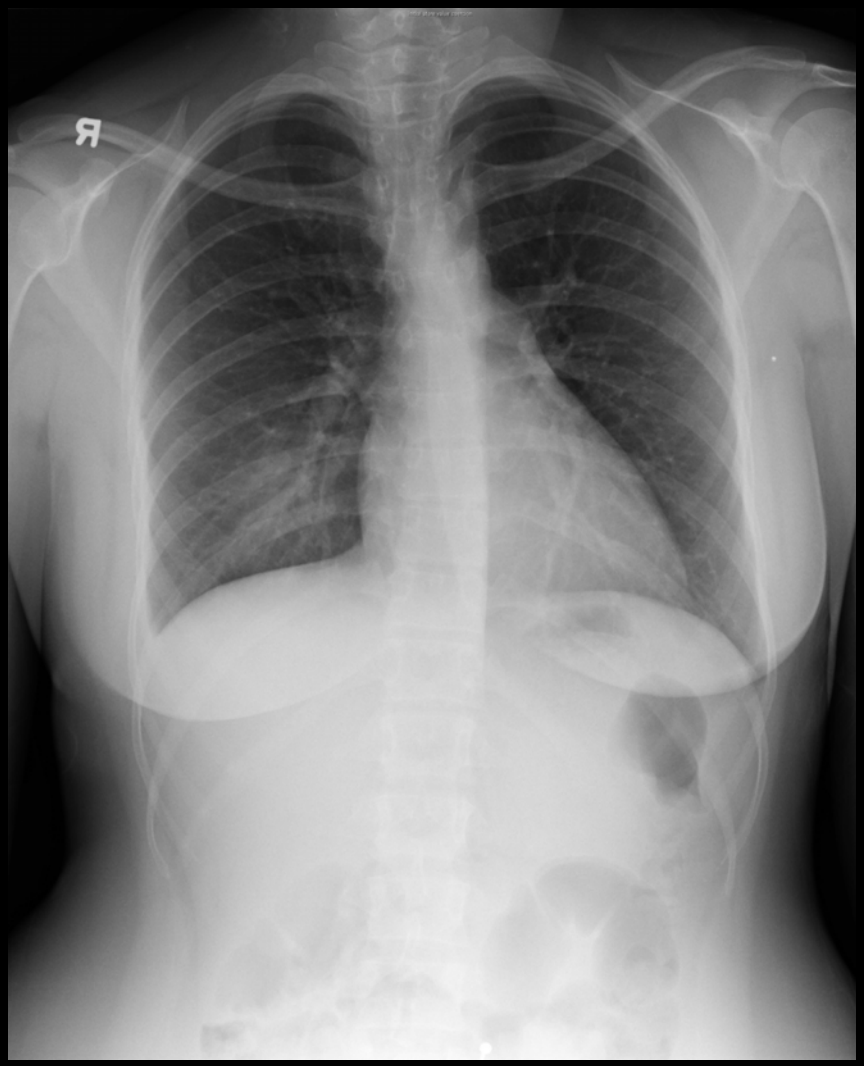




Population of plasma cells:
•CD56, CD138, and CD38-positive with cytoplasmic kappa or light chain staining.

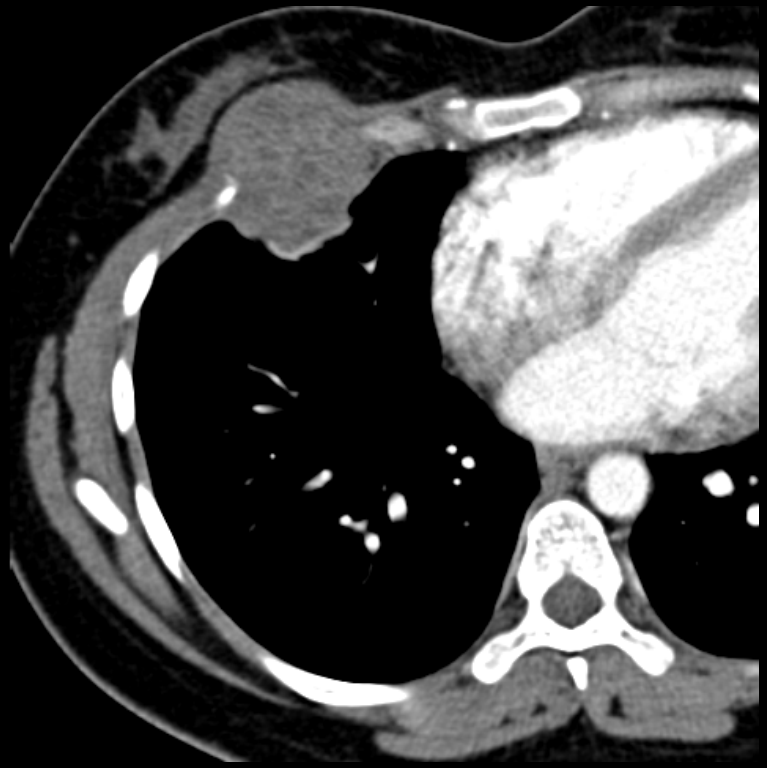
# Case 2

23-year-old-female with several week history of chest discomfort and recent development of a palpable mass near the right breast.

# Case 2



# Case 2



# Case 2

# Summary of Findings

- CXR
- CT
- NM Bone Scan

# Case 2 Differential Diagnosis

- Aneurysmal bone cyst
- Multiple myeloma/plasmacytoma
- Metastasis
- Telangiectatic osteosarcoma

# Appropriateness Criteria

## Soft-tissue mass, abdomen or chest wall

**Variant 4:** **Soft-tissue mass: abdominal or chest wall.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray abdomen | 9 | Radiographs may not preclude the need for advanced imaging. | ☢☢ |
| X-ray chest | 9 | Radiographs may not preclude the need for advanced imaging. | ☢ |
| CT abdomen or chest with or without contrast | 9 | Use of contrast depends on clinical situation and radiologist discretion. | ☢☢☢ |
| MRI abdomen or chest with or without contrast | 7 | Use of contrast depends on clinical situation and radiologist discretion. See statement regarding contrast in text under "Anticipated Exceptions." | O |
| US abdomen or chest | 3 | | O |
| Tc-99m bone scan abdomen or chest | 1 | | ☢☢☢ |
| FDG-PET/CT abdomen or chest | 1 | | ☢☢☢☢ |
| **Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate | | | *Relative Radiation Level |

