

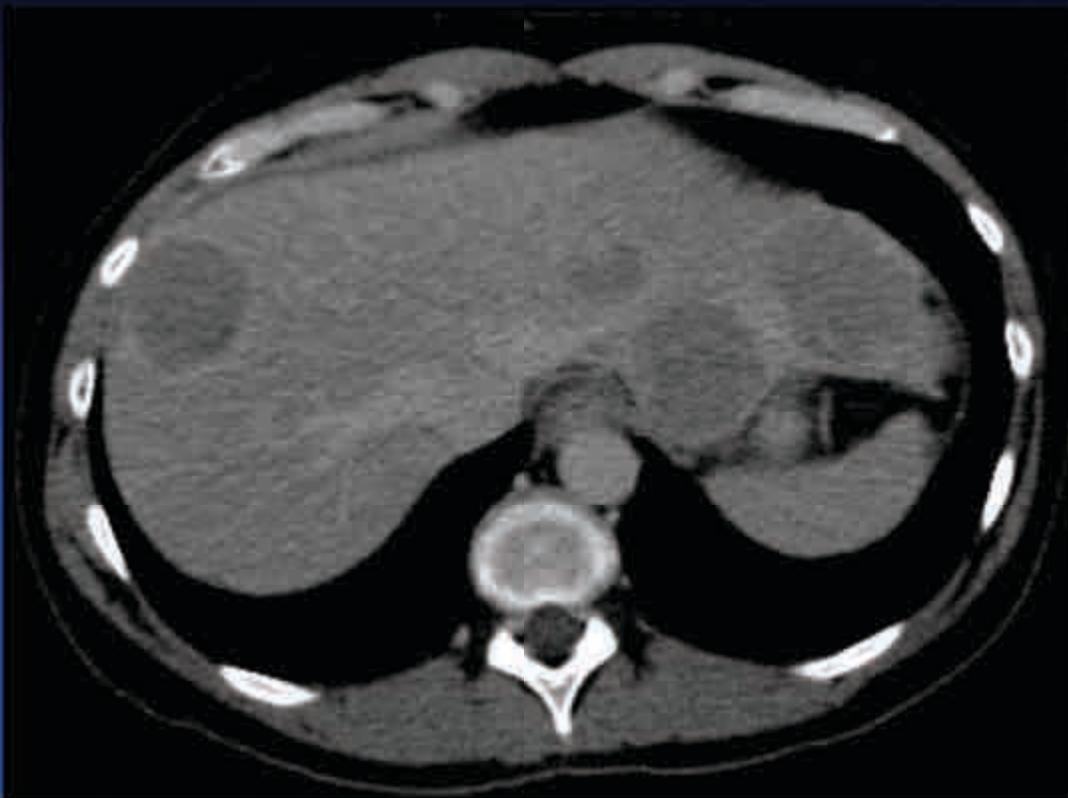
Radiology / Pathology Conference

November 2010

Wade Hedegard, Radiology Resident
Kirsten Woolf, Cytopathology Fellow

Case 1

**47 year old female presents
with 2 weeks of abdominal
pain and constipation**

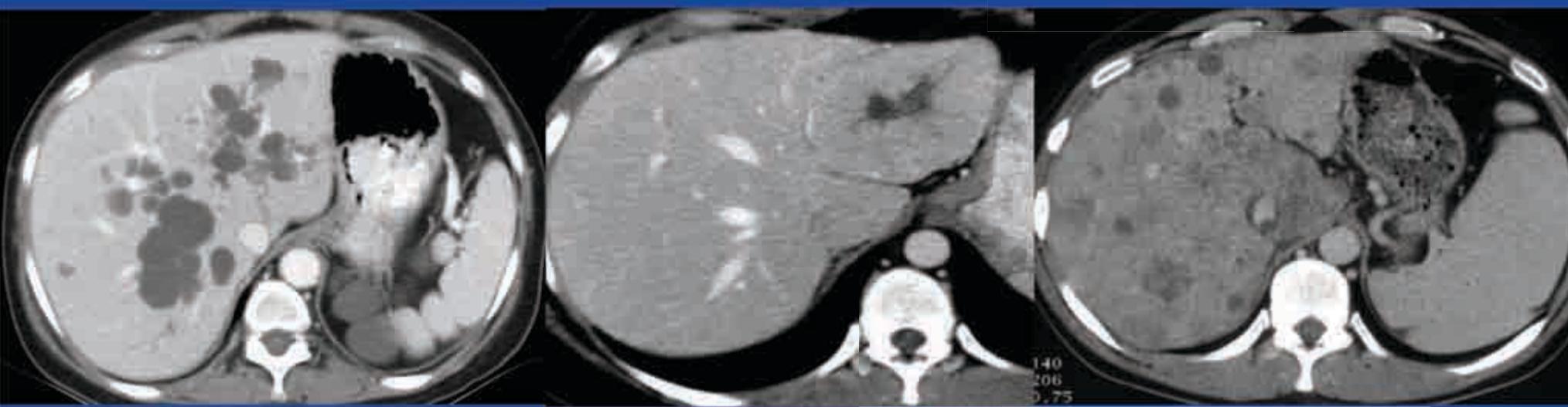


Multiple Hypodense Liver Lesions DDx:





Metastases

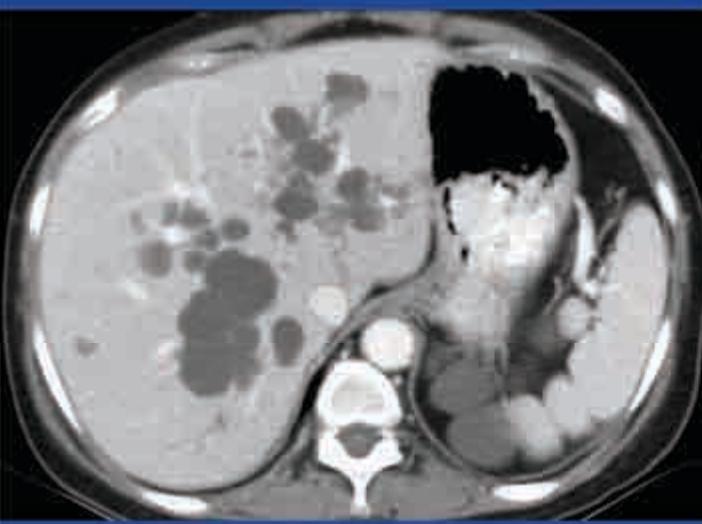


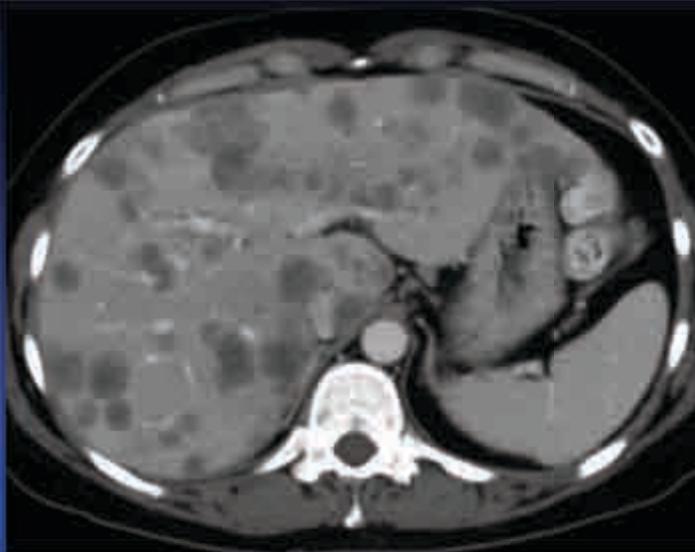


Metastases

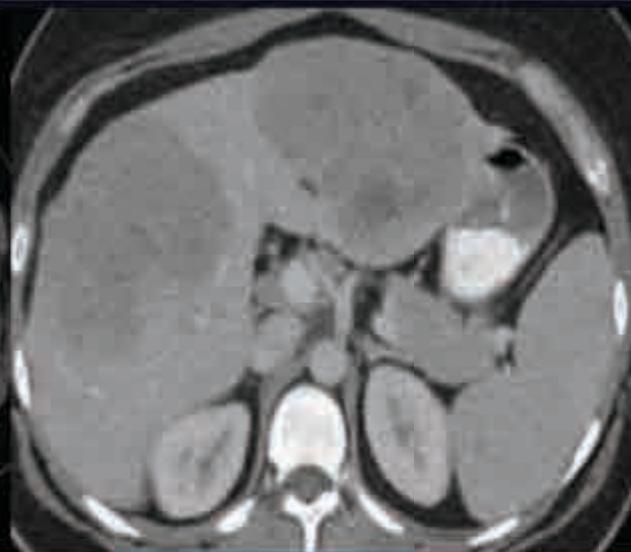


Lymphoma





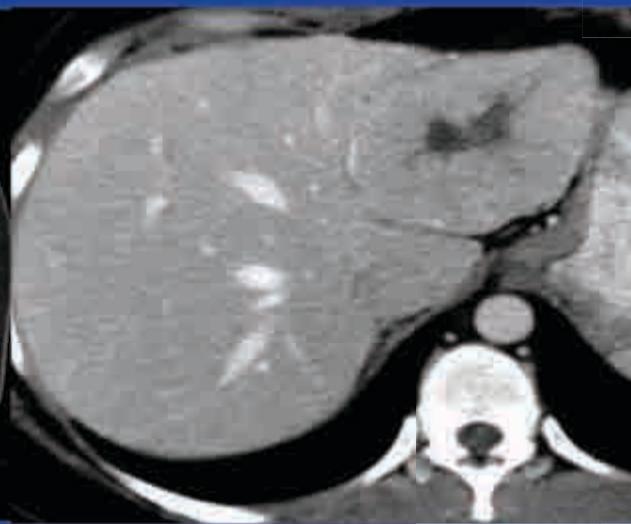
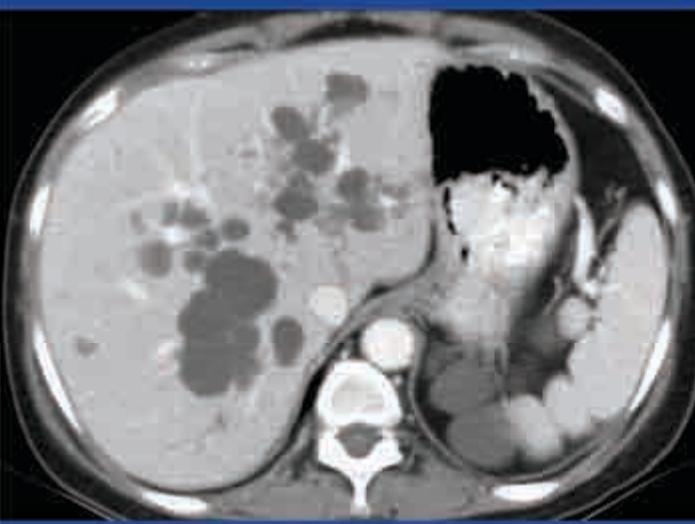
Metastases