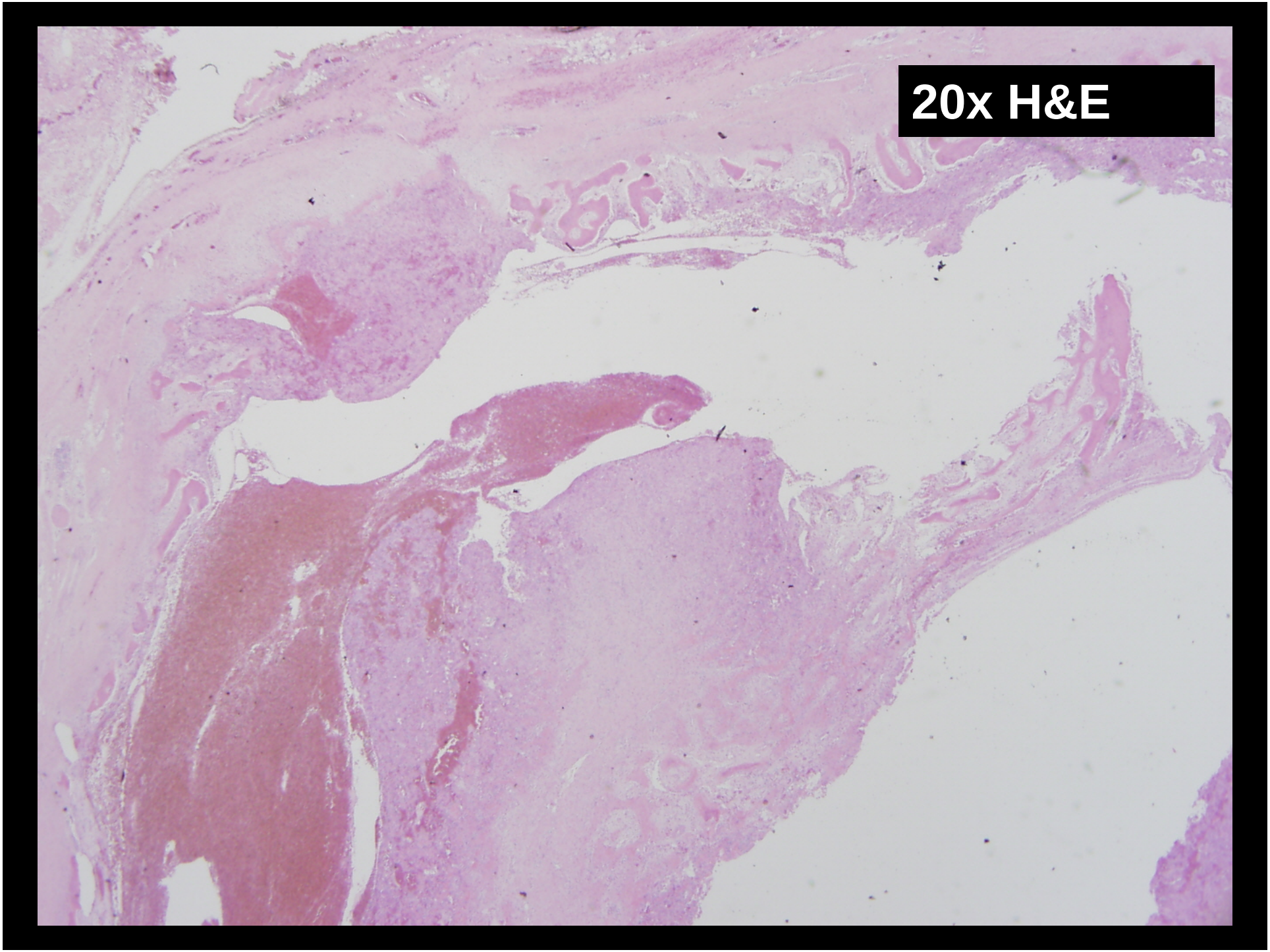
# Case 2 Pathology

Jelena Mirkovic

# IR

23920051 / BS-09-K26770 / (6/10/2009)

**A. RIGHT CHEST WALL MASS, RESECTION:**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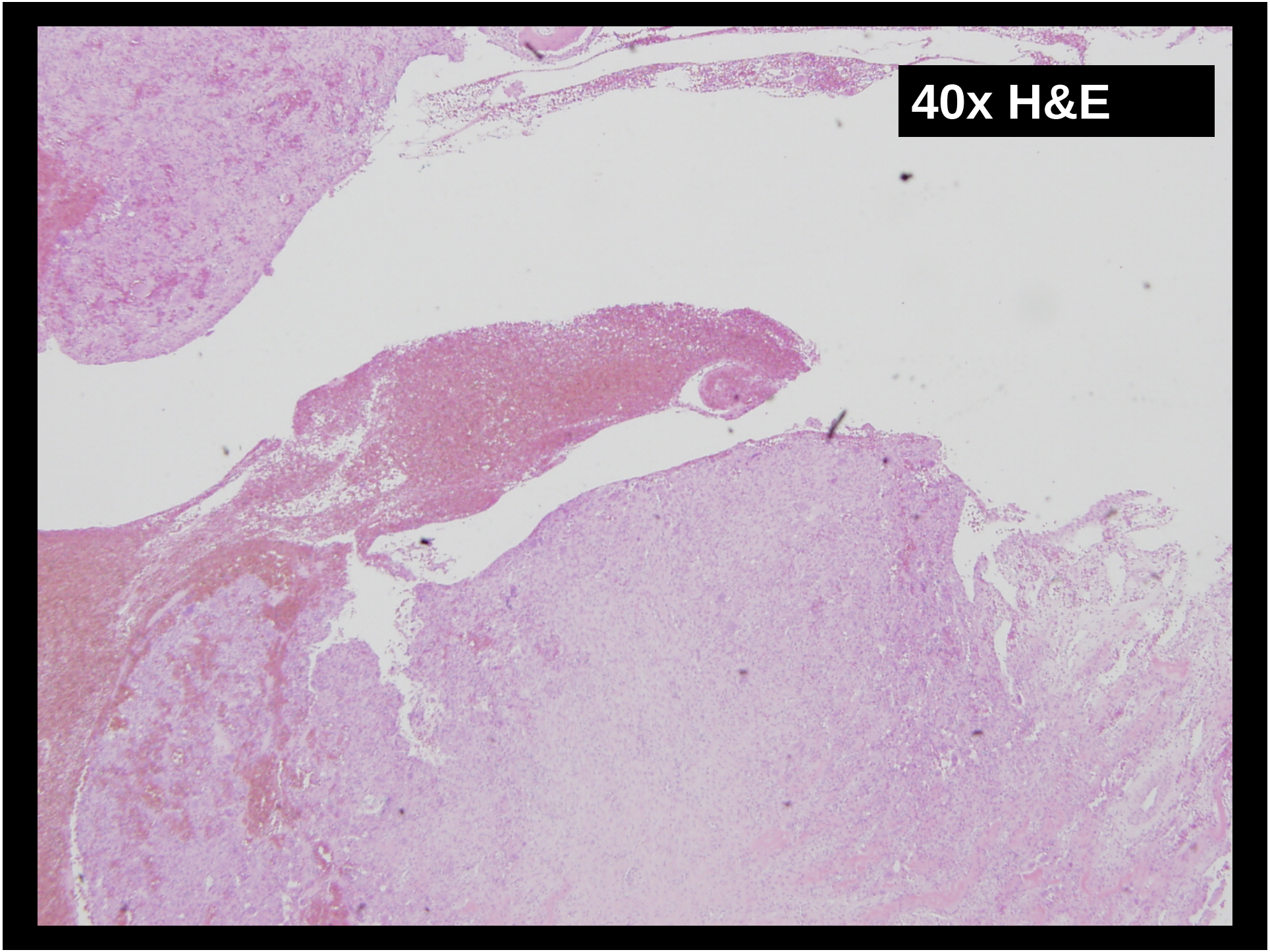
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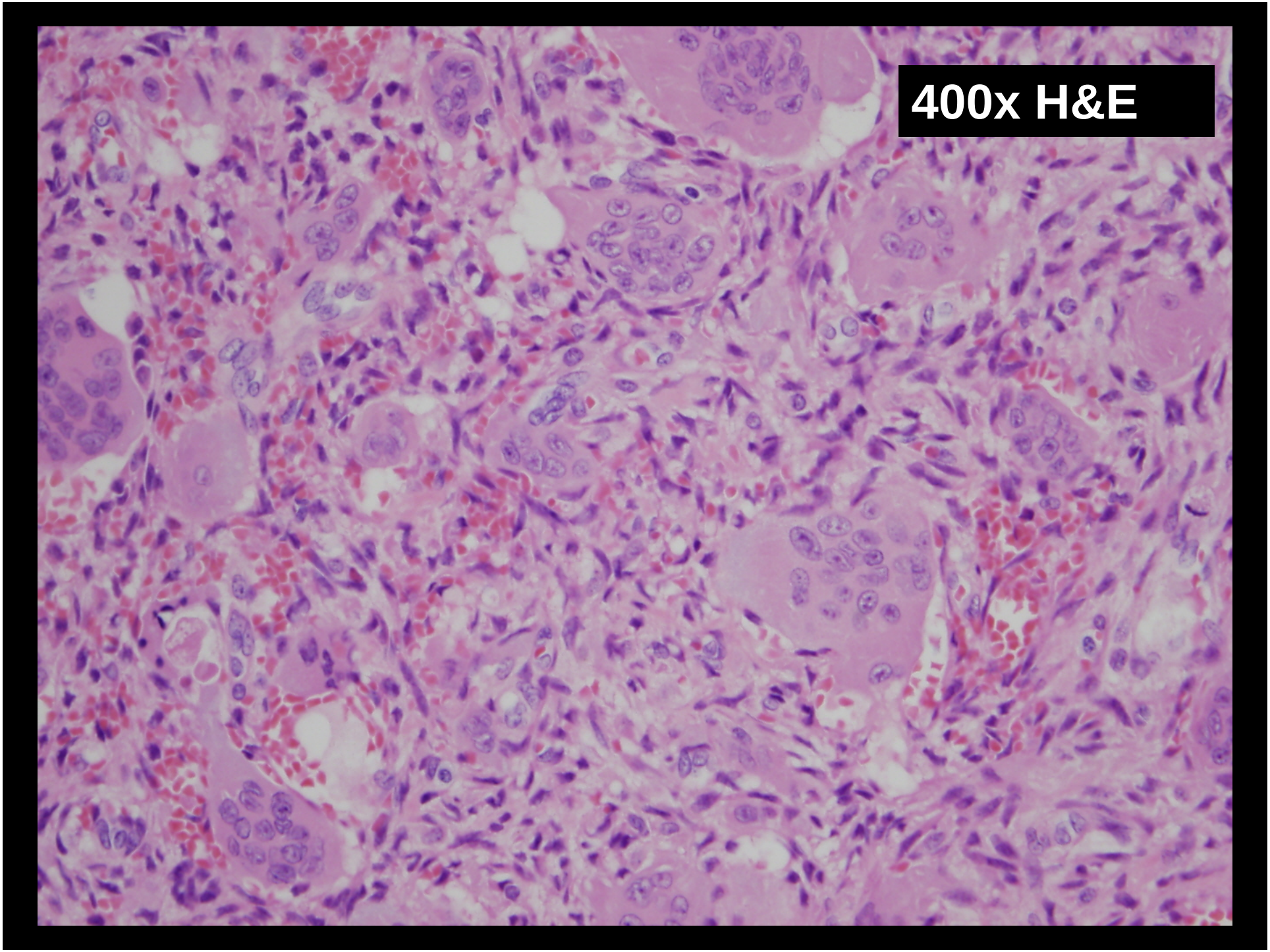

400x H&E

# IR

## 23920051 / BS-09-K26770 / (6/10/2009)

**PATHOLOGIC DIAGNOSIS:**

**A. RIGHT CHEST WALL MASS, RESECTION:**

**Aneurysmal Bone Cyst.**

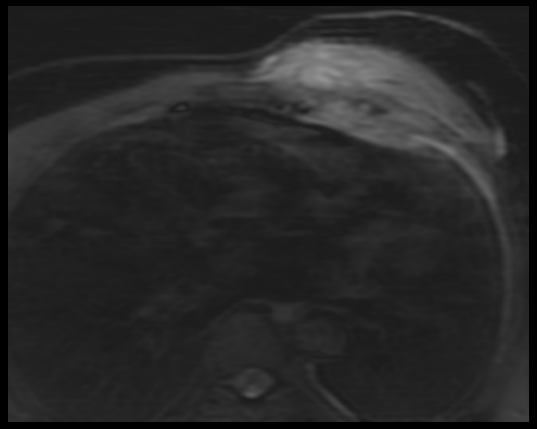
The tumor is a multicystic spindle cell neoplasm with numerous multinucleated giant cells.

# Case 3

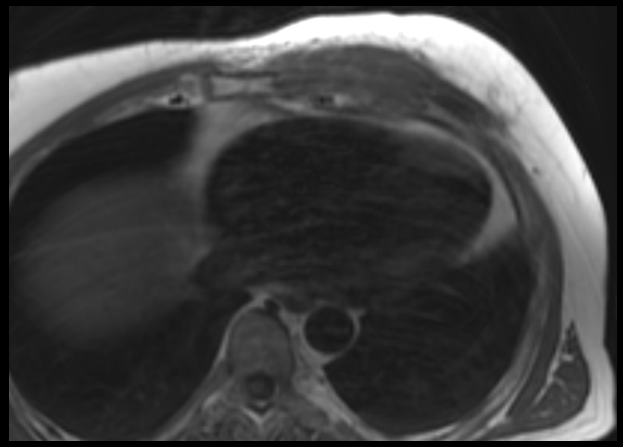
52-year-old-male with a history of a fall on ice one year prior to presentation with trauma to the left chest wall. Two months prior to presentation, he noted pain in the left upper chest region after painting his pool. This improved, but two weeks ago, he again felt discomfort after raking leaves and noticed visible fullness and firmness in the left breast region.