Lymphoma



Cavernous Hemangiomas





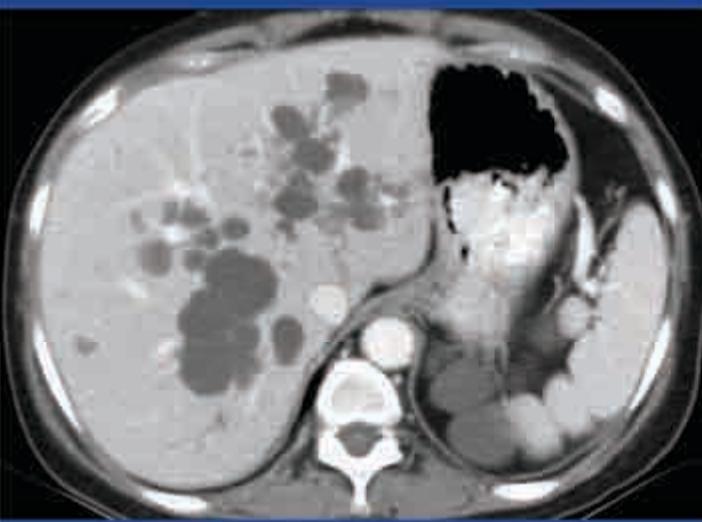
Metastases



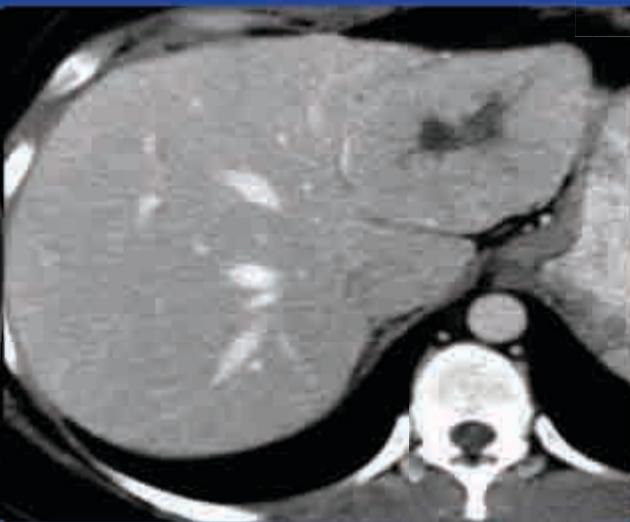
Lymphoma

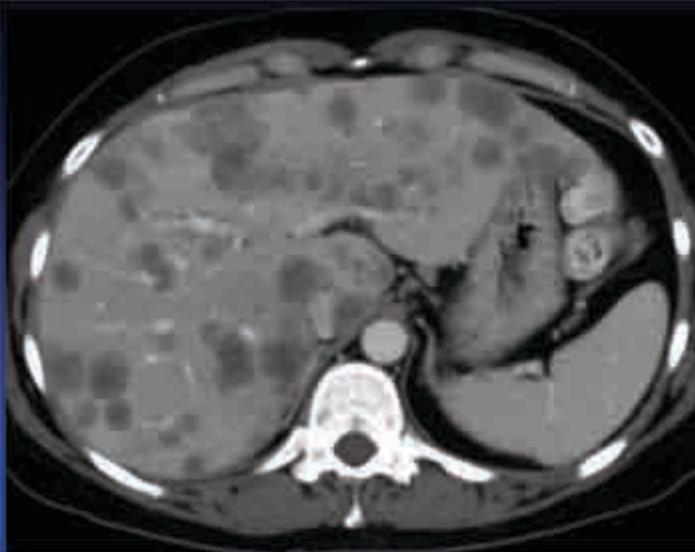


Cavernous Hemangiomas

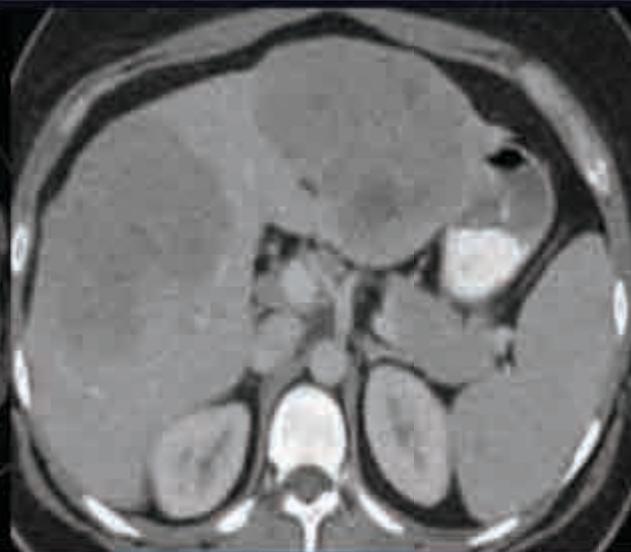


Hepatic Cysts

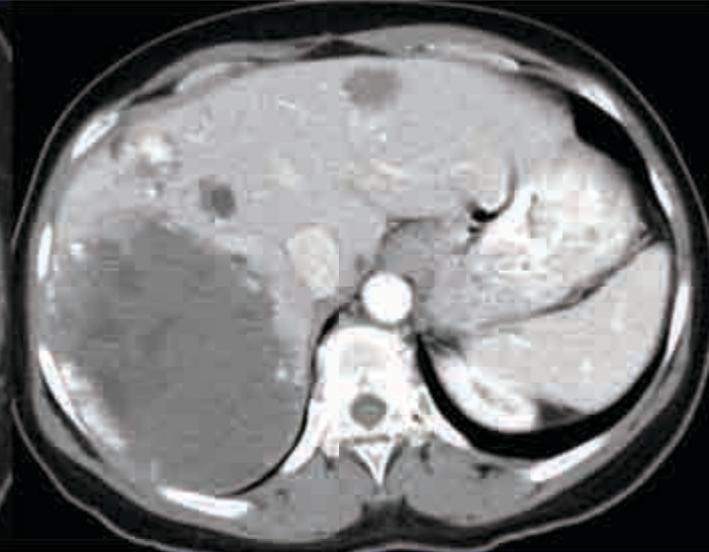




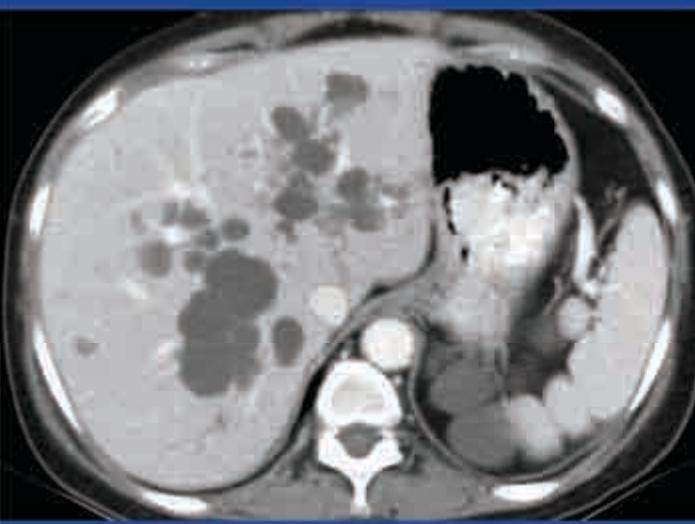
Metastases



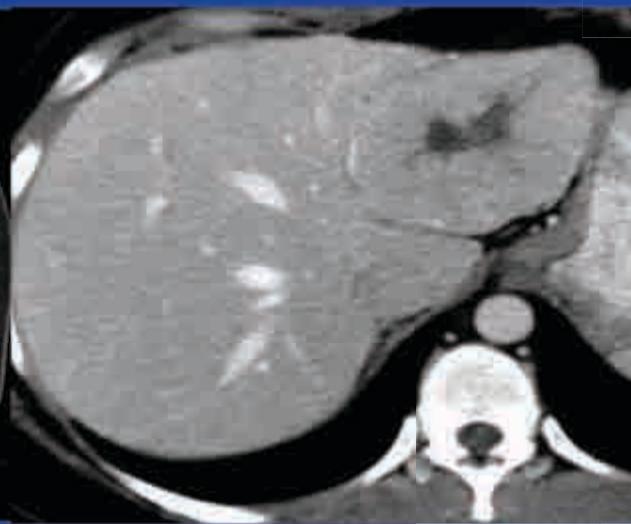
Lymphoma



Cavernous Hemangiomas

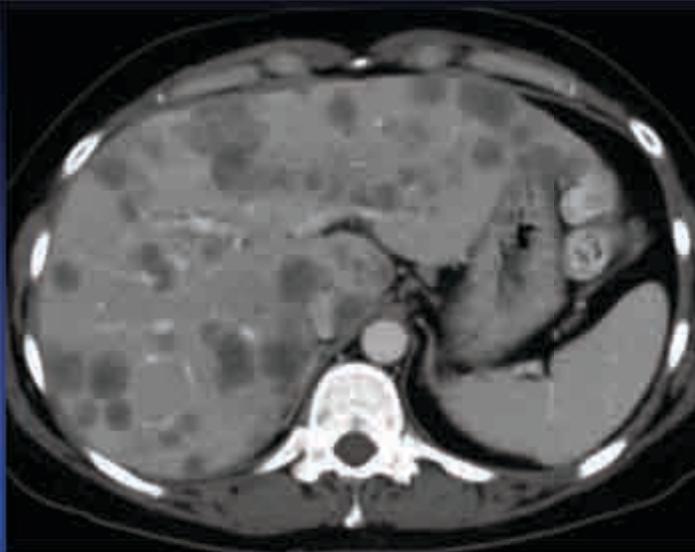


Hepatic Cysts



FNH





Metastases



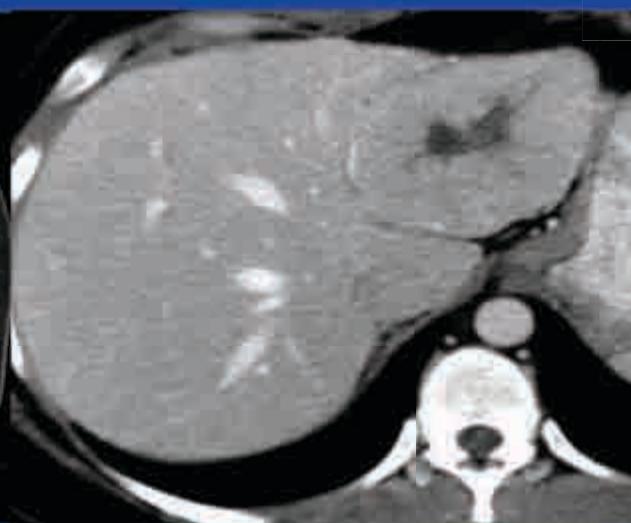
Lymphoma



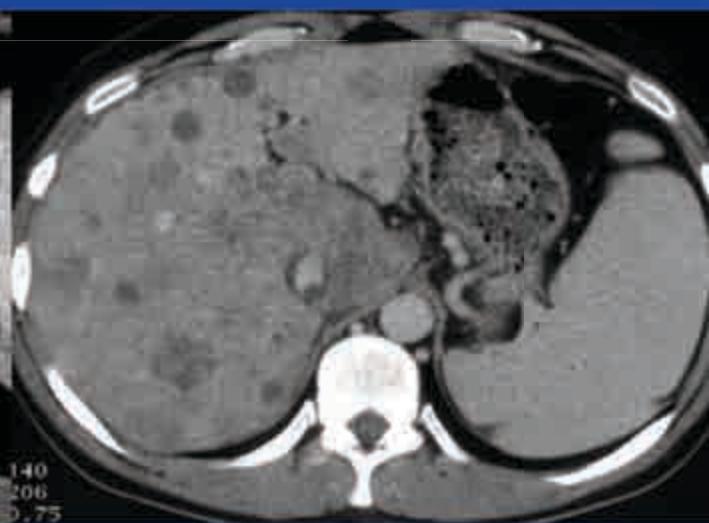
Cavernous Hemangiomas



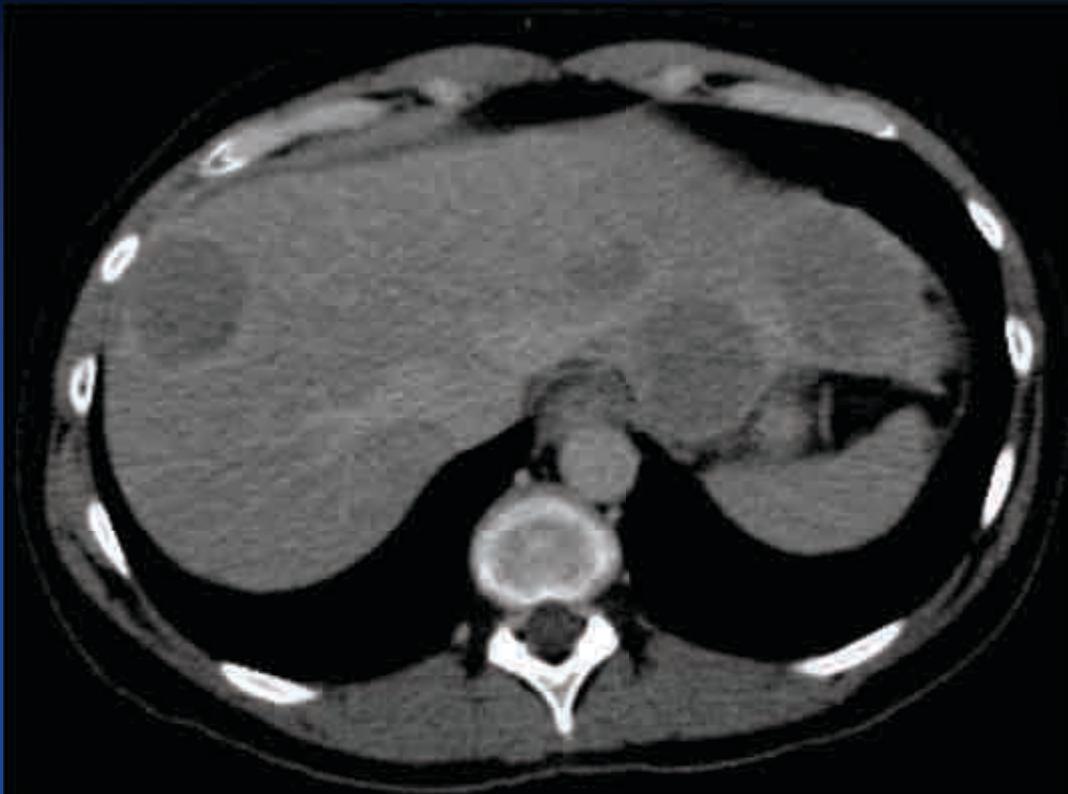
Hepatic Cysts



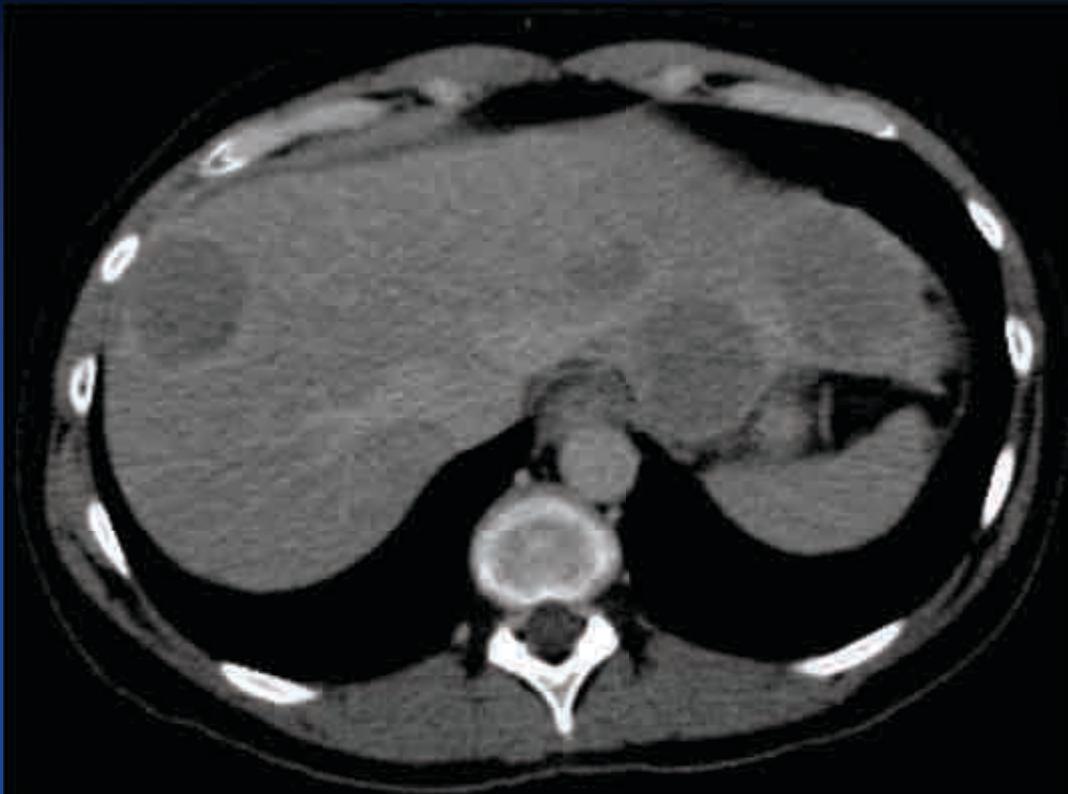
FNH



Multifocal HCC

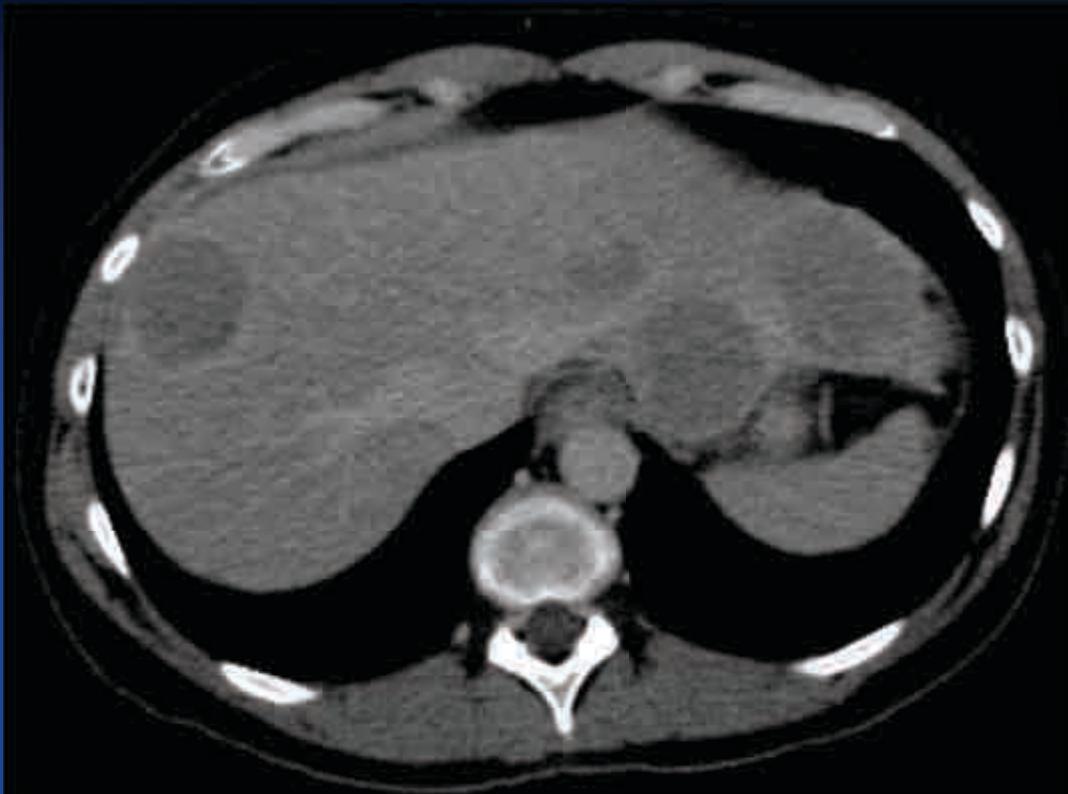


Most Likely?



Most Likely?

■ What do you do next?



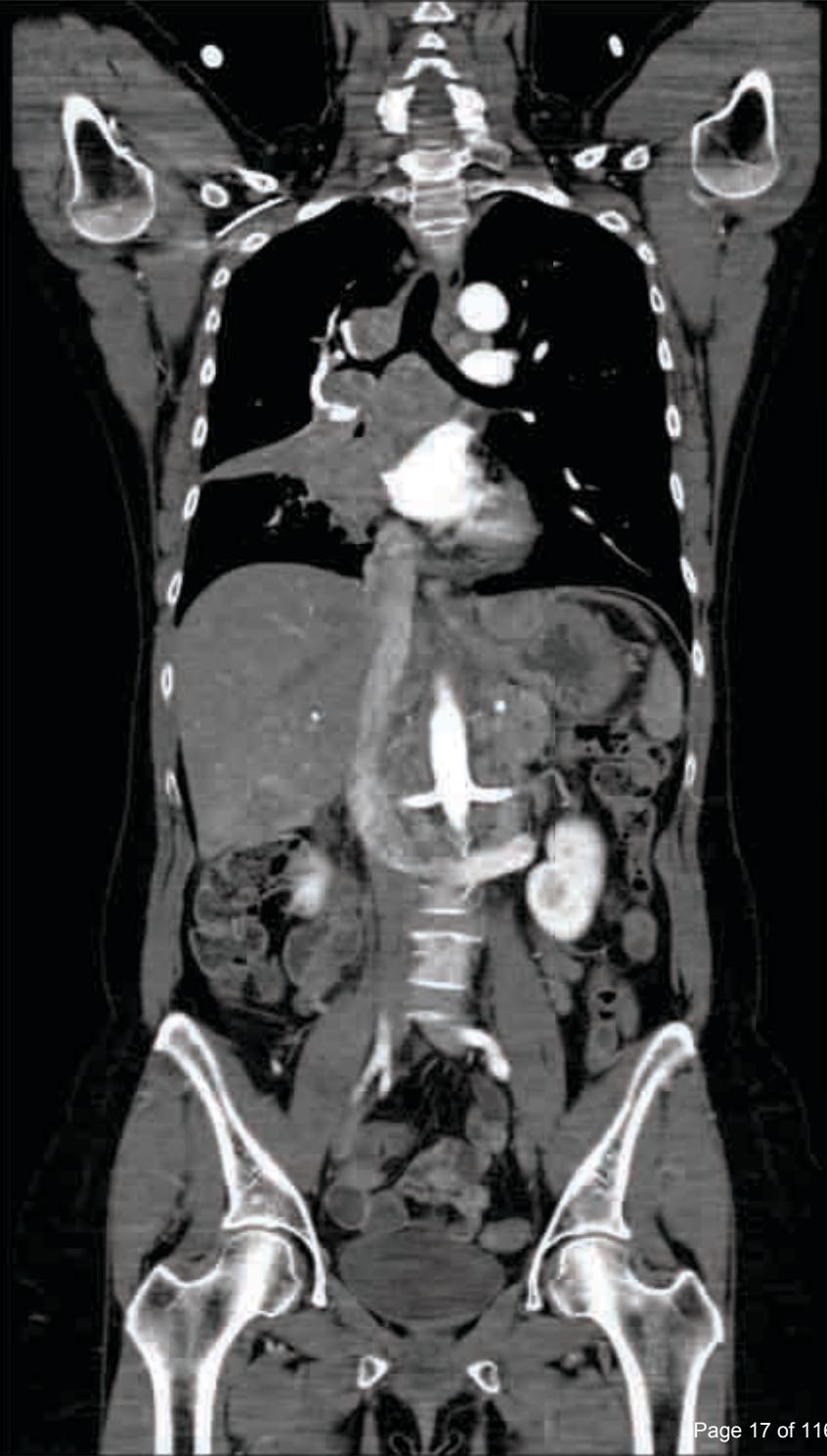
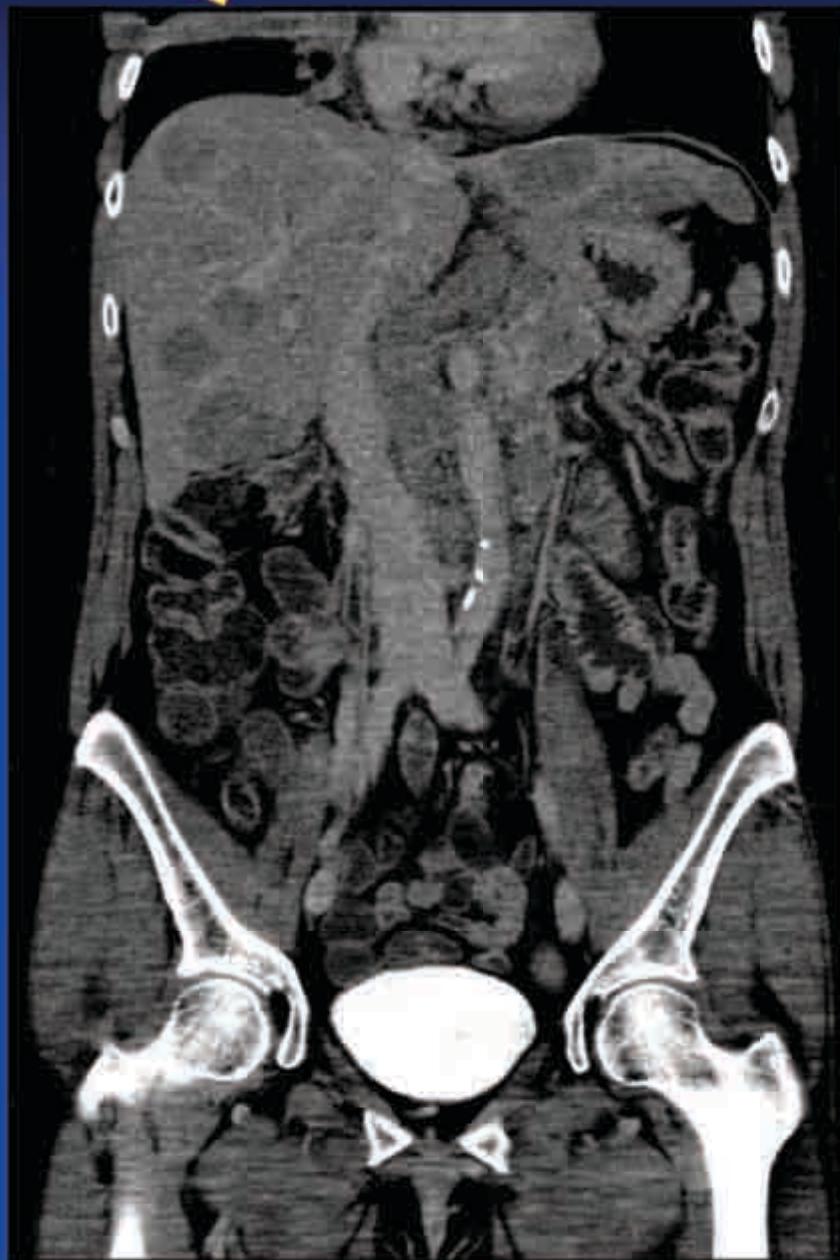
Most Likely?

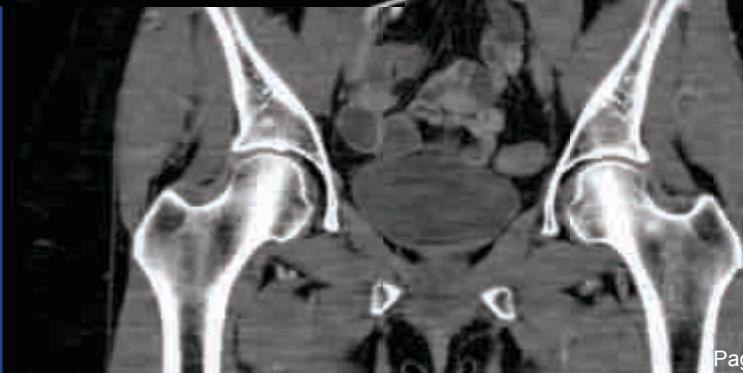
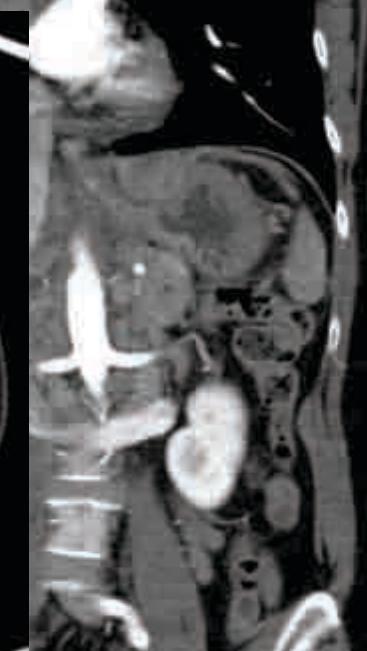
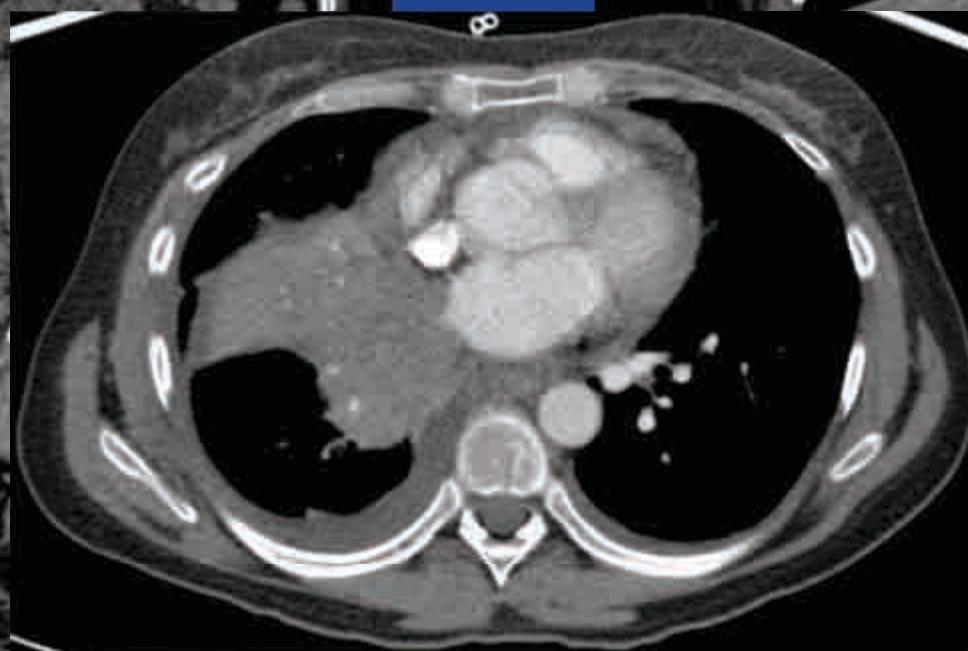
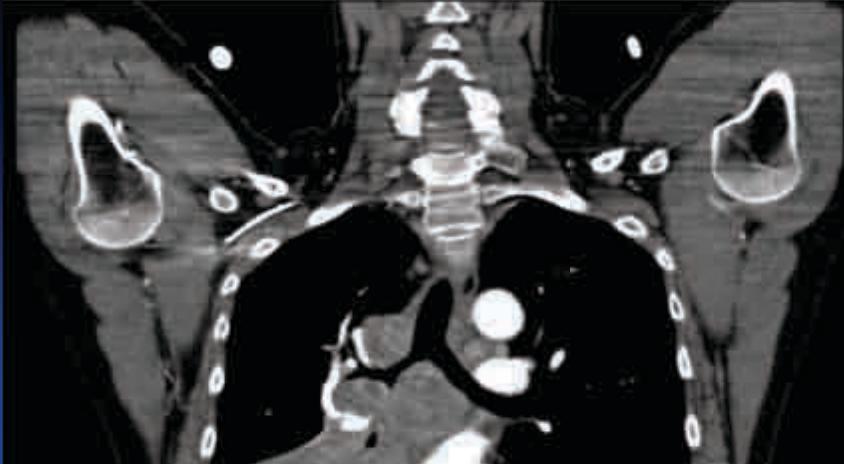
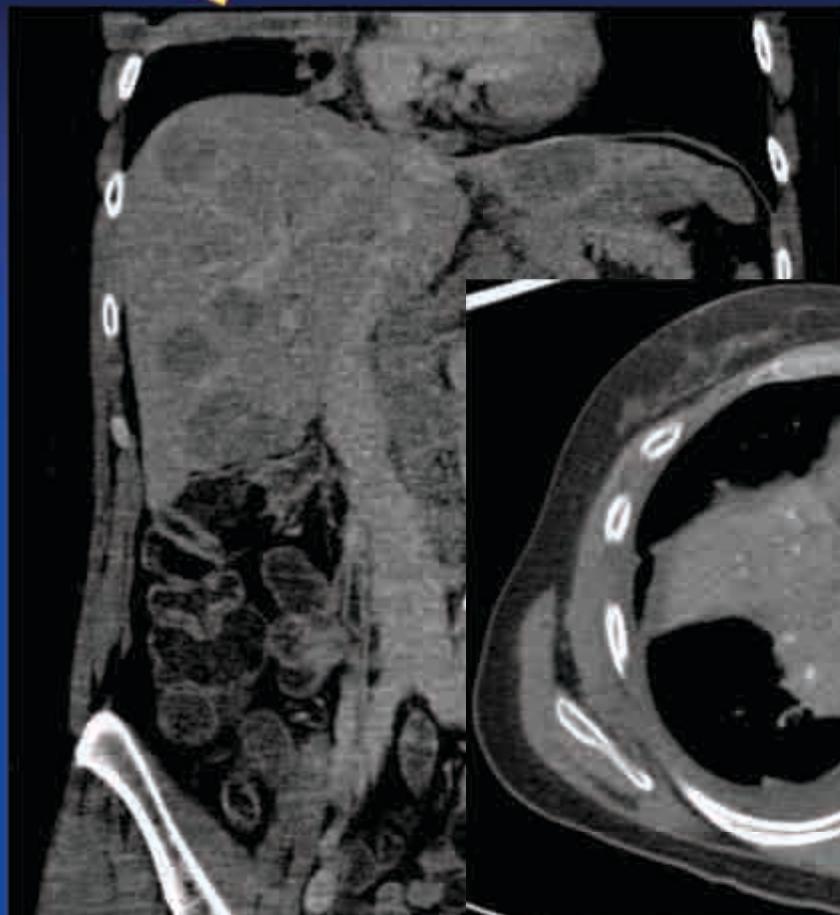
■ What do you do next?