# Case 3

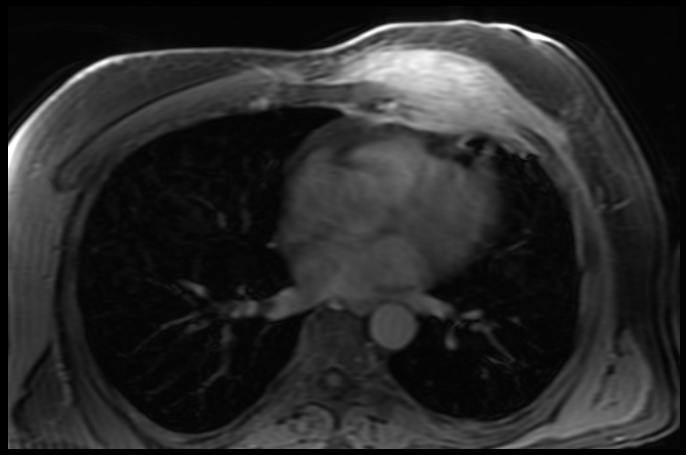
T2



STIR



T1



T1 post contrast

# Case 3
# 4 months later, post-treatment

# Summary of Findings

- MR images demonstrate an enhancing mass within the left pectoralis muscle, extending to involve the chest wall and underlying rib.

- Follow-up chest CT demonstrates persistent but decreased size of lytic abnormality involving the left fifth rib and costochondral junction, as well as decreased stranding and soft tissue anterior to rib.

# Case 3 Differential Diagnosis

Depends on age, presence or absence of history of primary malignancy, length/type of symptom.

- Osteomyelitis (chronic)
- Chondrosarcoma (costochondral – though this would not "improve" unless resected)
- Multiple myeloma (treated)
- Metastatic disease (treated)

# Appropriateness Criteria

## Clinically suspected soft-tissue mass, general

**Variant 4:** **Soft-tissue mass: abdominal or chest wall.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray abdomen | 9 | Radiographs may not preclude the need for advanced imaging. | ☢☢ |
| X-ray chest | 9 | Radiographs may not preclude the need for advanced imaging. | ☢ |
| CT abdomen or chest with or without contrast | 9 | Use of contrast depends on clinical situation and radiologist discretion. | ☢☢☢ |
| MRI abdomen or chest with or without contrast | 7 | Use of contrast depends on clinical situation and radiologist discretion. See statement regarding contrast in text under "Anticipated Exceptions." | O |
| US abdomen or chest | 3 | | O |
| Tc-99m bone scan abdomen or chest | 1 | | ☢☢☢ |
| FDG-PET/CT abdomen or chest | 1 | | ☢☢☢☢ |
| **Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate | | | *Relative Radiation Level |

# Appropriateness Criteria

## Soft tissue mass, abdominal or chest wall

**Variant 4:** **Soft-tissue mass: abdominal or chest wall.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray abdomen | 9 | Radiographs may not preclude the need for advanced imaging. | ☢☢ |
| X-ray chest | 9 | Radiographs may not preclude the need for advanced imaging. | ☢ |
| CT abdomen or chest with or without contrast | 9 | Use of contrast depends on clinical situation and radiologist discretion. | ☢☢☢ |
| MRI abdomen or chest with or without contrast | 7 | Use of contrast depends on clinical situation and radiologist discretion. See statement regarding contrast in text under "Anticipated Exceptions." | O |
| US abdomen or chest | 3 | | O |
| Tc-99m bone scan abdomen or chest | 1 | | ☢☢☢ |
| FDG-PET/CT abdomen or chest | 1 | | ☢☢☢☢ |
| **Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate | | | *Relative Radiation Level |

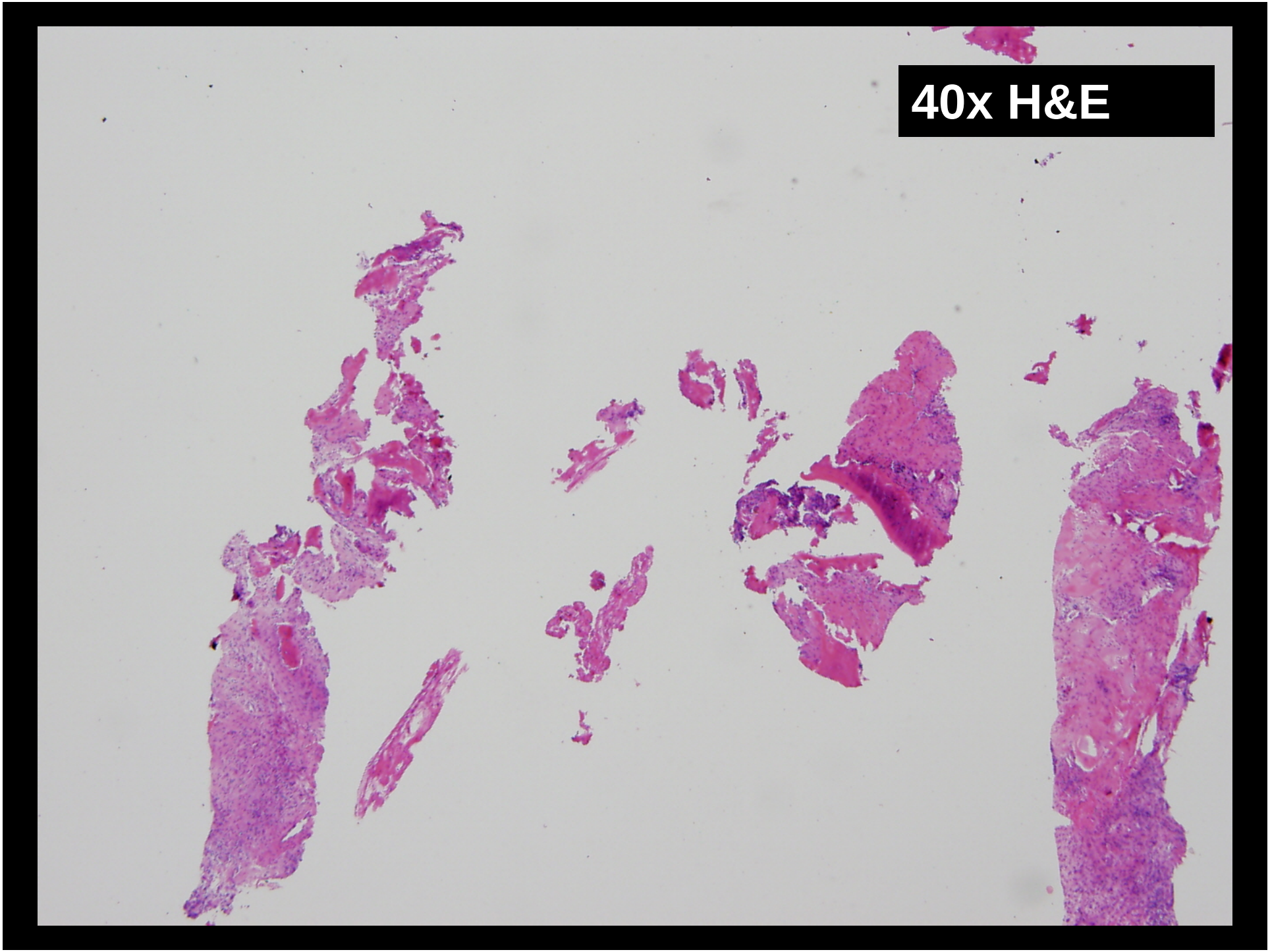
# Case 3 Pathology

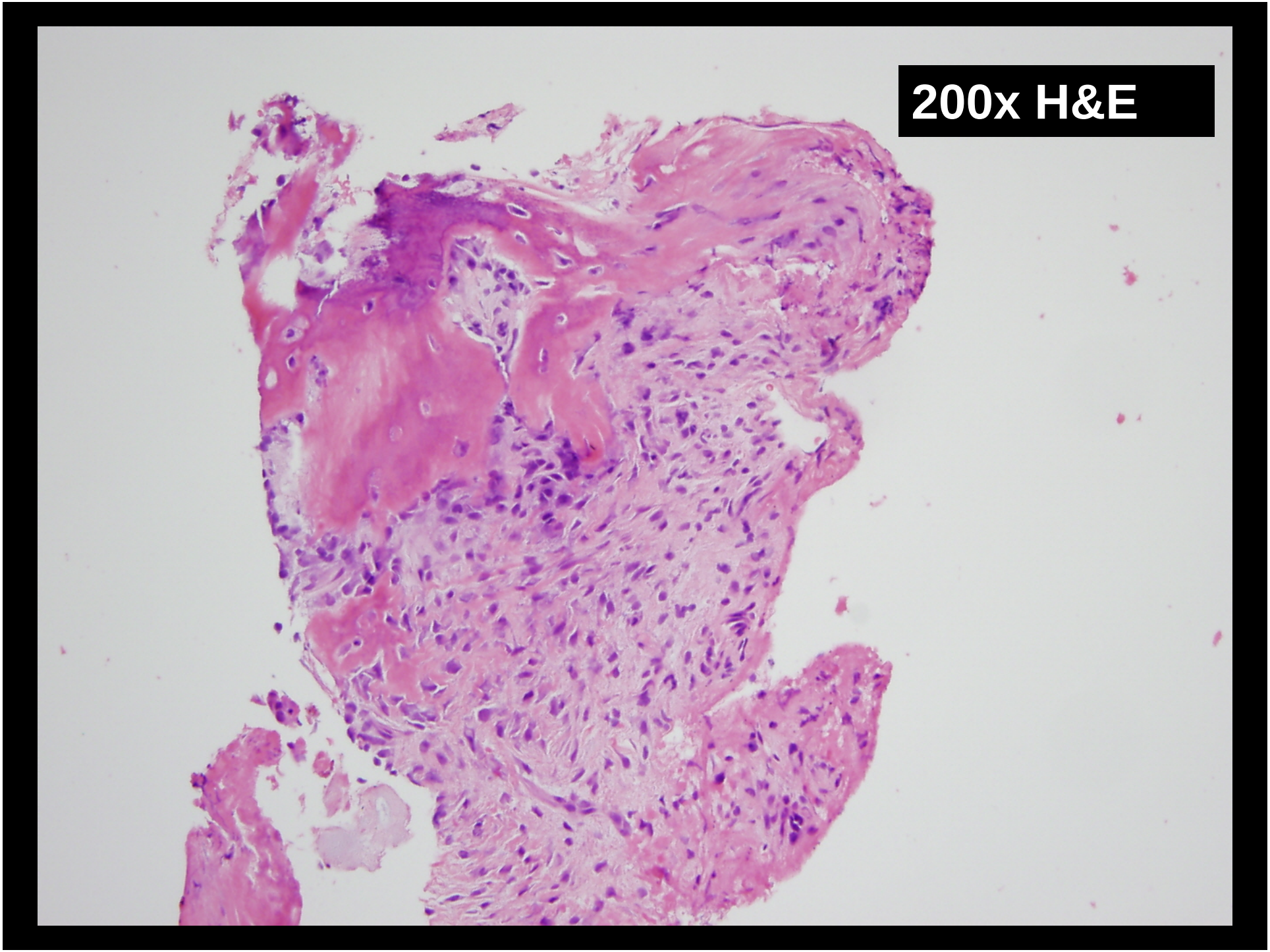
Jelena Mirkovic

# PB

## 15301906 / BS-09-D07737 / (3/09/2012)

**SPECIMEN DESIGNATED "CORE BIOPSY, LEFT FIFTH ANTERIOR RIB":**


40x H&E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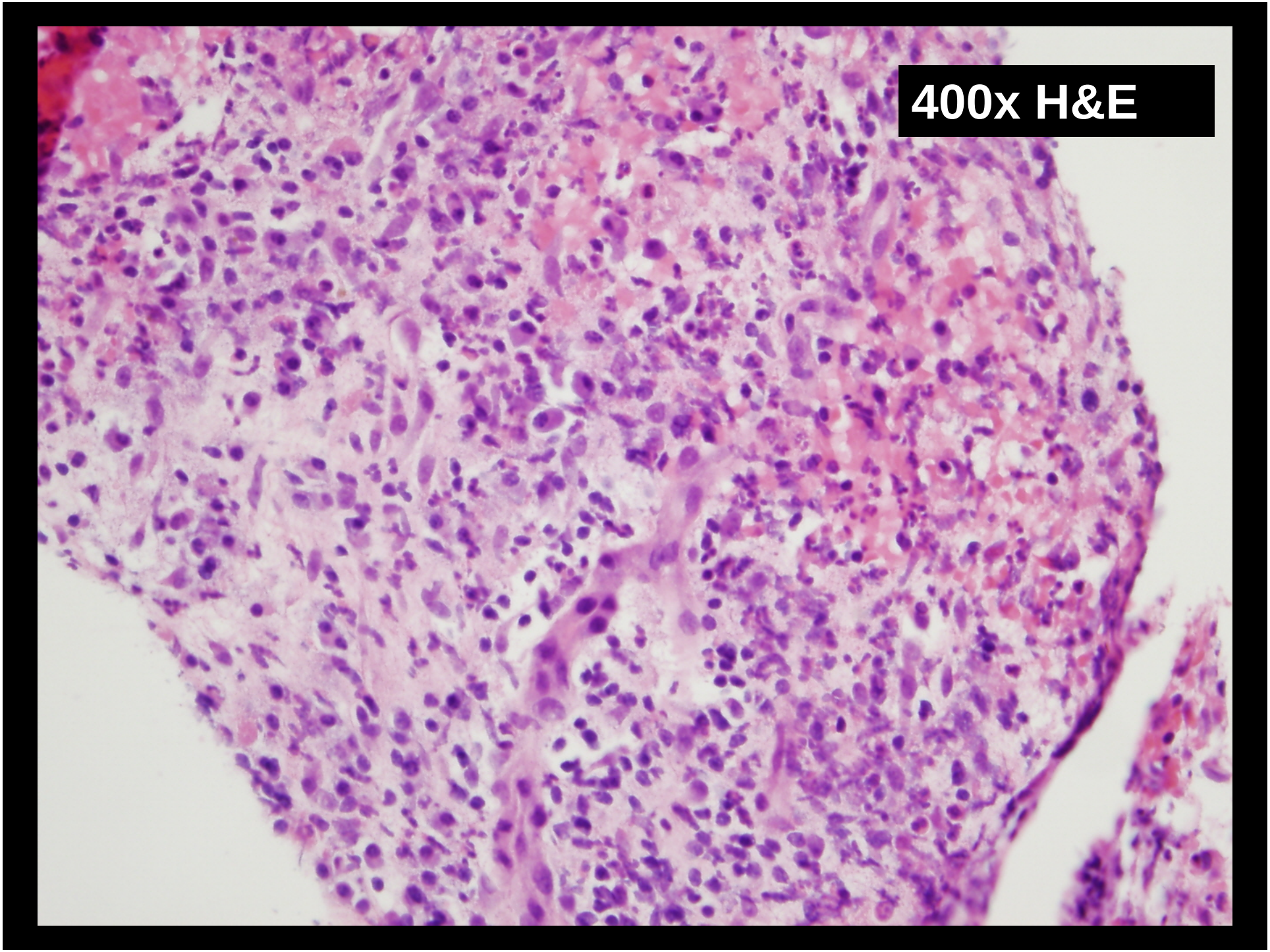