- Biopsy and/or search for a primary

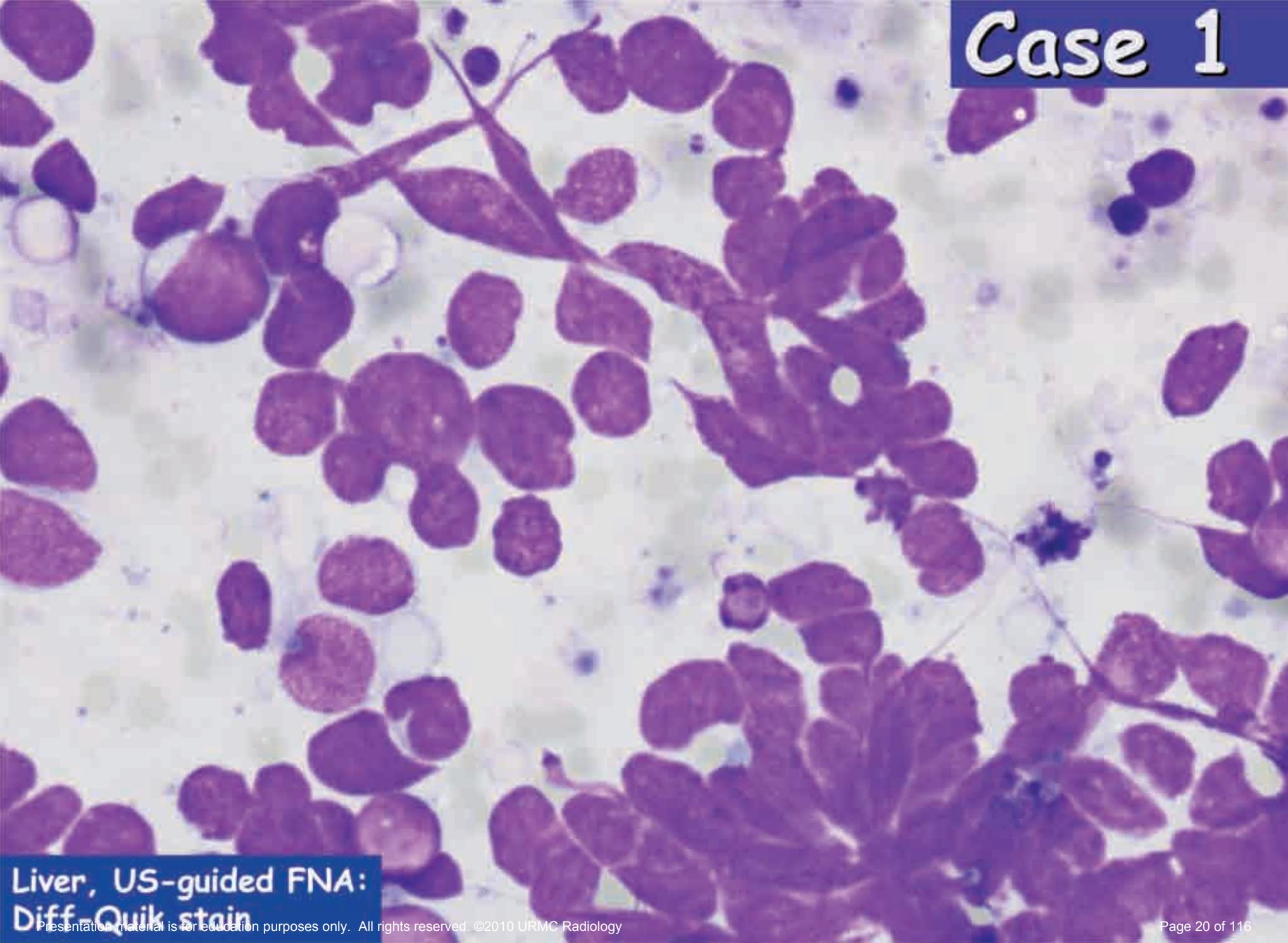




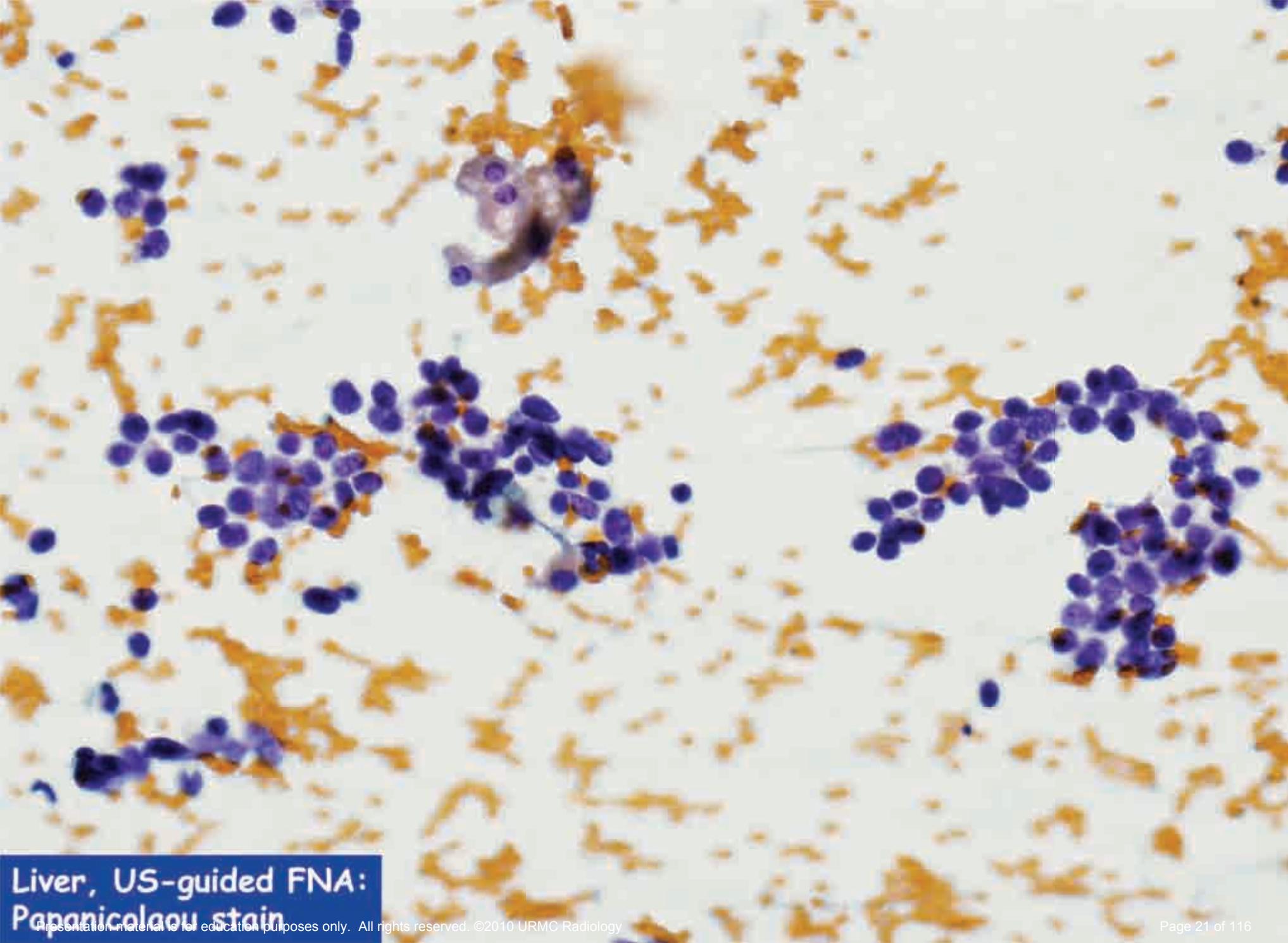




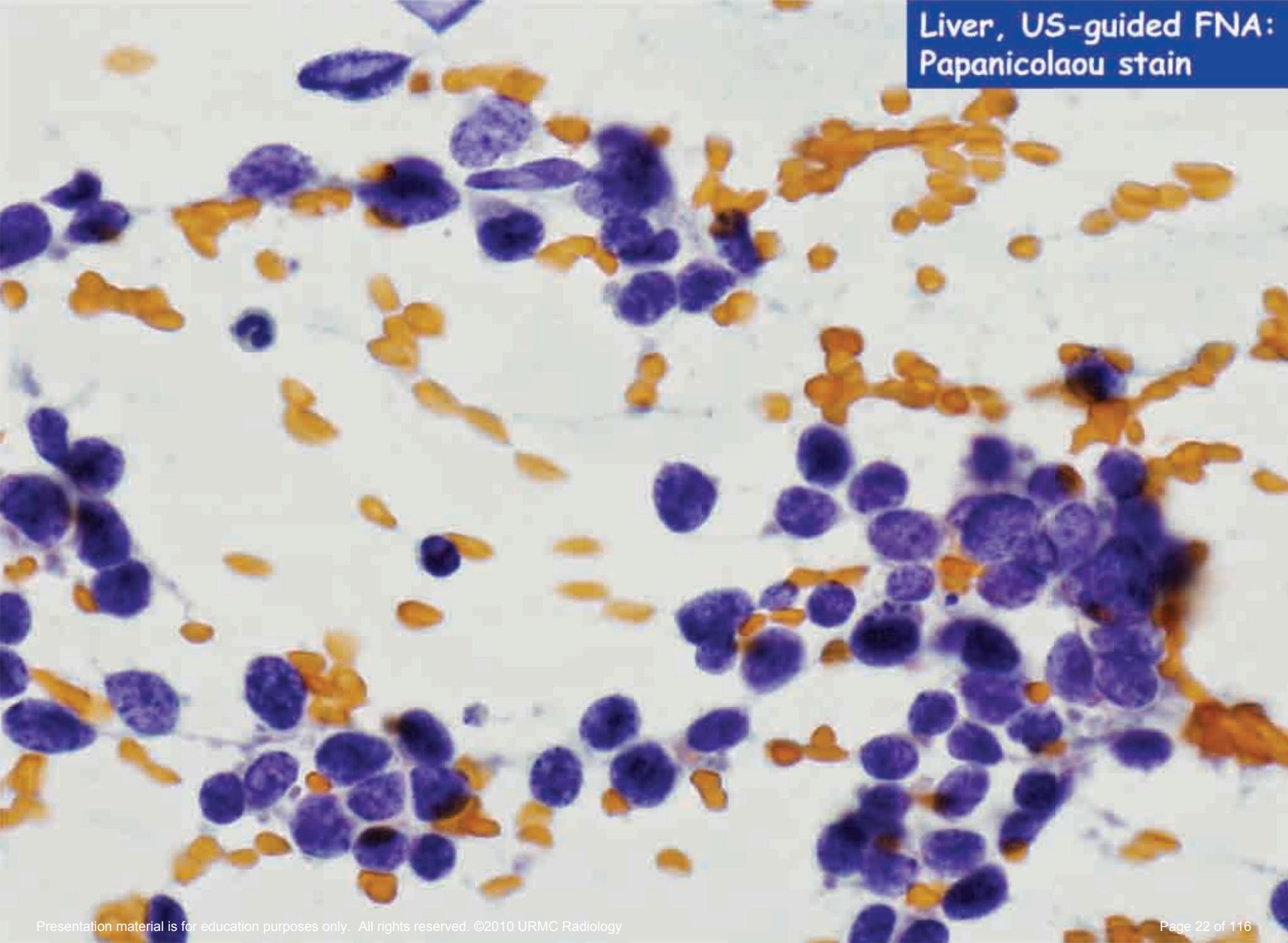




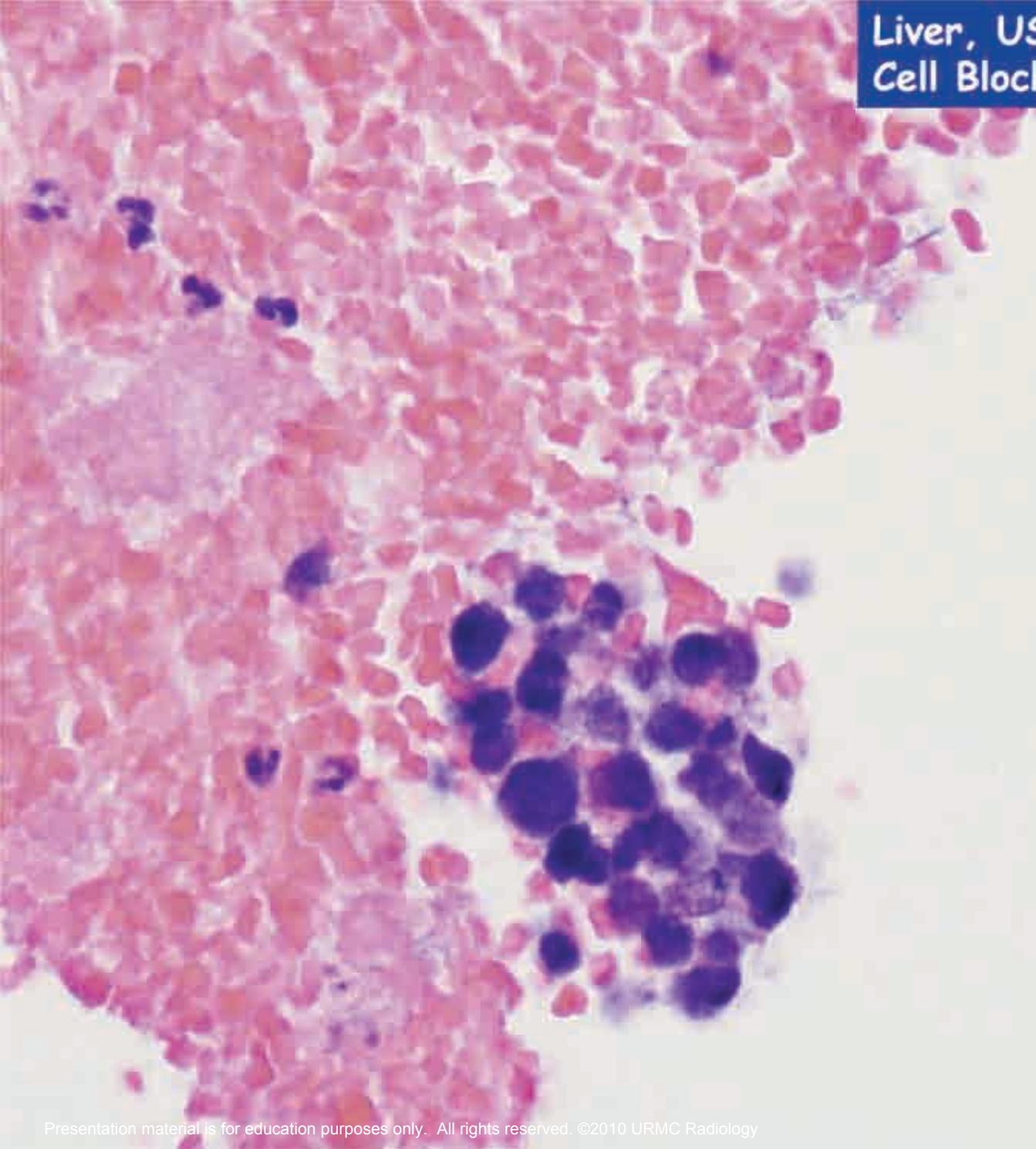
Liver, US-guided FNA:
Diff-Quik stain



Liver, US-guided FNA:
Papanicolaou stain



Liver, US-guided FNA:
Cell Block, hematoxylin & eosin stain



Liver, US-guided FNA:
Cell Block, Immunohistochemical stains

Cytokeratin

CD56

TTF-1

Liver, ultrasound-guided fine needle aspiration:

Malignant tumor cells present derived from small cell carcinoma.

Comment:

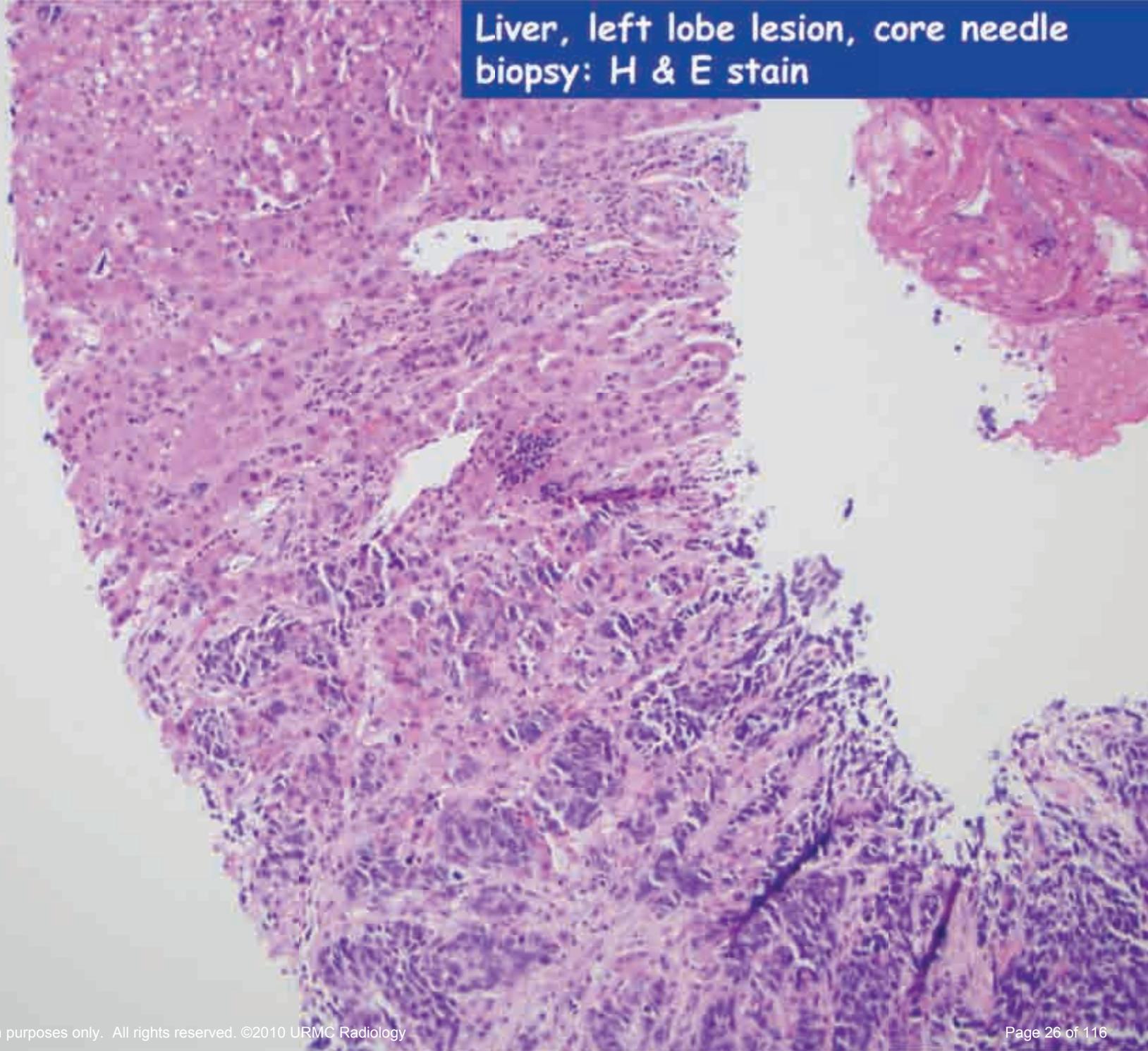
Immunohistochemical stains:

Positive: TTF-1, CD56, CK

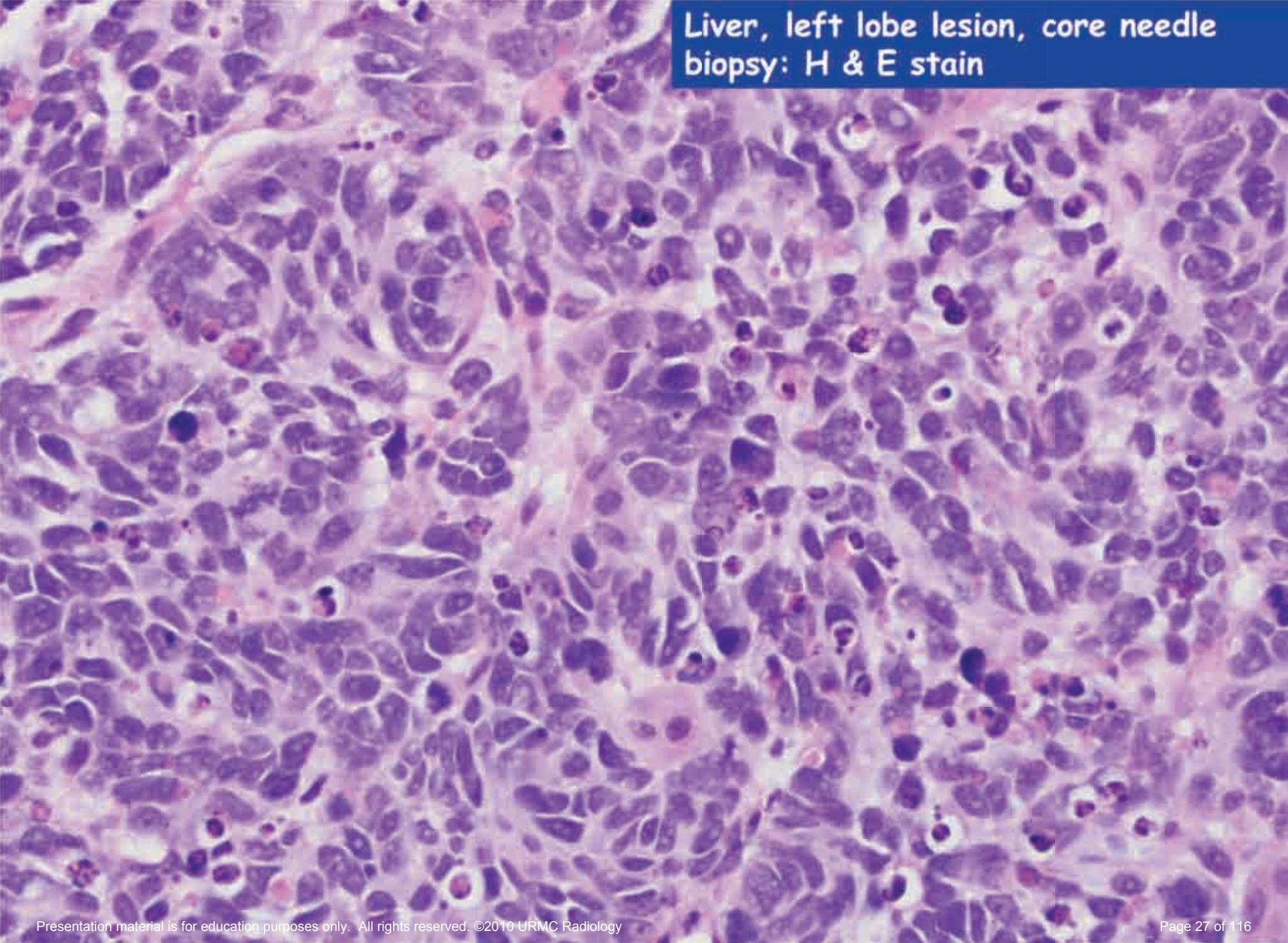
Negative: synaptophysin and chromogranin

This staining pattern supports small cell carcinoma, likely derived from the lung.
Clinical correlation is recommended.