400x H&E

# PB

15301906 / BS-09-D07737 / (3/09/2012)

**PATHOLOGIC DIAGNOSIS:**

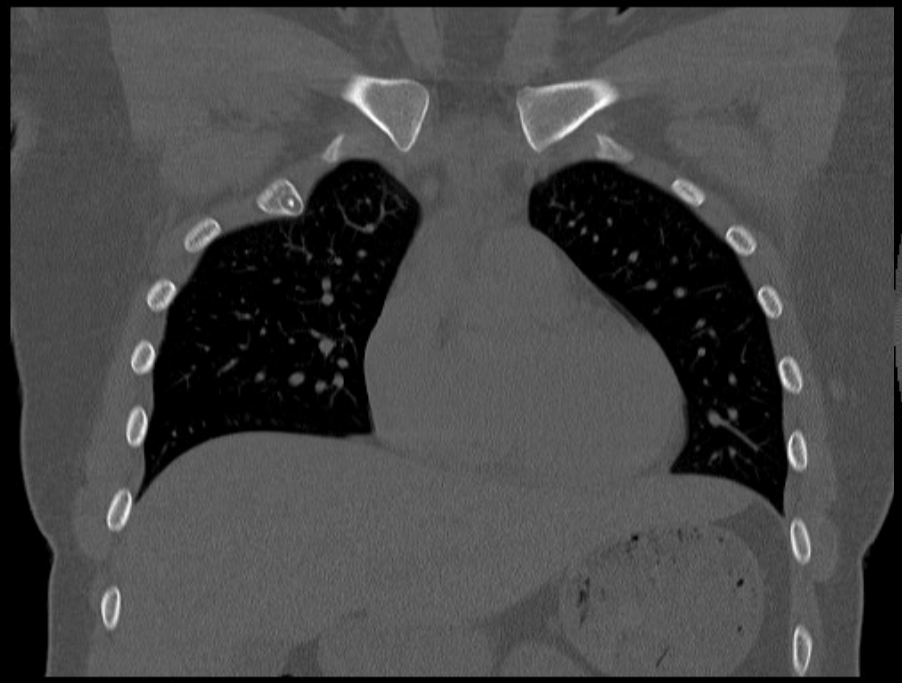
**SPECIMEN DESIGNATED "CORE BIOPSY, LEFT FIFTH ANTERIOR RIB":**

Fragments of reactive bone and chondroid material with
focal dense acute and chronic inflammation.
Gram, fungal (MSS), and acid-fast stains are negative for organisms

# Case 4

29 year-old-female with history of follicular thyroid carcinoma and a two year history of episodic, sharp, right anterior chest pain radiating to the axilla. Worse pain at night. The patient was 10 weeks pregnant at the time of presentation.

# Case 4



# Summary of Findings

- CT

# Case 4 Differential Diagnosis

- Osteoid osteoma
- Enchondroma
- Chondrosarcoma
- Osteosarcoma (any lesion with mineralization)

# Appropriateness Criteria

## Acute nonspecific chest pain – low probability CAD

**Clinical Condition:** Acute Nonspecific Chest Pain — Low Probability of Coronary Artery Disease

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray chest | 9 | | ☢ |
| CTA coronary arteries with contrast | 7 | | ☢☢☢☢ |
| CTA coronary arteries with contrast with advanced low dose techniques | 7 | | ☢☢☢ |
| CTA chest (noncoronary) with contrast | 7 | | ☢☢☢ |
| US echocardiography transthoracic resting | 7 | | O |
| SPECT MPI rest and stress | 6 | | ☢☢☢☢ |
| Tc-99m V/Q scan lung | 5 | | ☢☢☢ |
| MRA aorta without and with contrast | 5 | See statement regarding contrast in text under "Anticipated Exceptions." | O |
| X-ray rib views | 5 | | ☢☢☢ |
| MRA chest (noncoronary) without and with contrast | 5 | See statement regarding contrast in text under "Anticipated Exceptions." | O |
| MRA aorta without contrast | 4 | | O |
| MRA chest (noncoronary) without contrast | 4 | | O |
| X-ray barium swallow and upper GI series | 4 | | ☢☢☢ |
| X-ray thoracic spine | 4 | | ☢☢☢ |
| US abdomen | 4 | | O |
| MRI heart with or without stress without and with contrast | 3 | | O |
| MRA pulmonary arteries without and with contrast | 3 | | O |
| MRA coronary arteries without contrast | 3 | | O |
| MRA coronary arteries without and with contrast | 3 | | O |
| US echocardiography transthoracic stress | 3 | | O |
| US echocardiography transesophageal | 2 | | O |
| MRI heart with or without stress without contrast | 2 | | O |
| MRA pulmonary arteries without contrast | 2 | | O |
| Coronary angiography with or without ventriculography | 1 | | ☢☢☢ |