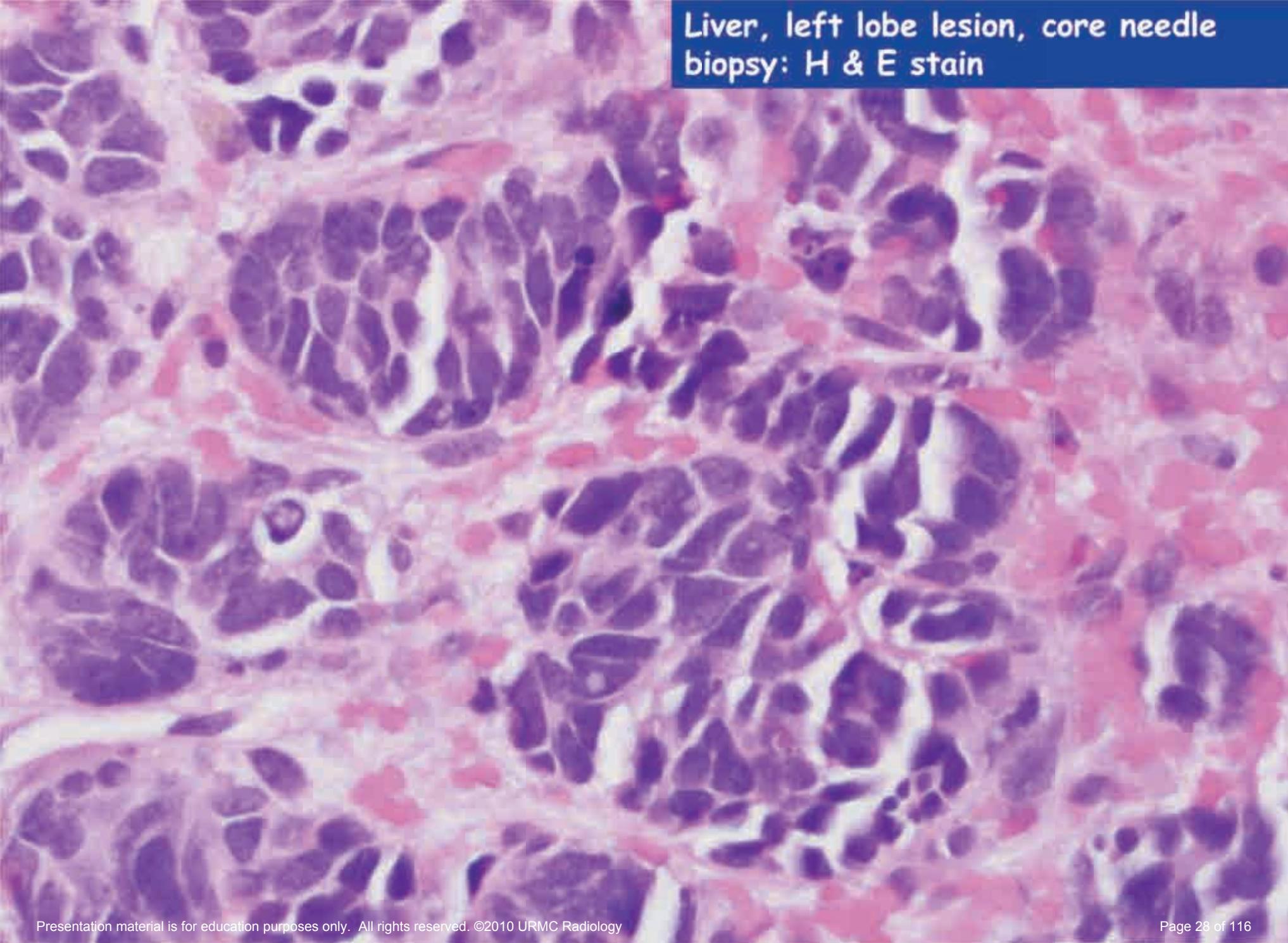
Liver, left lobe lesion, core needle biopsy: H & E stain



Liver, left lobe lesion, core needle biopsy: H & E stain



Liver, left lobe lesion, core needle biopsy: H & E stain



**Liver, left lobe lesion, core
needle biopsy:**

Small cell carcinoma

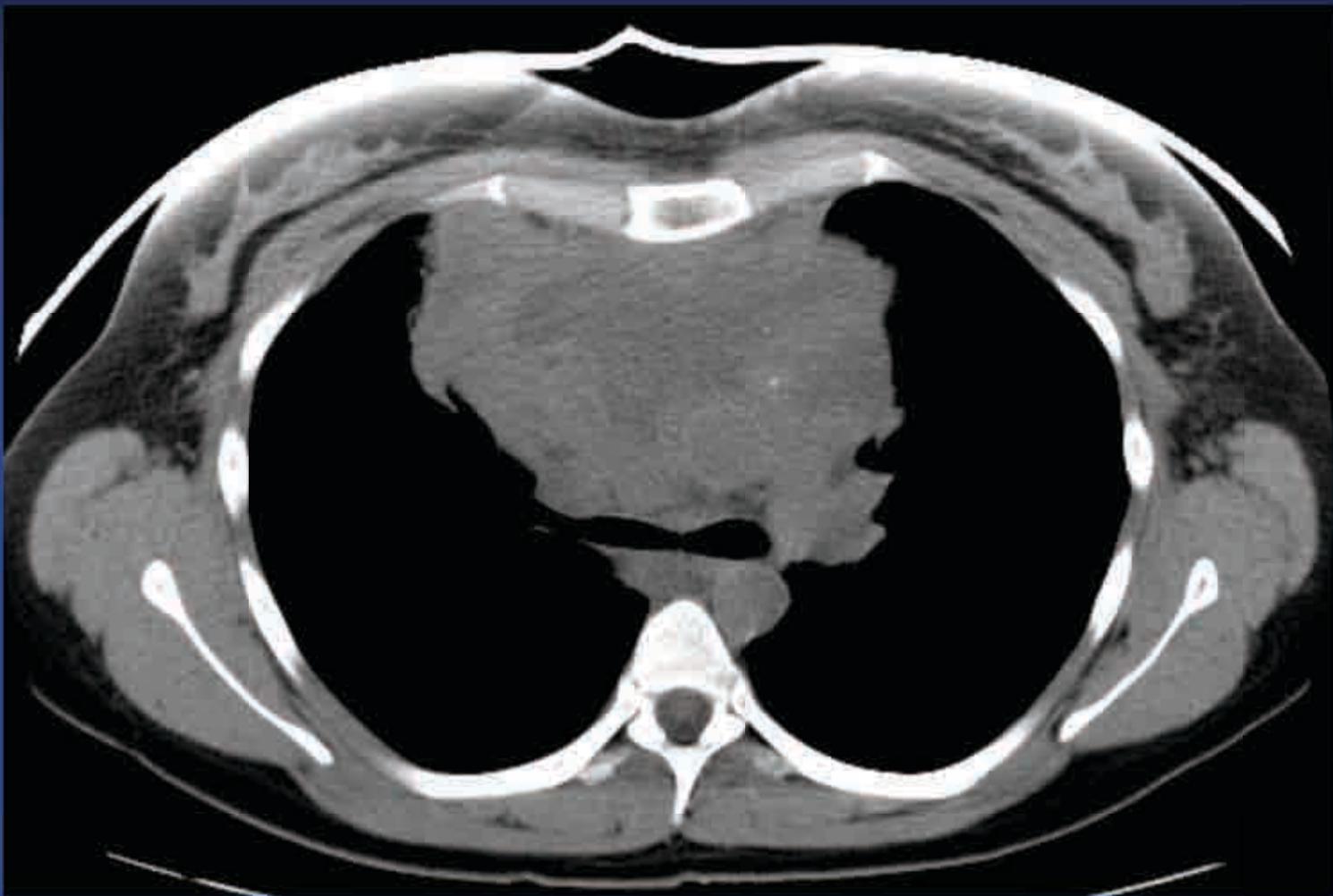
**Flow cytometry: Negative for
monoclonal B-cell population.**

Small Cell Carcinoma

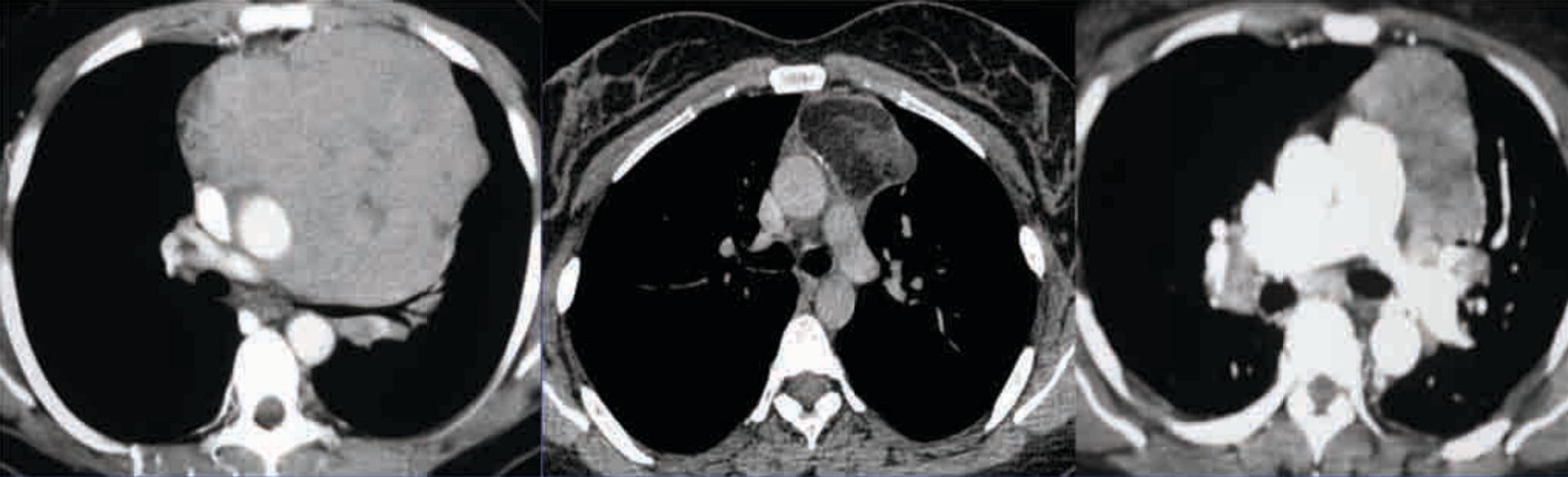
- 10-20% of lung carcinomas
- M>F, median age 60, 99% smokers
- Can be associated with paraneoplastic syndromes (ADH, ACTH, PTH, calcitonin, etc.)
- Aggressive, often present with positive lymph nodes
 - 5 year survival stage I-II: 30-40%, stage III-IV: 10-20%
- Usually hilar mass with necrosis
- Immunohistochemistry: CK, TTF1 (90%), CD56, synaptophysin, chromogranin

Case 2

30 year old female presents with two weeks of headache, neck swelling, blurry vision and epistaxis

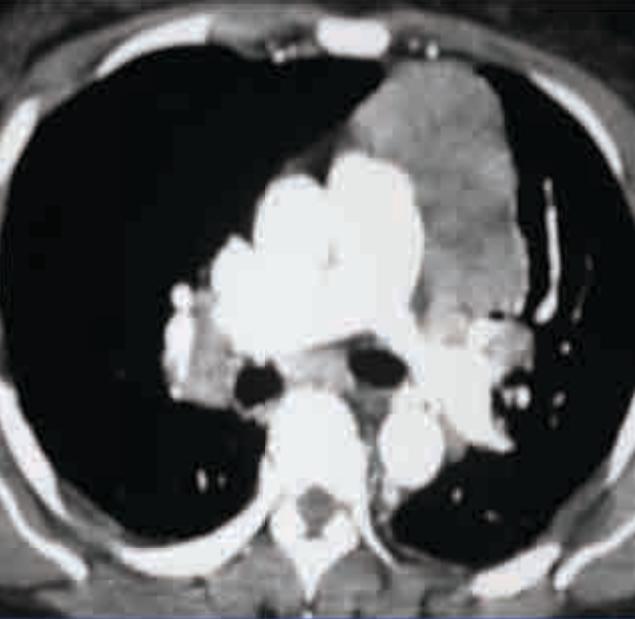
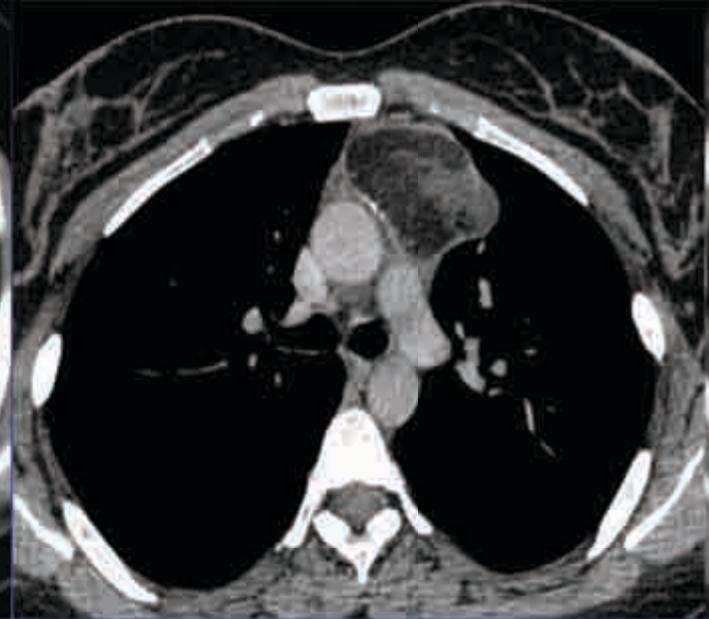
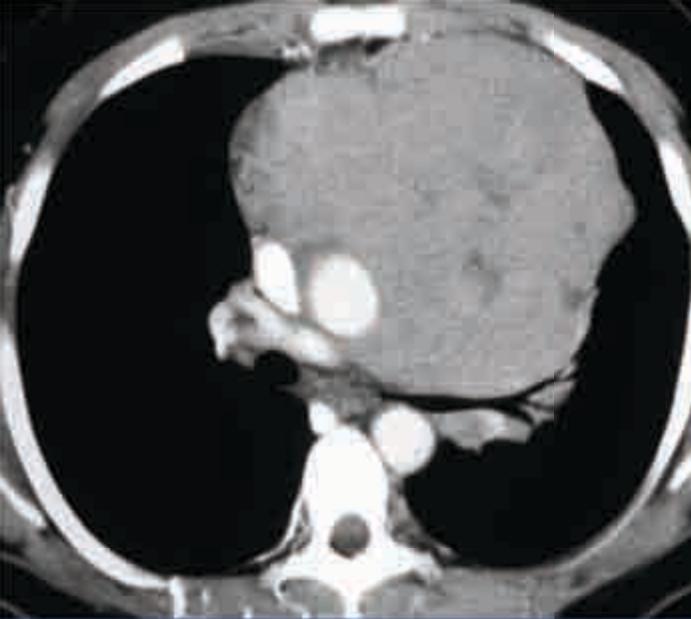






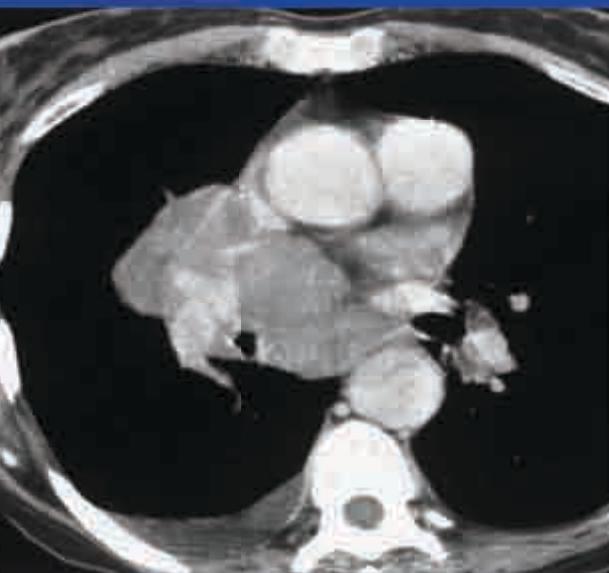
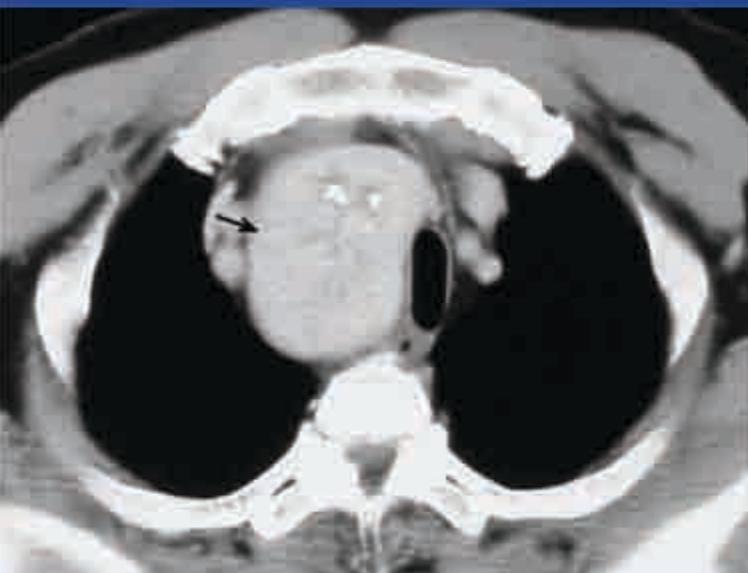
Lymphoma

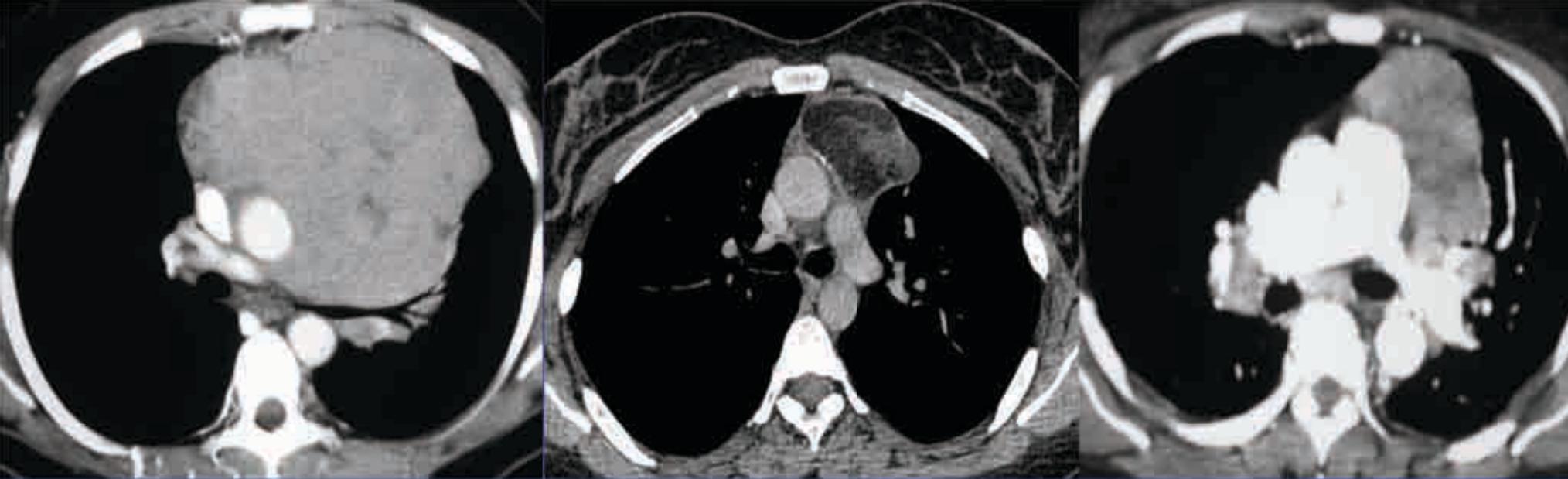




Lymphoma

Teratoma (Germ Cell)





Lymphoma

Teratoma (Germ Cell)

Thymoma





Lymphoma

Teratoma (Germ Cell)

Thymoma



Thyroid Goiter/CA



Lymphoma

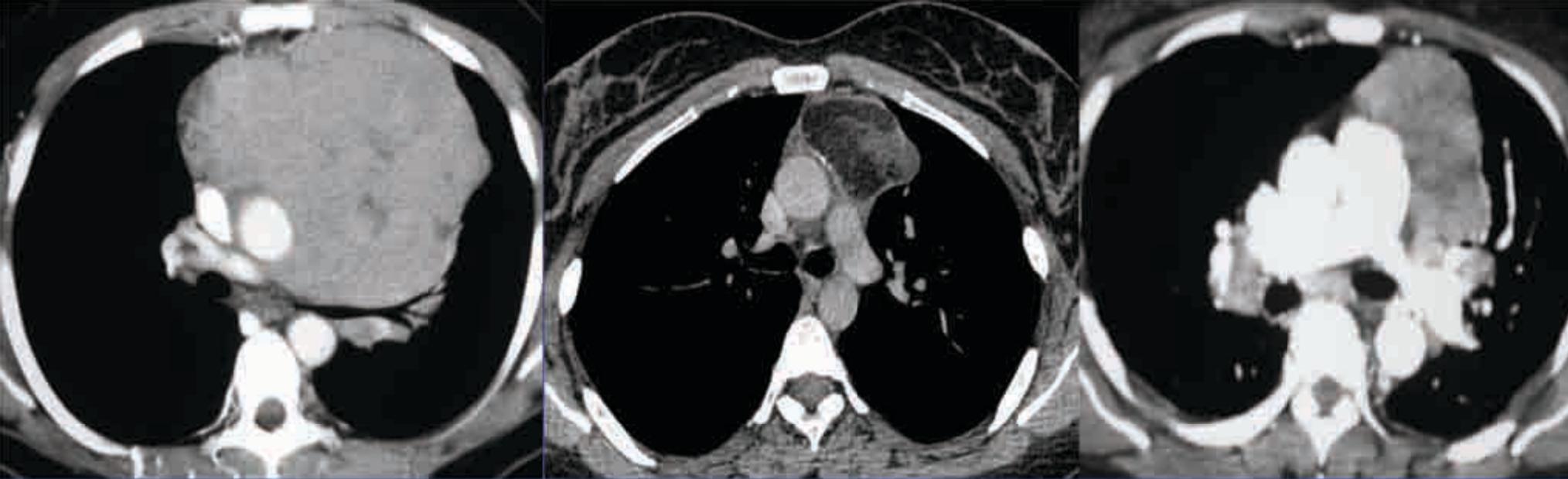
Teratoma (Germ Cell)

Thymoma



Thyroid Goiter/CA

Metastases



Lymphoma

Teratoma (Germ Cell)

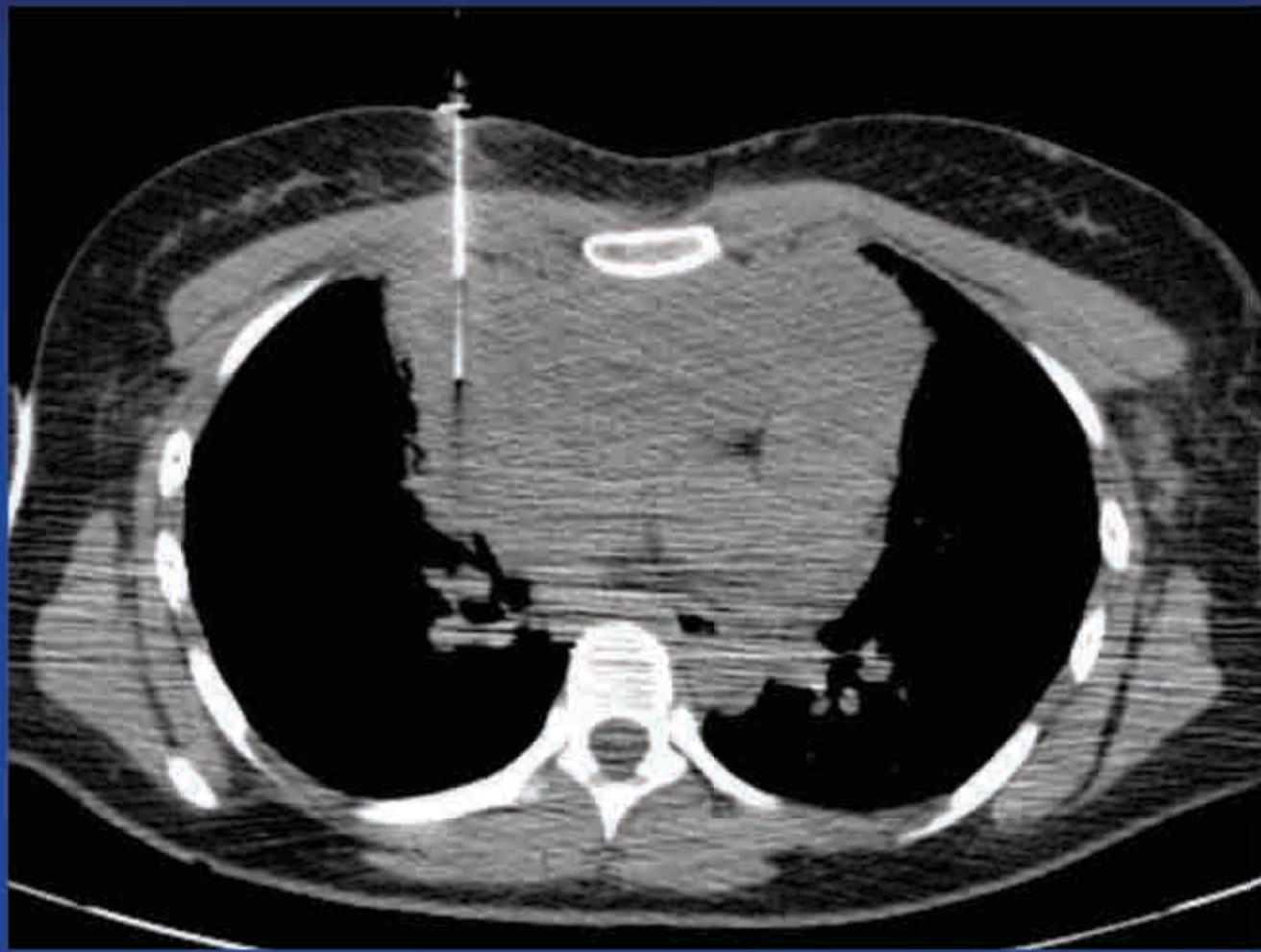
Thymoma



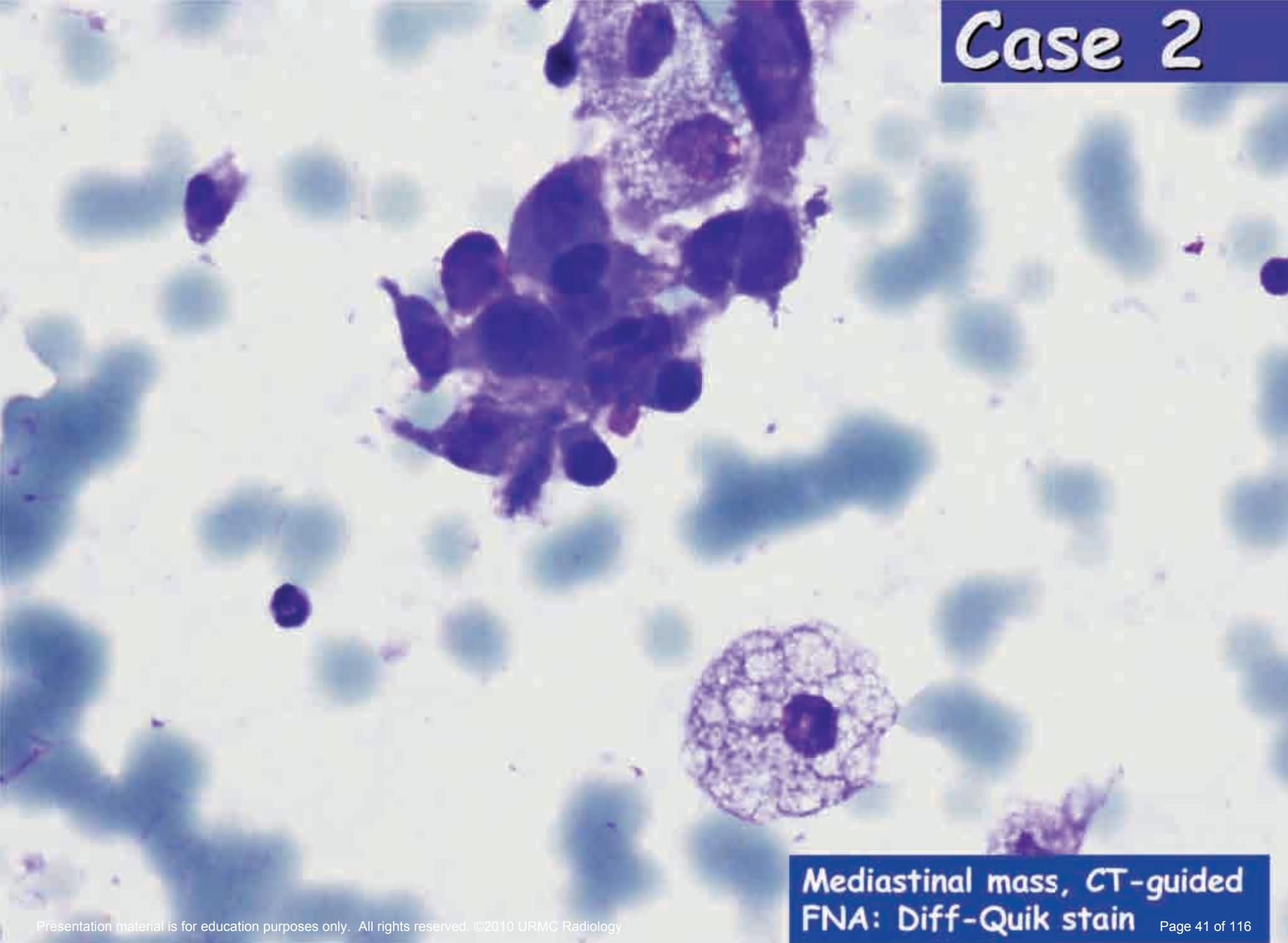
Thyroid Goiter/CA

Metastases

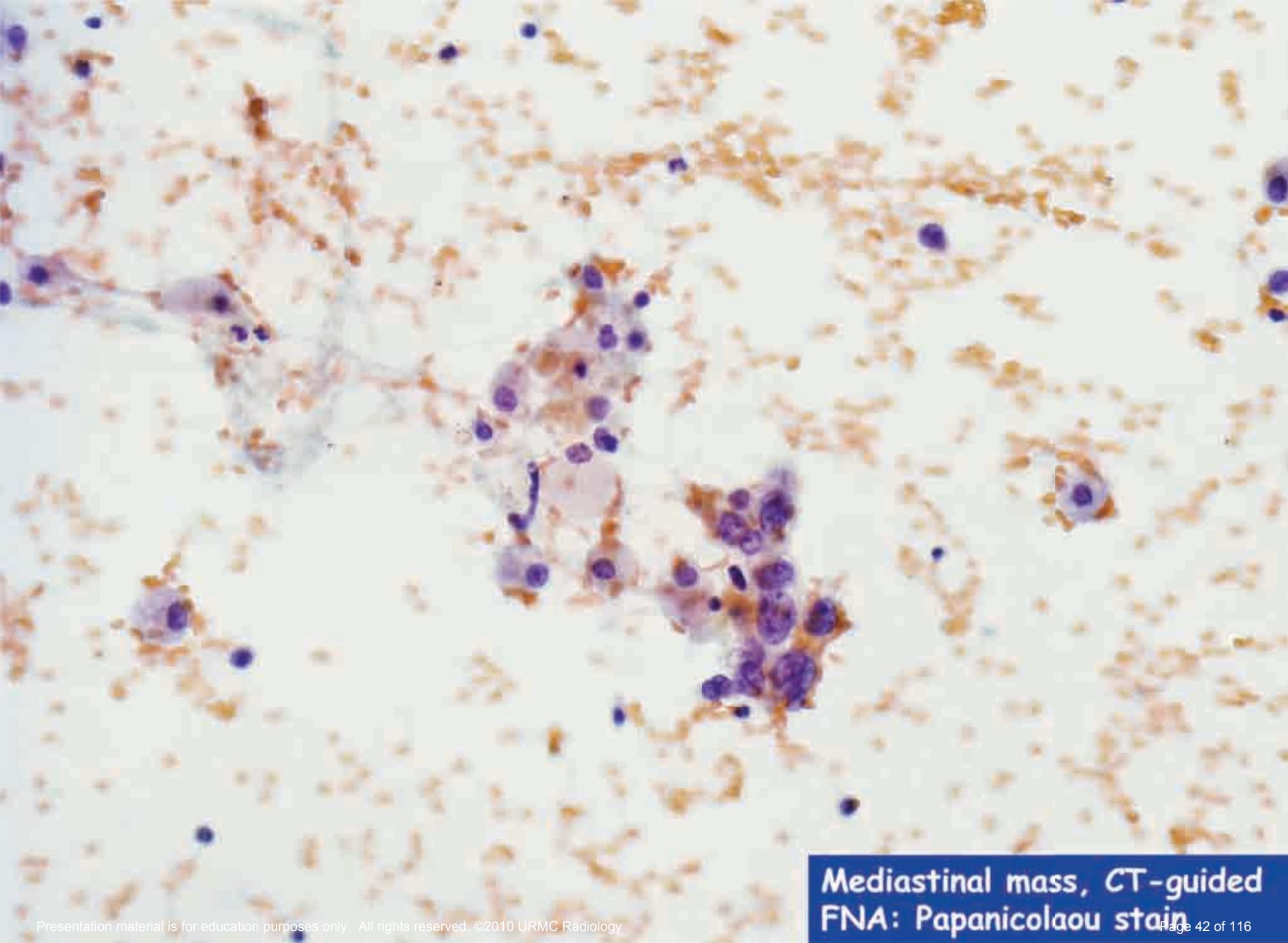
Small Cell CA



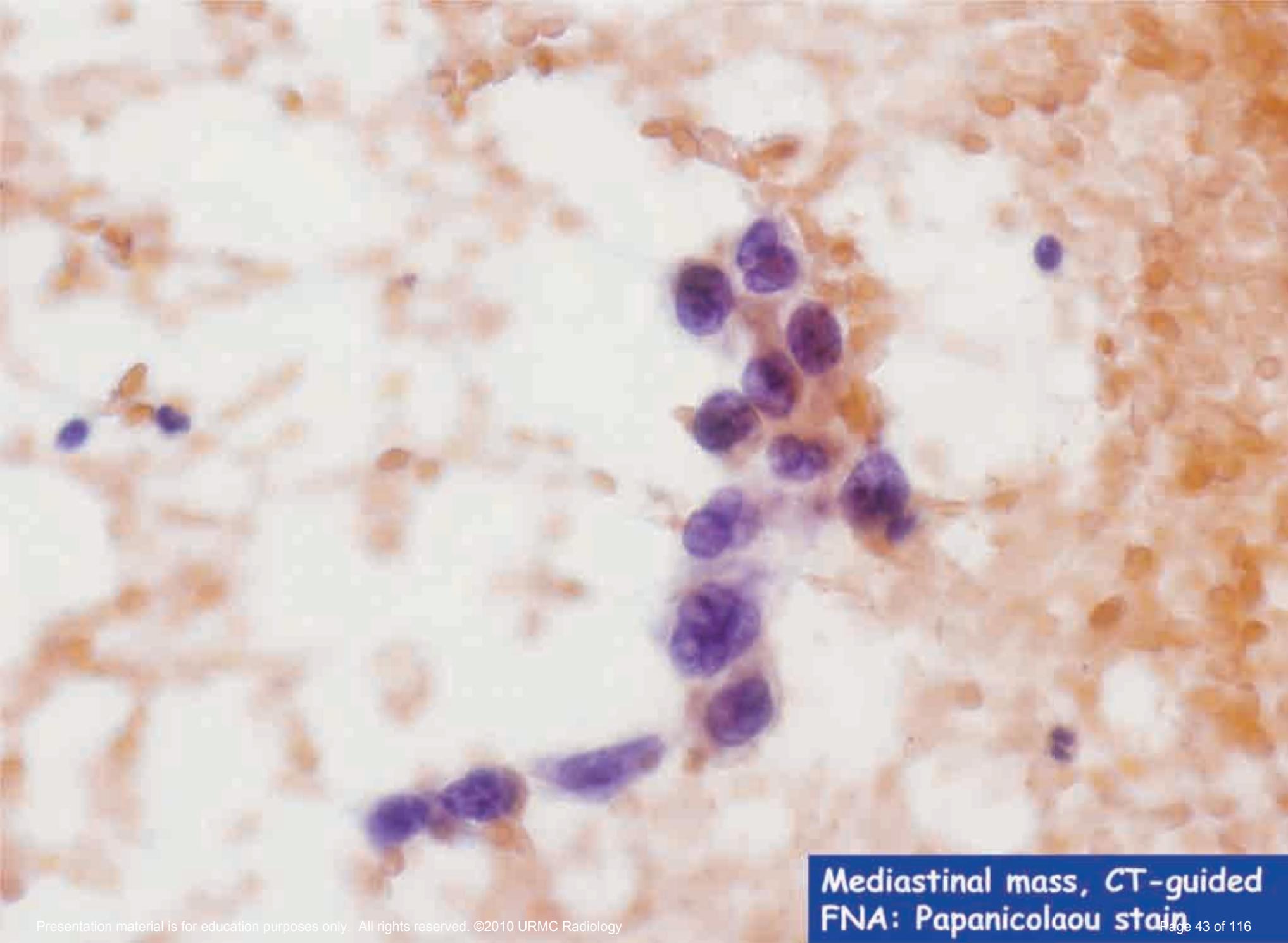
Case 2



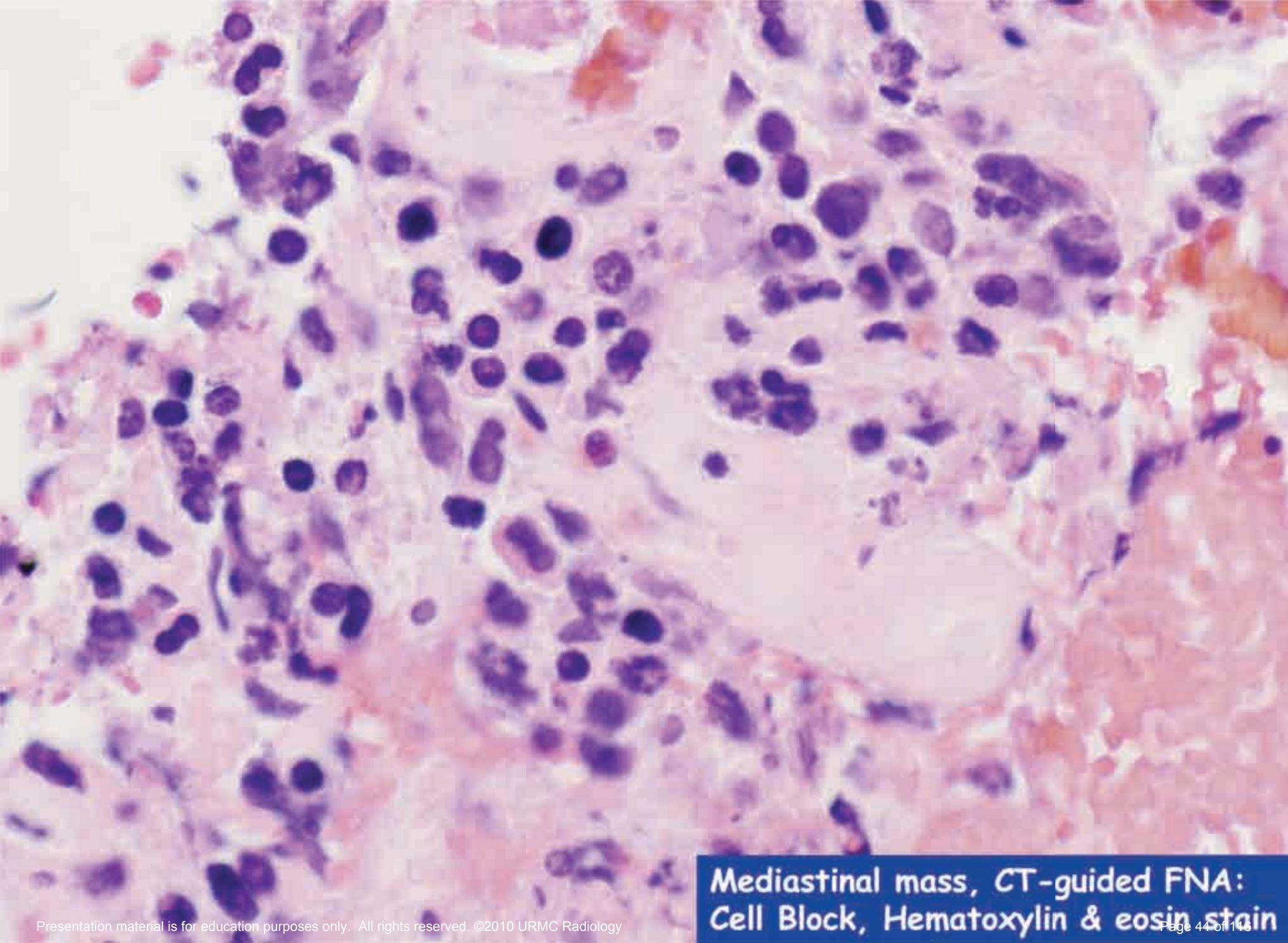
Mediastinal mass, CT-guided
FNA: Diff-Quik stain