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level

# Appropriateness Criteria

## Primary bone tumors, screening/first study

**Clinical Condition:** **Primary Bone Tumors**

**Variant 1:** **Screening, first study.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray area of interest | 9 | Absolute requirement in patient with suspected bone lesion. | Varies |
| US area of interest | 1 | | O |
| MRI area of interest with or without contrast | 1 | | O |
| Tc-99m bone scan whole body | 1 | | ☢☢☢ |
| CT area of interest without contrast | 1 | | Varies |
| FDG-PET/CT whole body | 1 | | ☢☢☢☢ |

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level

# Appropriateness Criteria

## Primary bone tumor, suspicion for osteoid osteoma

**Clinical Condition:** **Primary Bone Tumors**

**Variant 4:** **Clinically suspected osteoid osteoma.**

| Radiologic Procedure | Rating | Comments | RRL* |
|---|---|---|---|
| X-ray area of interest | 9 | Necessary. Follow with CT if positive. | Varies |
| CT area of interest without contrast | 9 | | Varies |
| Tc-99m bone scan whole body | 6 | Very sensitive but non-specific. Good for localization if lesion is occult radiographically. | ☢ ☢ ☢ |
| MRI area of interest with or without contrast | 6 | CT is more useful but diagnosis can often be made with MRI. Contrast may improve nidus identification. See statement regarding contrast in text under "Anticipated Exceptions." | O |
| US area of interest | 1 | | O |
| FDG-PET/CT whole body | 1 | | ☢ ☢ ☢ ☢ |
| **Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate | | | *Relative Radiation Level |

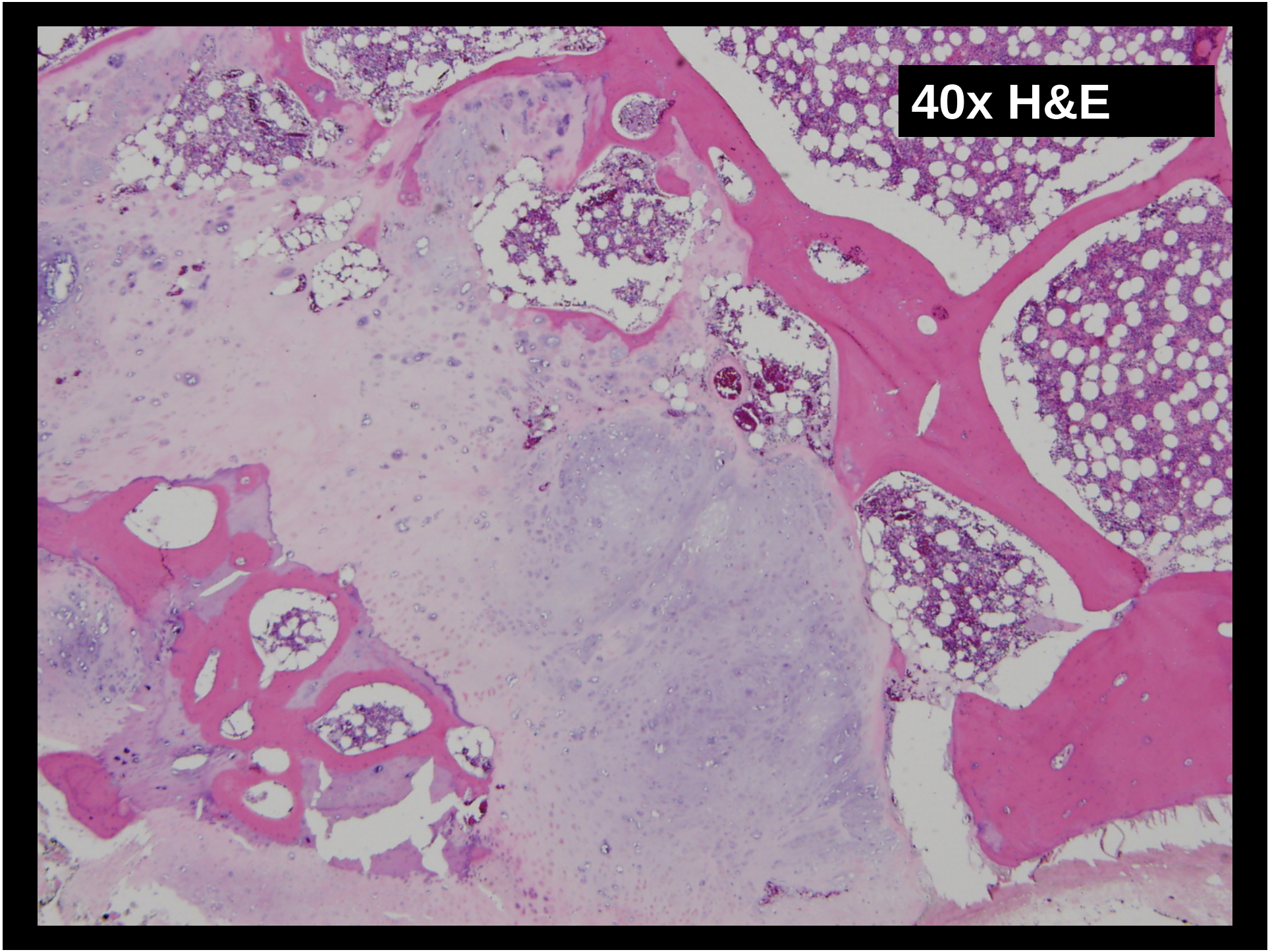
# Case 4 Pathology

Jelena Mirkovic

# TY

12798153 / BS-12-A11716 / (3/09/2012)