Mediastinal mass, CT-guided
FNA: Papanicolaou stain



Mediastinal mass, CT-guided
FNA: Papanicolaou stain



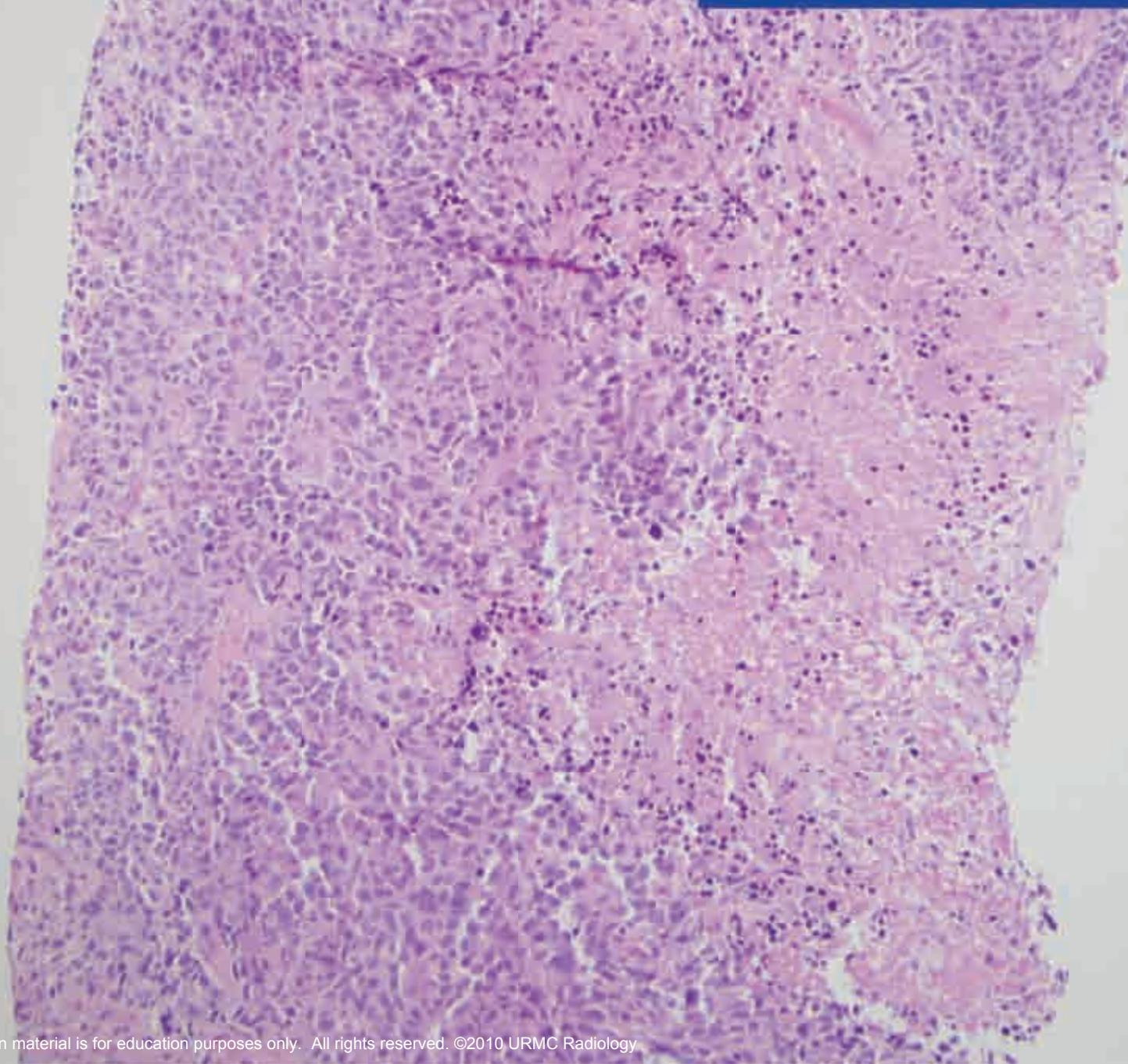
Mediastinal mass, CT-guided FNA:
Cell Block, Hematoxylin & eosin stain

Mediastinal Mass, CT-guided fine needle aspiration:

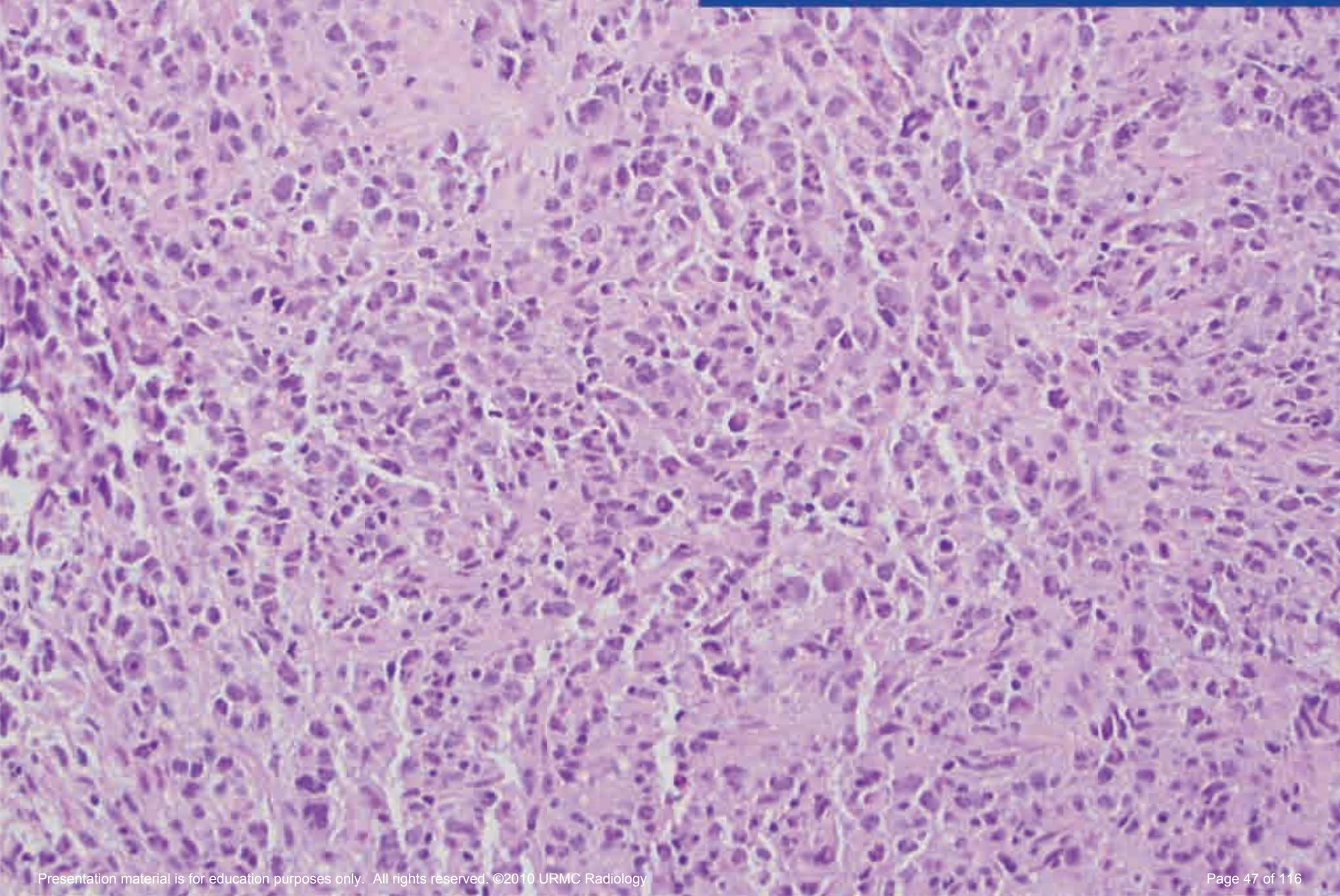
Malignant tumor cells present.

Comment: See surgical biopsy report for further characterization.

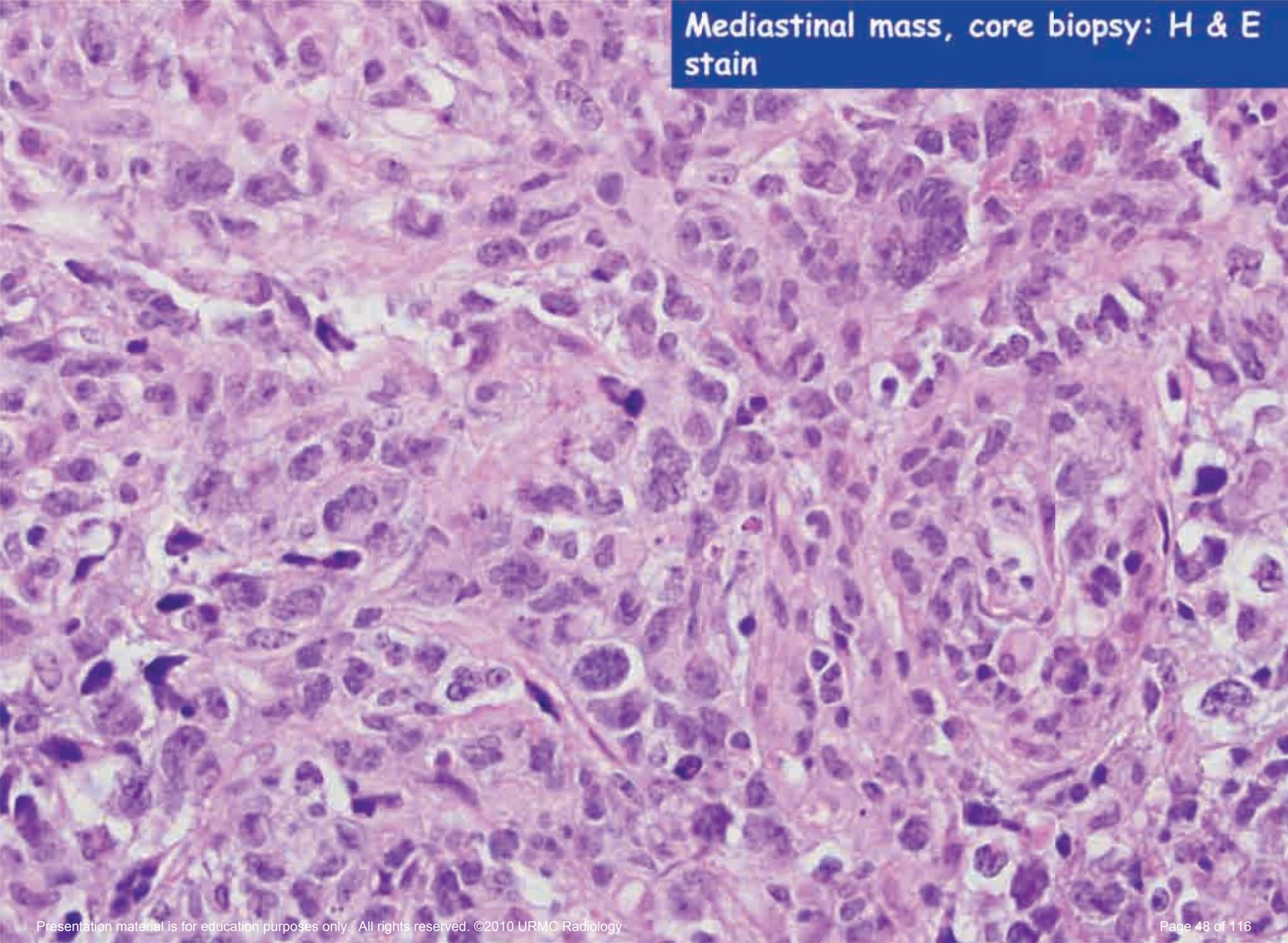
Mediastinal mass, core biopsy: H & E stain



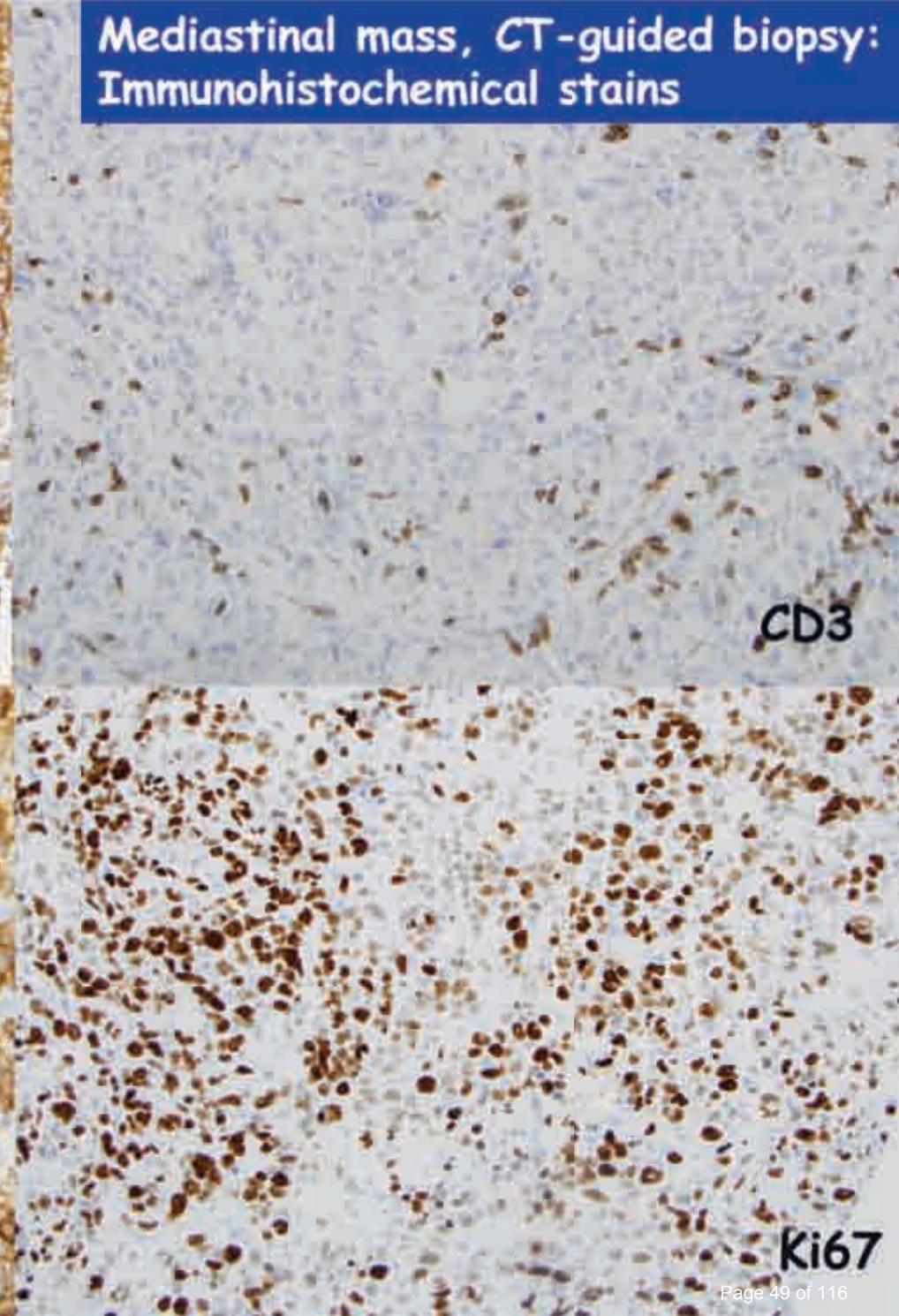
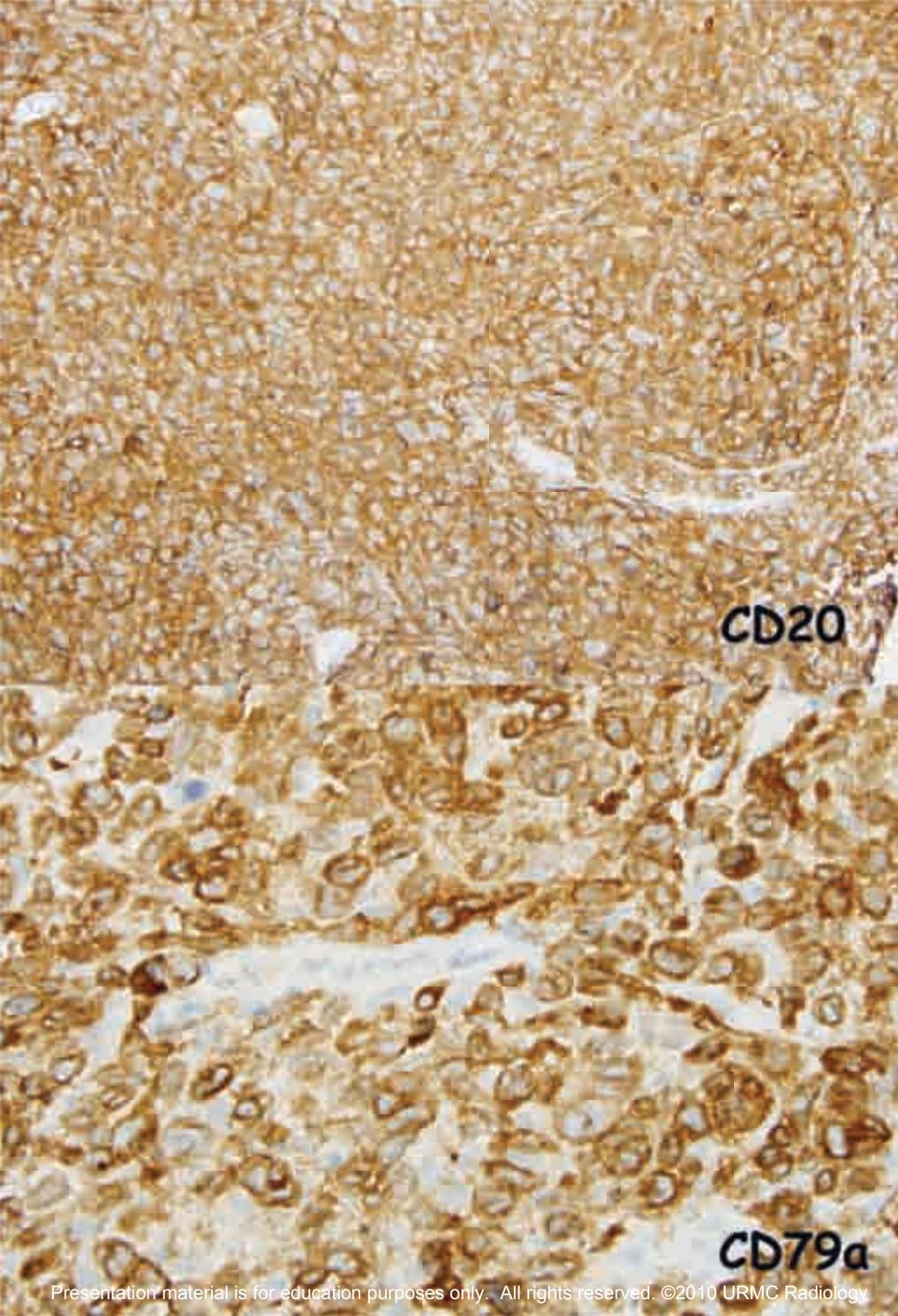
Mediastinal mass, core biopsy: H & E stain



Mediastinal mass, core biopsy: H & E stain



Mediastinal mass, CT-guided biopsy:
Immunohistochemical stains



CD79a

Ki67

Mediastinal Mass, CT-guided core biopsy:

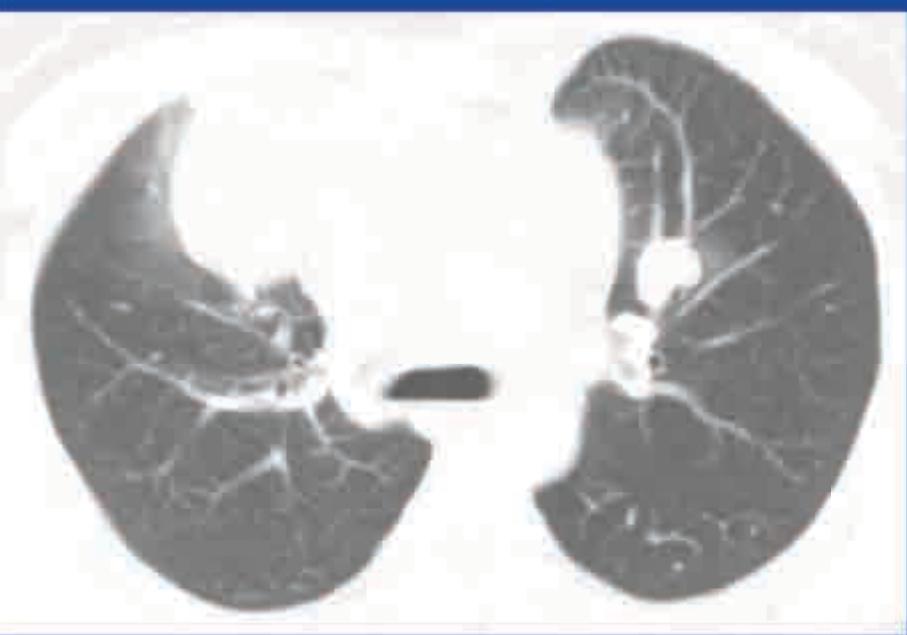
Primary mediastinal large B-cell lymphoma.

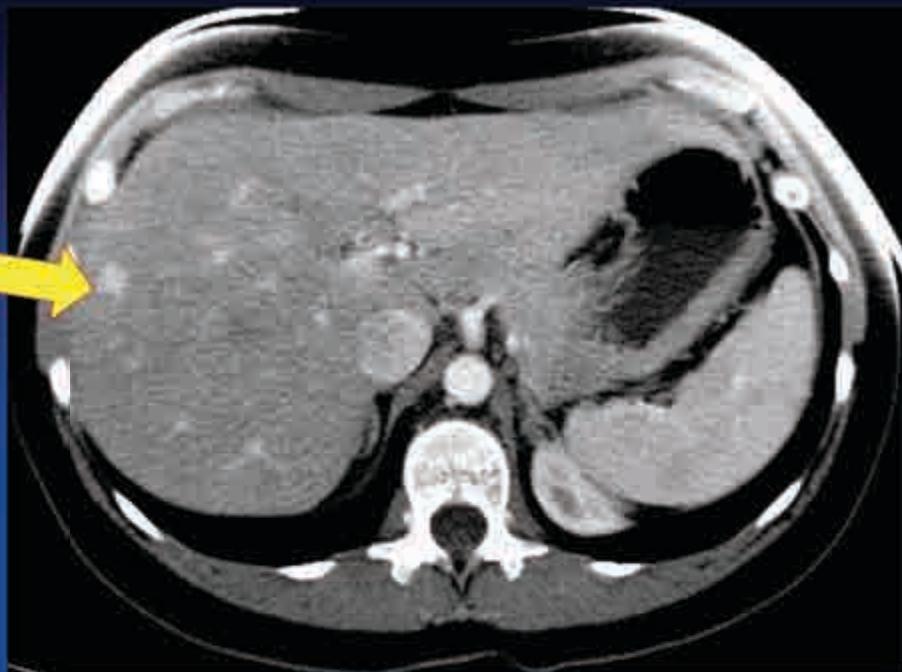
Comment: Core biopsy shows sheets of large lymphoid cells with pleomorphic nuclei, often compartmentalized by fine sclerosis. Cells are strongly positive for CD20, CD79a, and weakly positive for CD45 with scattered small CD3 positive T-cells in the background.

Primary Mediastinal Large B-cell Lymphoma

- Thymic B-cell origin
- Median age 35, M:F = 1:2
- Most commonly present with SVC syndrome and/or B symptoms
- Present with bulky mass and can involve regional nodes, but no systemic involvement (or DLBCL)
- Morphology: Usually uniform cells with pale cytoplasm, but can be pleomorphic and often associated with compartmentalizing fibrosis

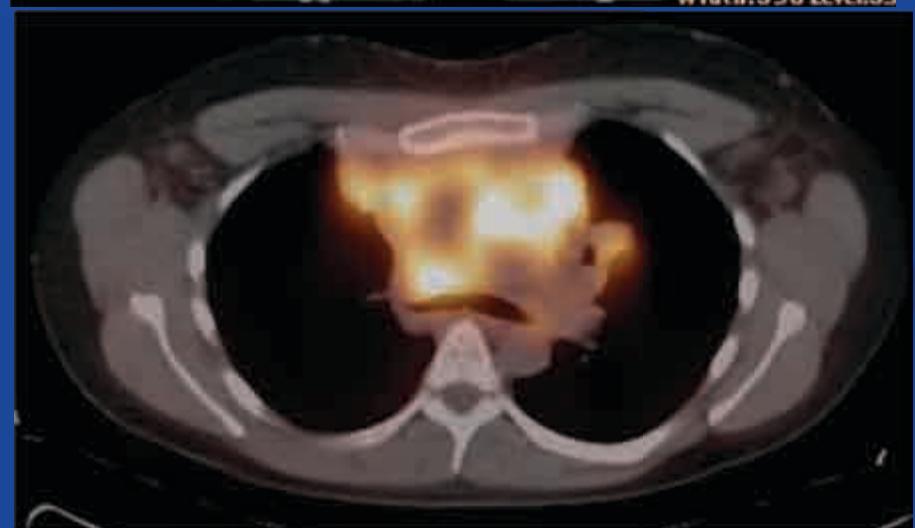
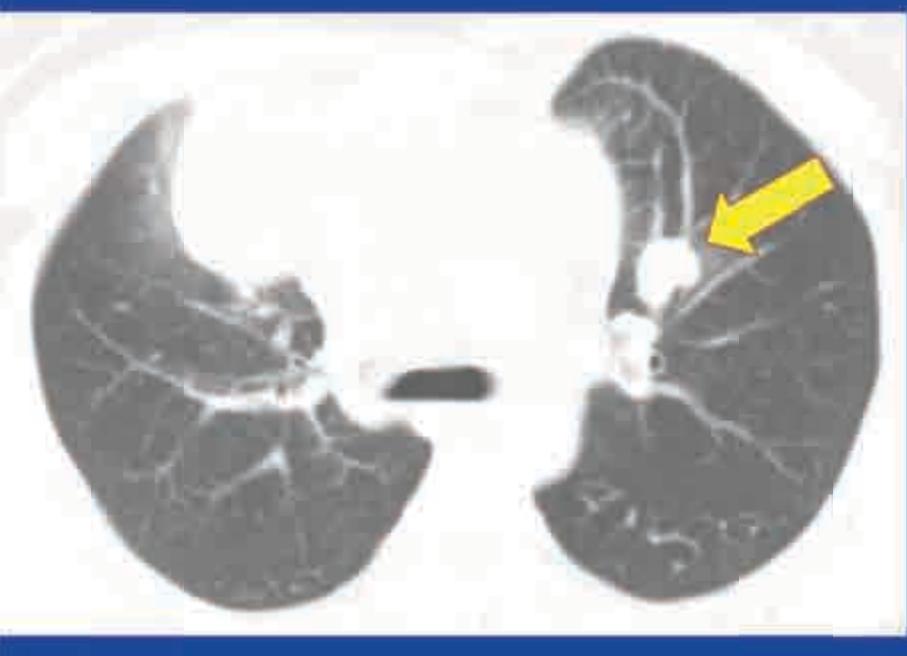
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CT: Body-Low Dose CT





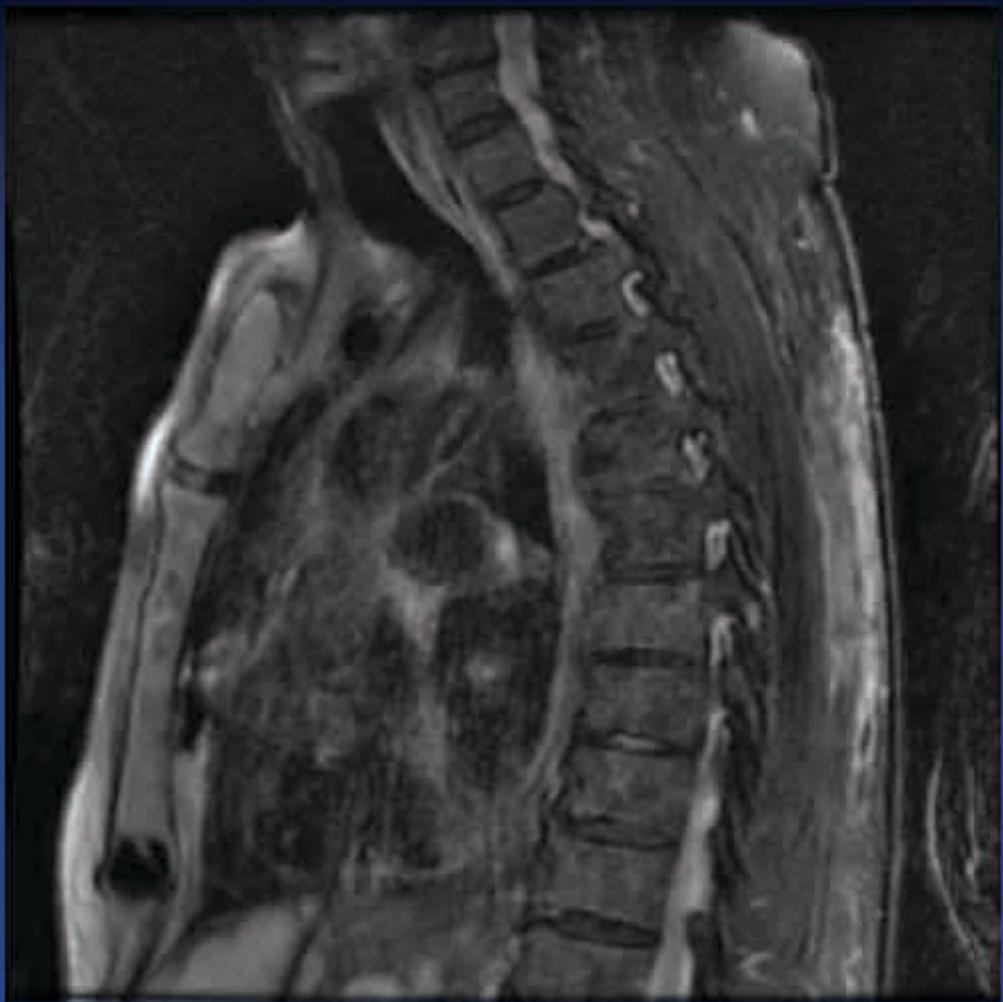
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CT: Body-Low Dose CT