**ANTERIOR SECOND RIB, RESECTION:**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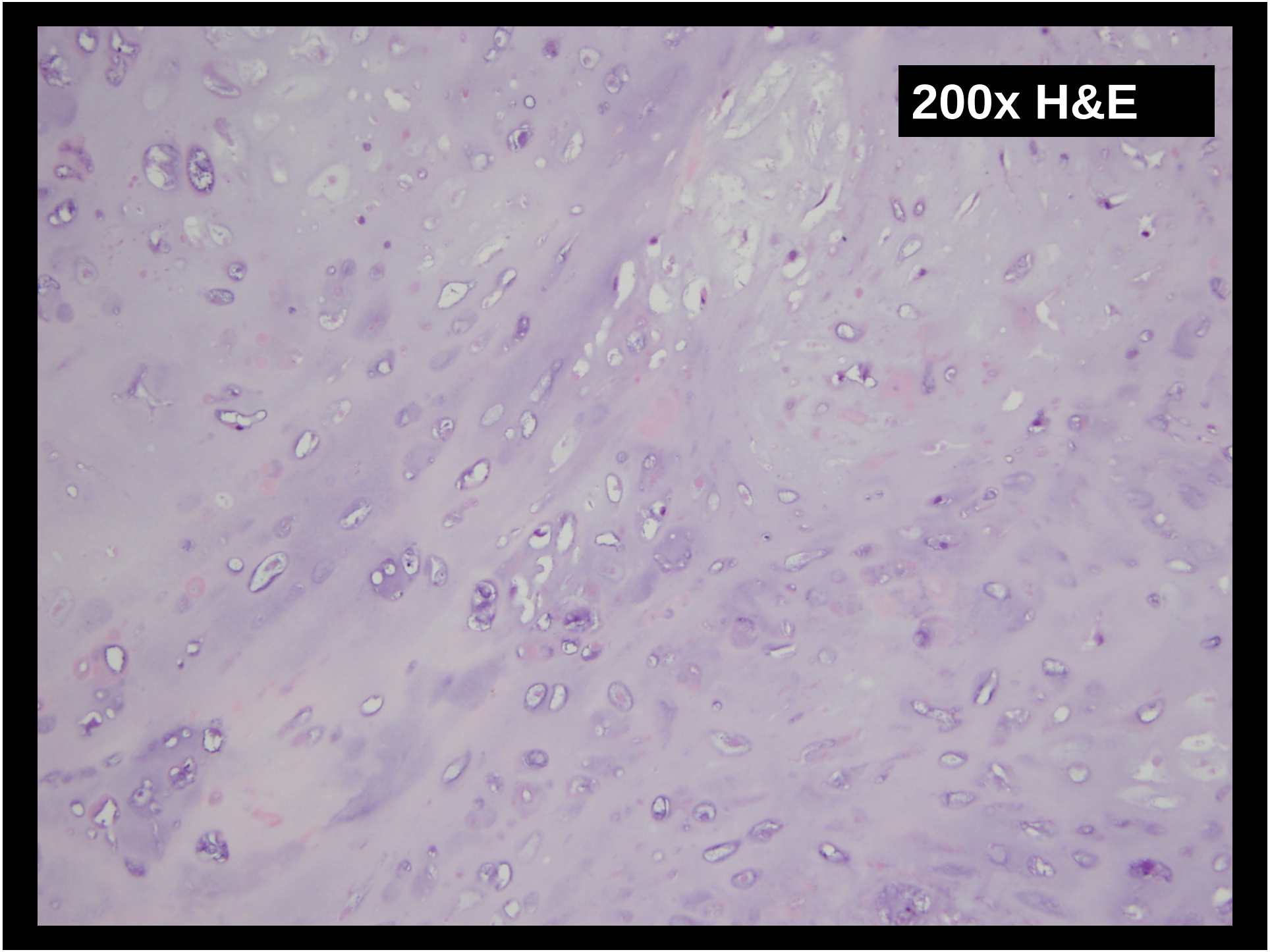
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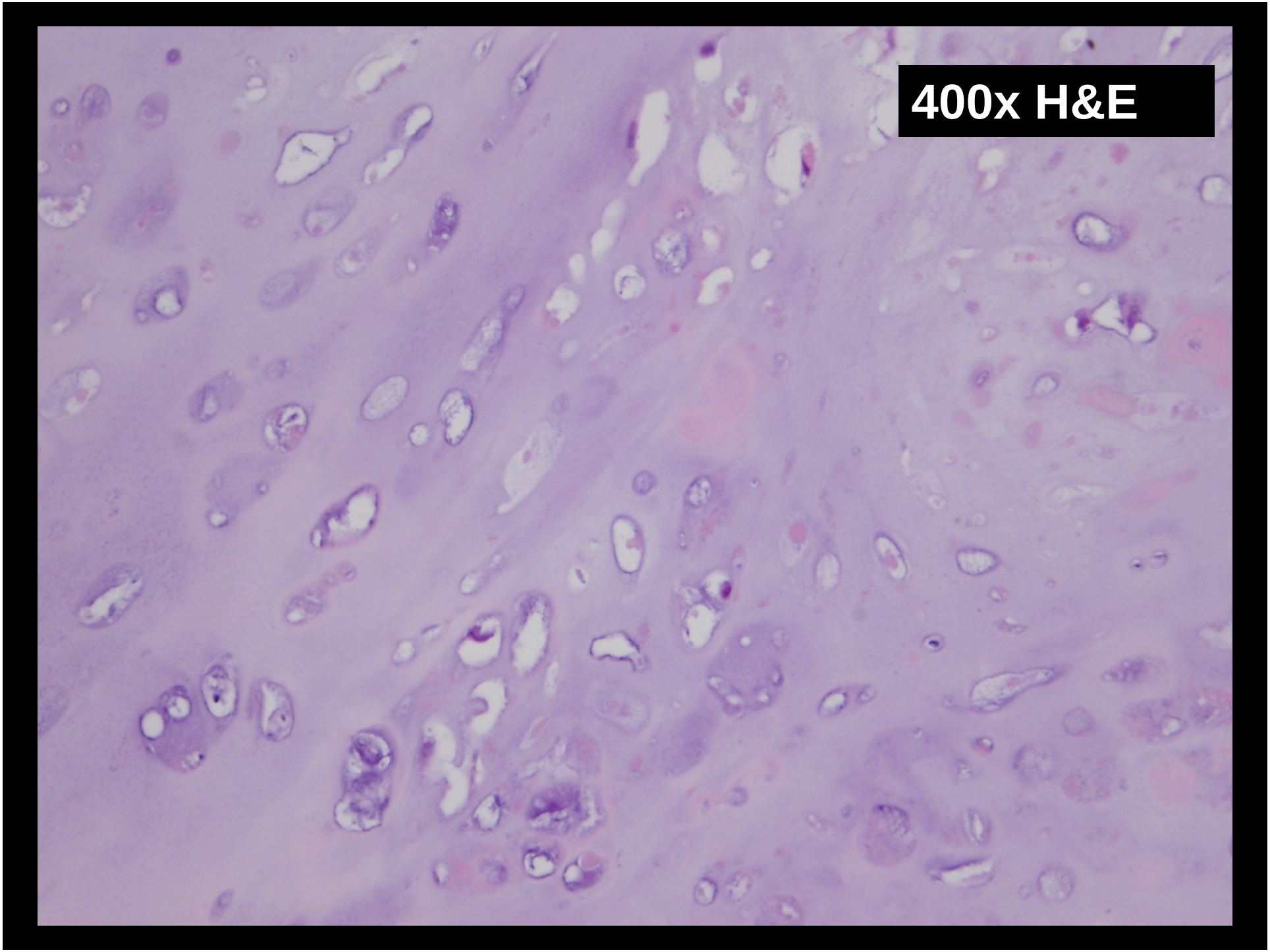
400x H&E

# TY

## 12798153 / BS-12-A11716 / (3/09/2012)

**PATHOLOGIC DIAGNOSIS:**

**ANTERIOR SECOND RIB, RESECTION:**

**CHONDROSARCOMA (1.6 cm), Grade 1 (of 3).**

Tumor involves rib and extends into soft tissue.

No necrosis identified.

Mitoses number <1 per 10 HPFs.

Bone resection margins, negative for tumor.

Tumor is 1.0 and 2.5 cm from the bone resection margins.

Tumor is focally present at the inked soft tissue edge.