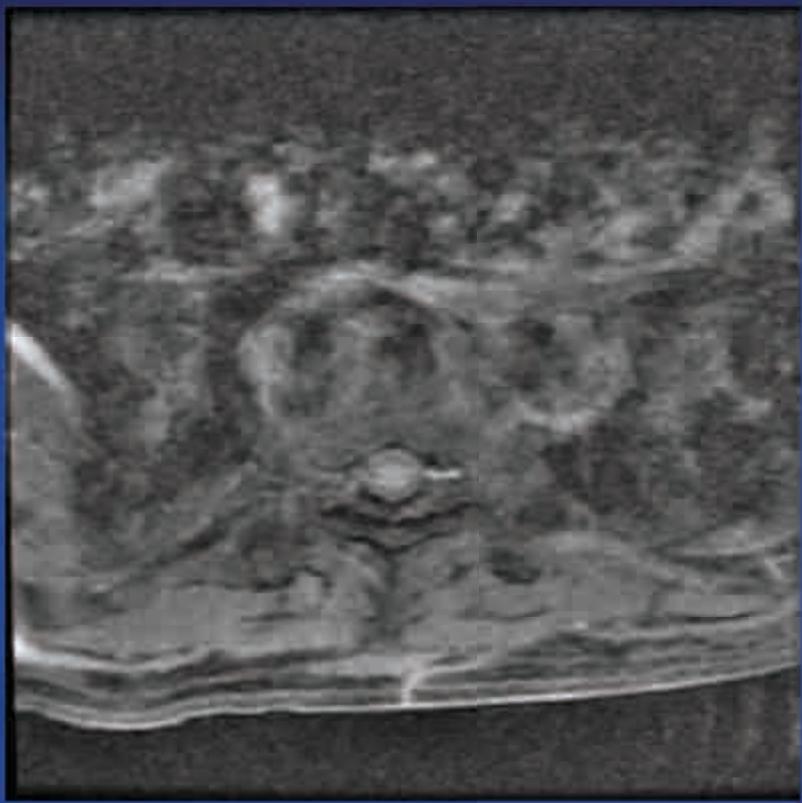


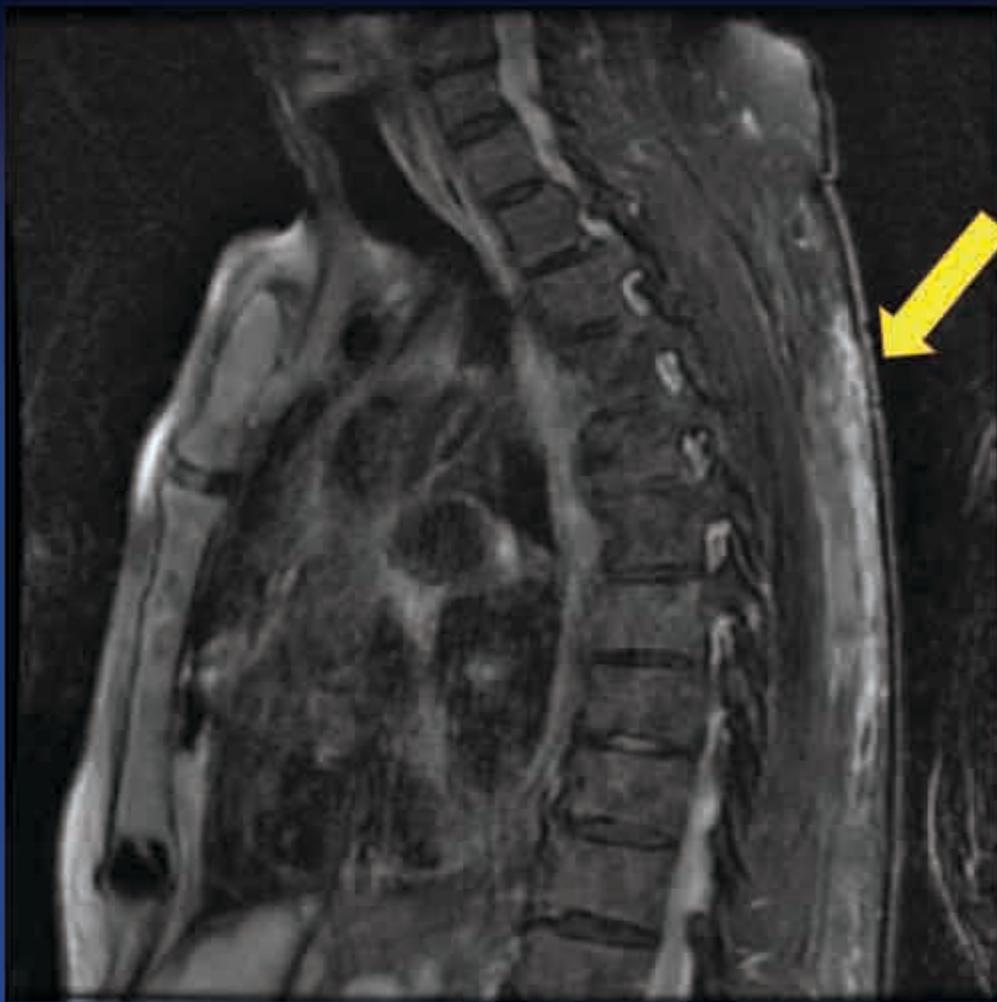
Case 3

**83 yo Male with Hx of dedifferentiated
liposarcoma of the back and chest wall
s/p resection and chemoradiation**

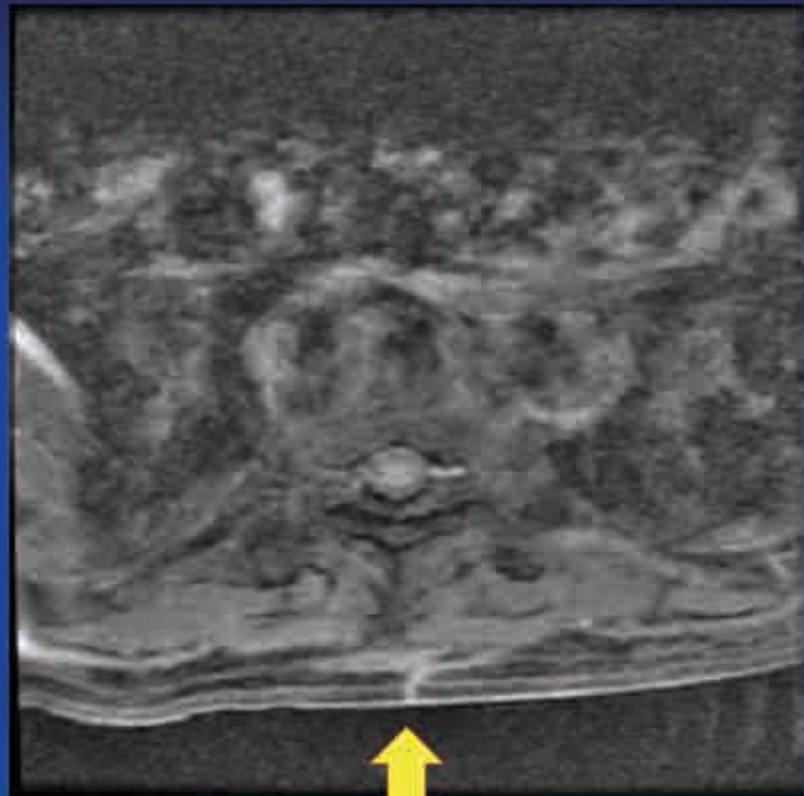


T2 w/ fat-sat

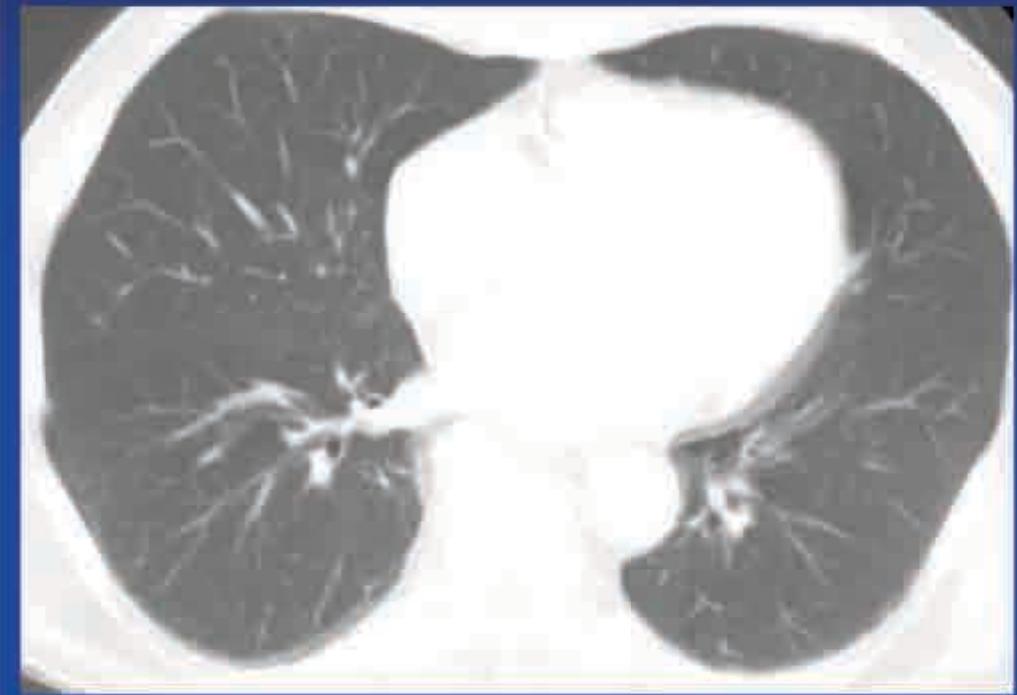




T2 w/ fat-sat



Post-treatment Changes

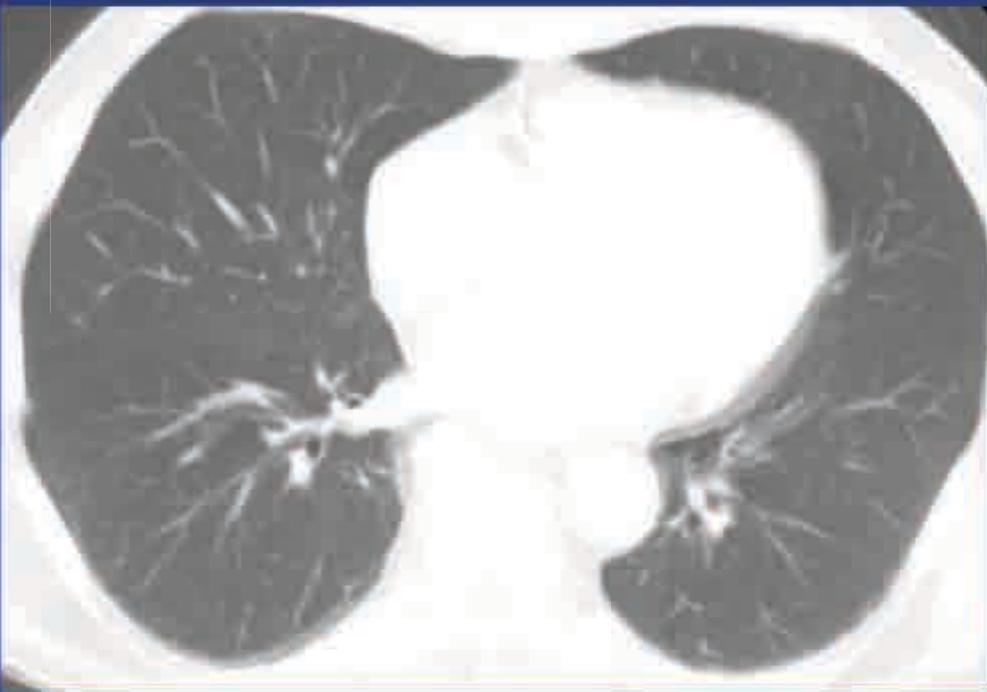


1 month post-op

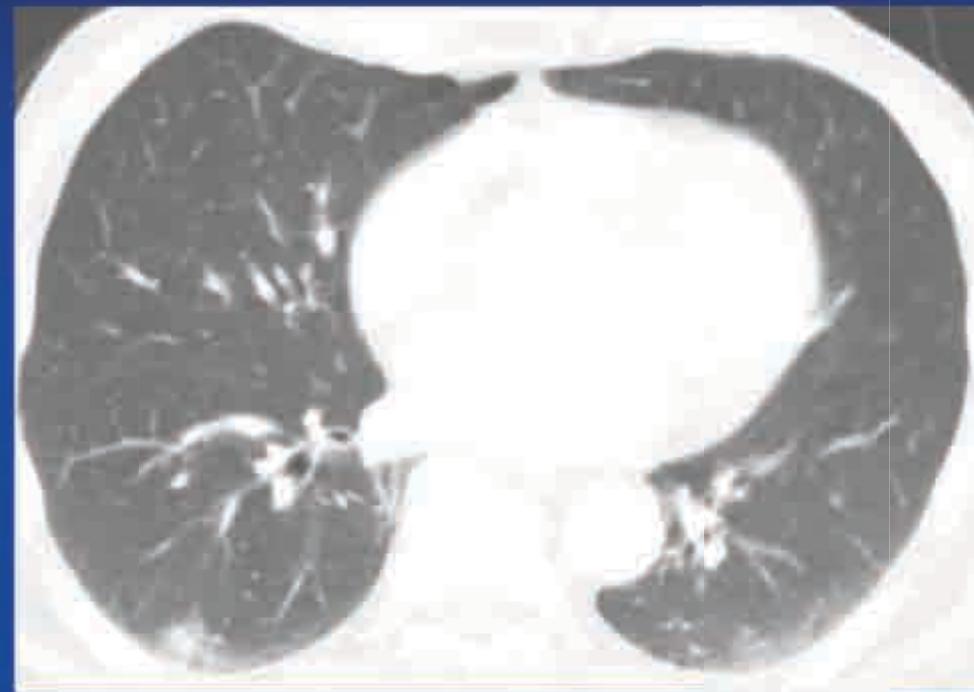


3 month post-op

DDX: Atelectasis, Early Fibrosis, Infection, Metastasis

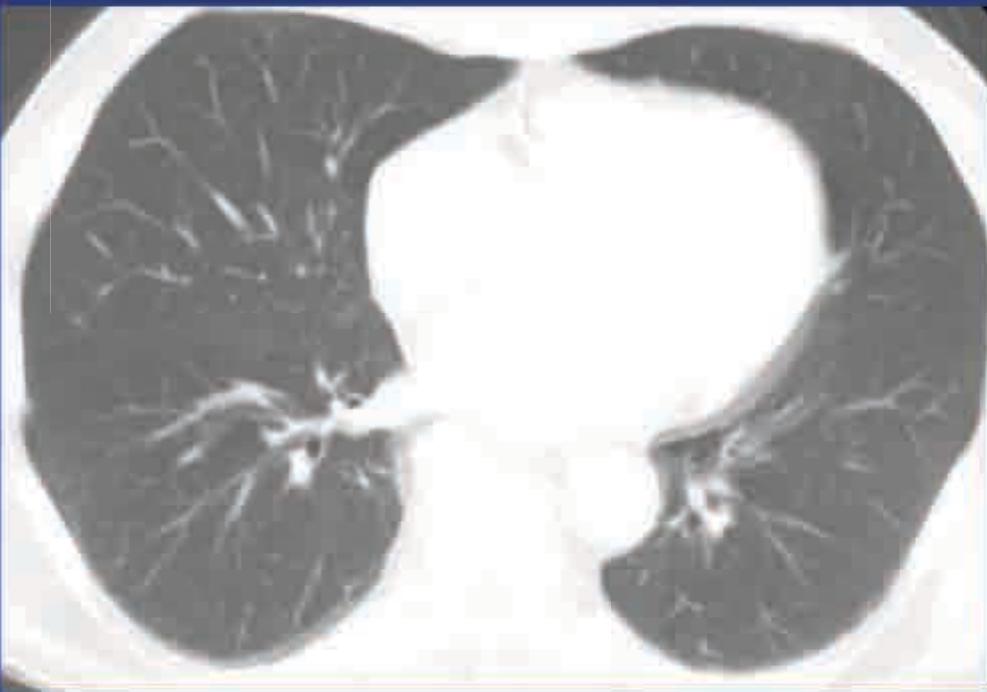


1 month post-op

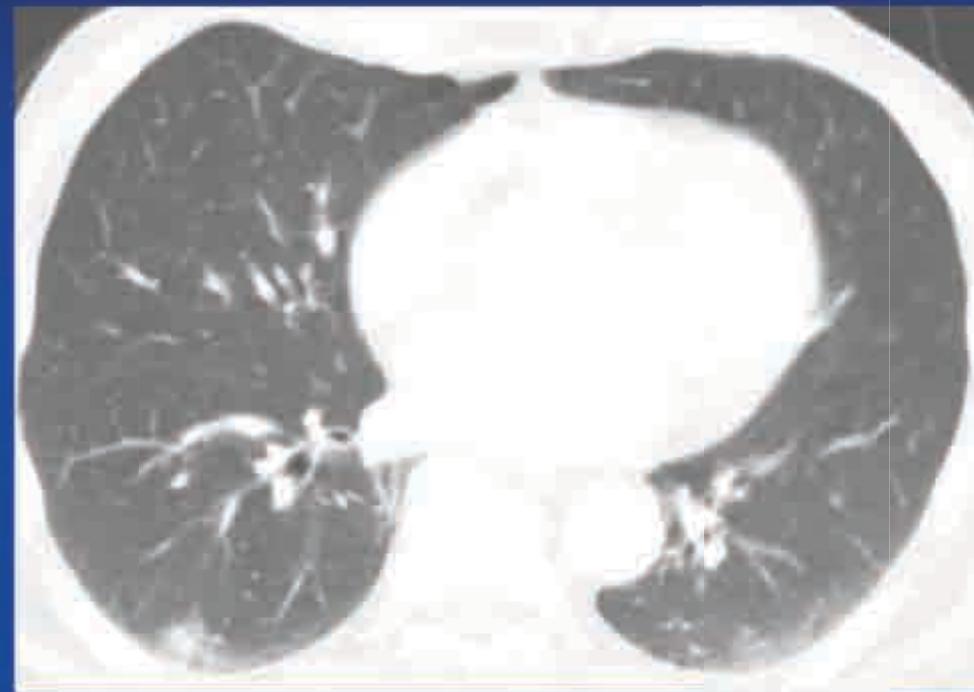


3 month post-op

DDX: Atelectasis, Early Fibrosis, Infection, Metastasis

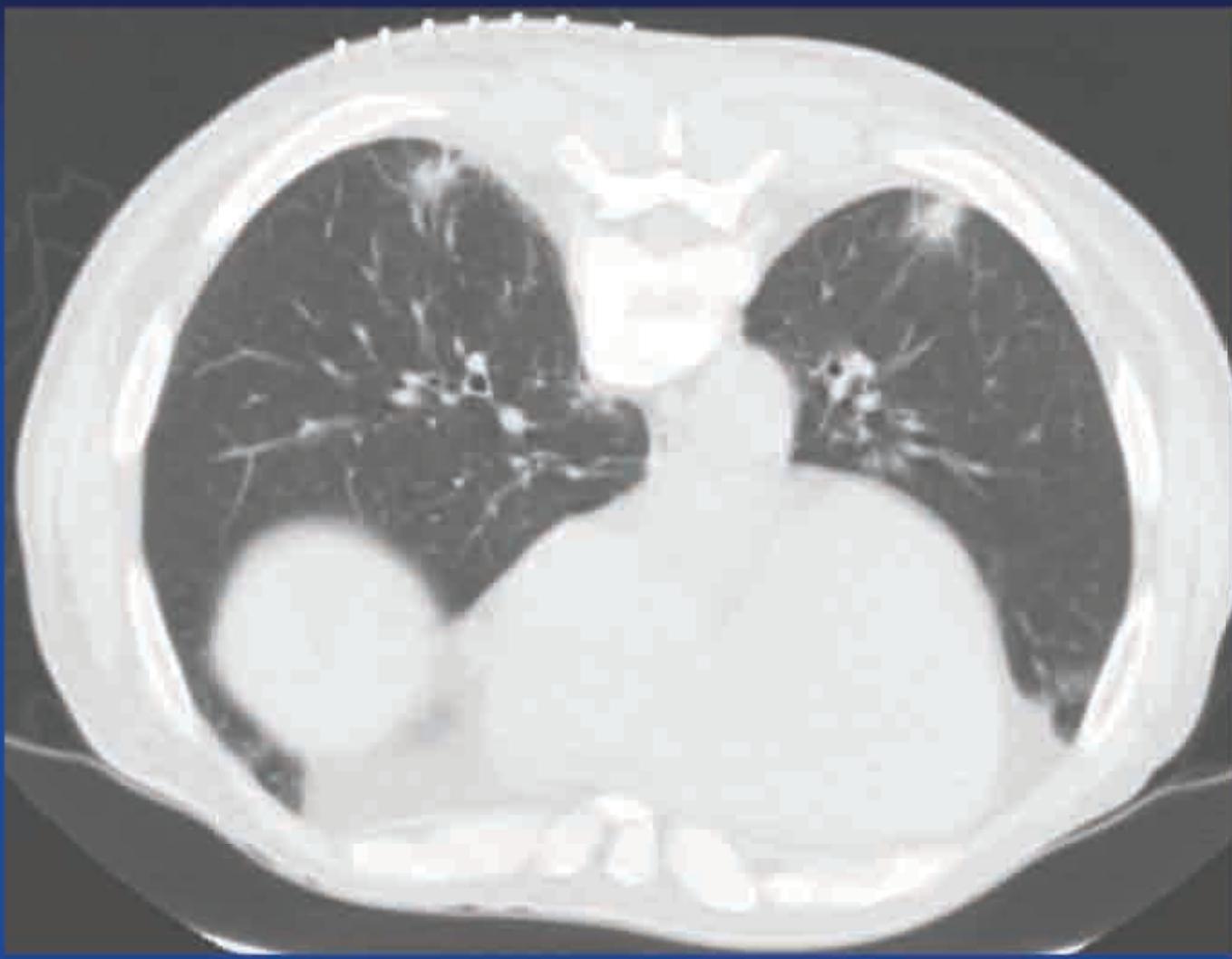


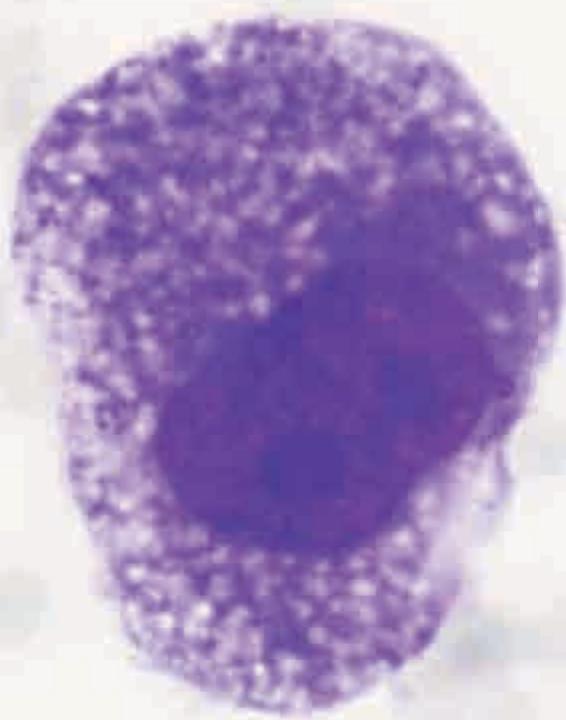
1 month post-op



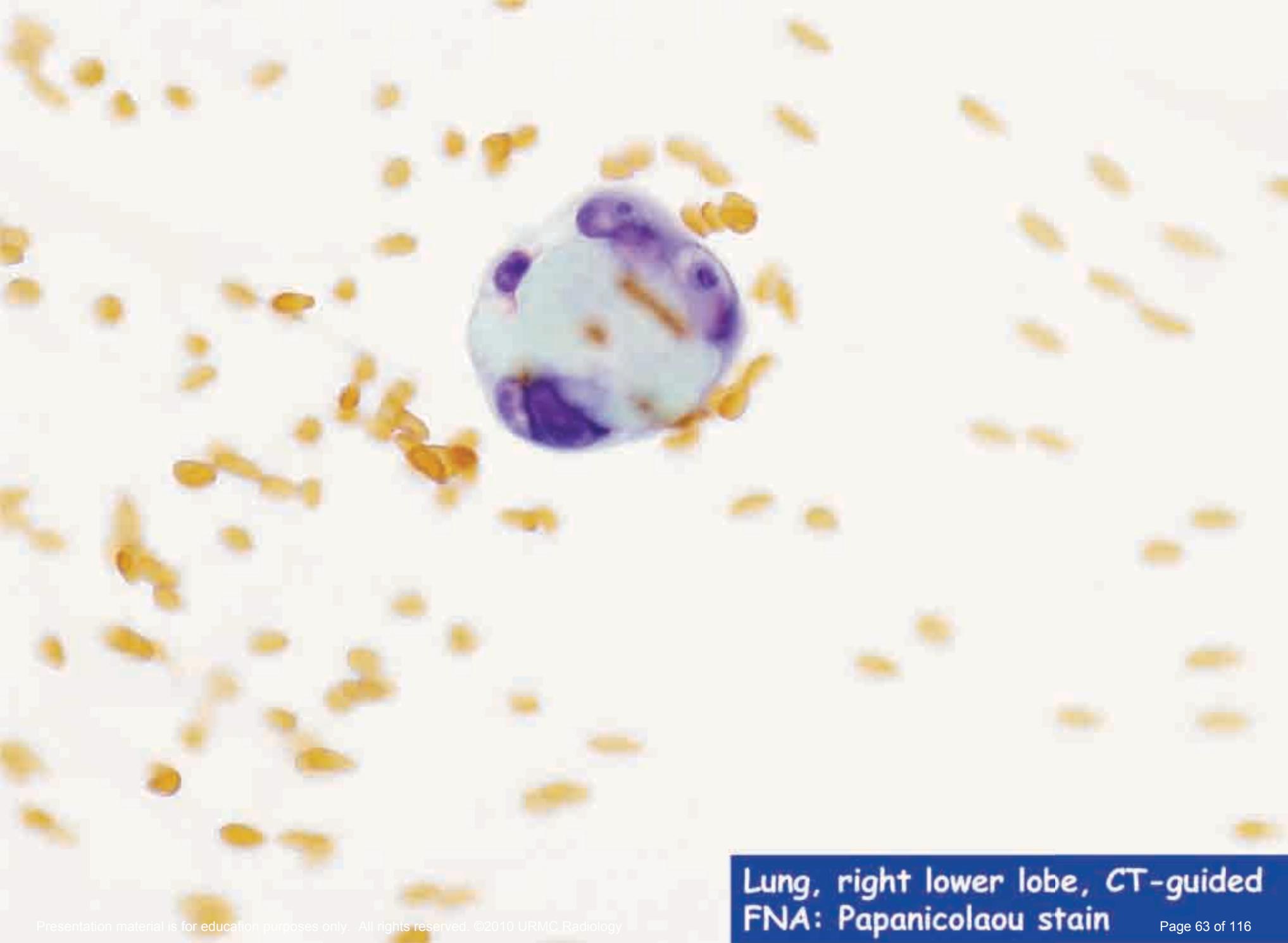
3 month post-op

What do you do next?



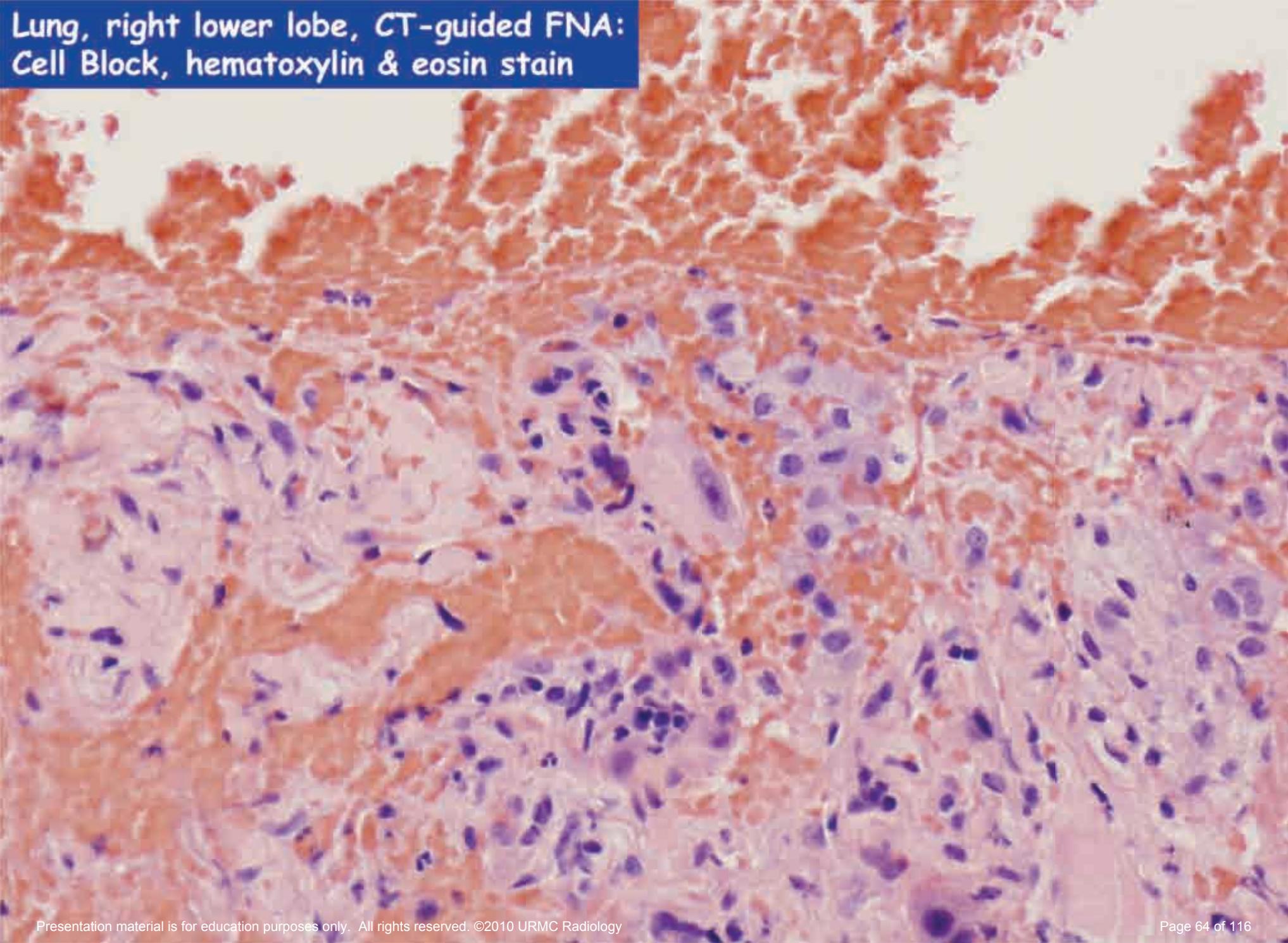


Lung, right lower lobe, CT-guided
FNA; Diff-Quik stain

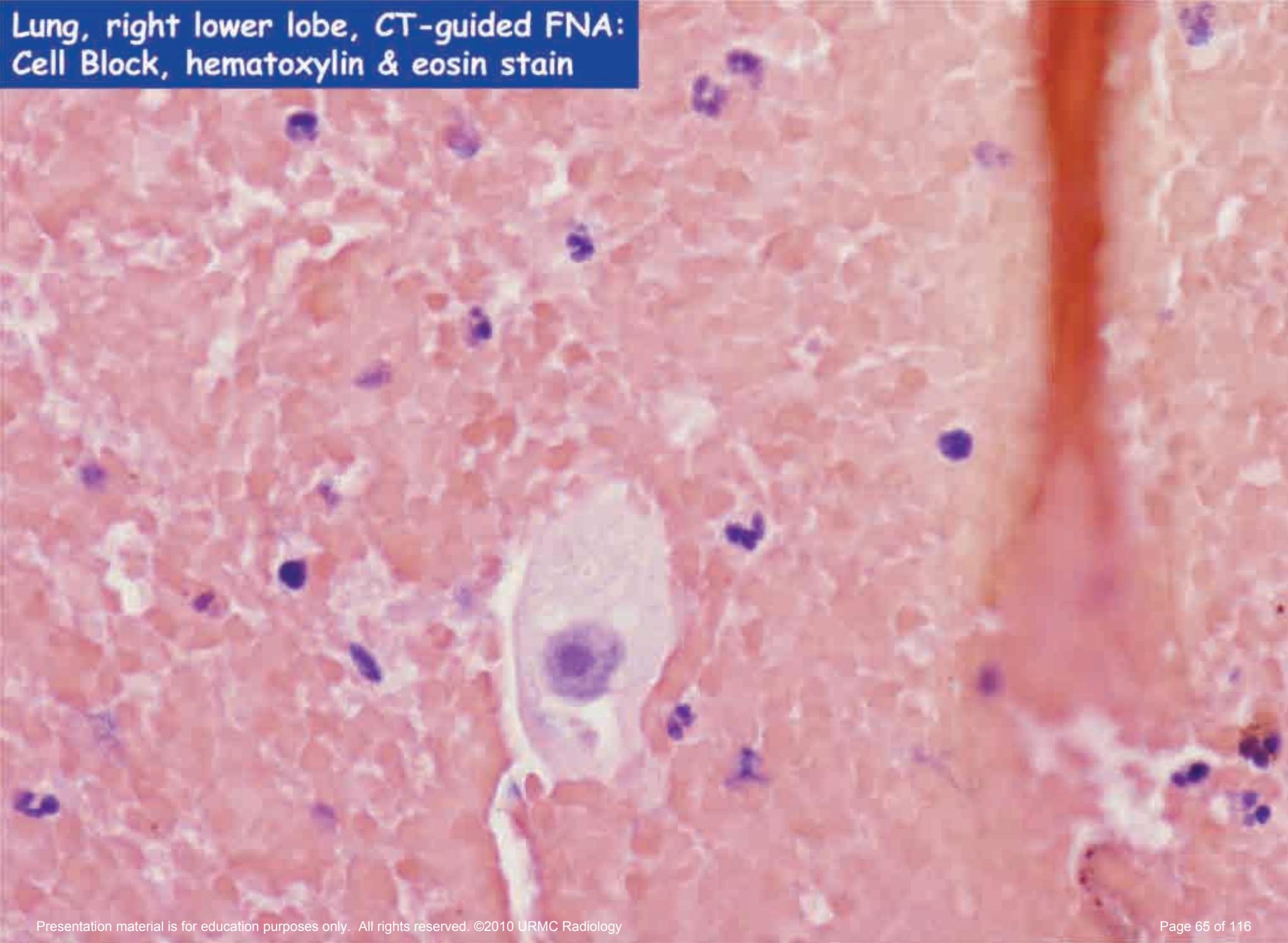


Lung, right lower lobe, CT-guided
FNA: Papanicolaou stain

Lung, right lower lobe, CT-guided FNA:
Cell Block, hematoxylin & eosin stain



Lung, right lower lobe, CT-guided FNA:
Cell Block, hematoxylin & eosin stain



Lung, right lower lobe, CT-guided FNA:
Cell Block, Immunohistochemical stains

Cytokeratin

TTF-1

NapsinA

Lung, right lower lobe, CT-guided fine needle aspiration:

Scant atypical cells, favor reactive.

Comment: Scant atypical cells with enlarged nuclei and prominent nucleoli are present, but the N:C ratio remains low and bubbly cytoplasm is noted. Findings favor reactive change, most likely due to radiation therapy.

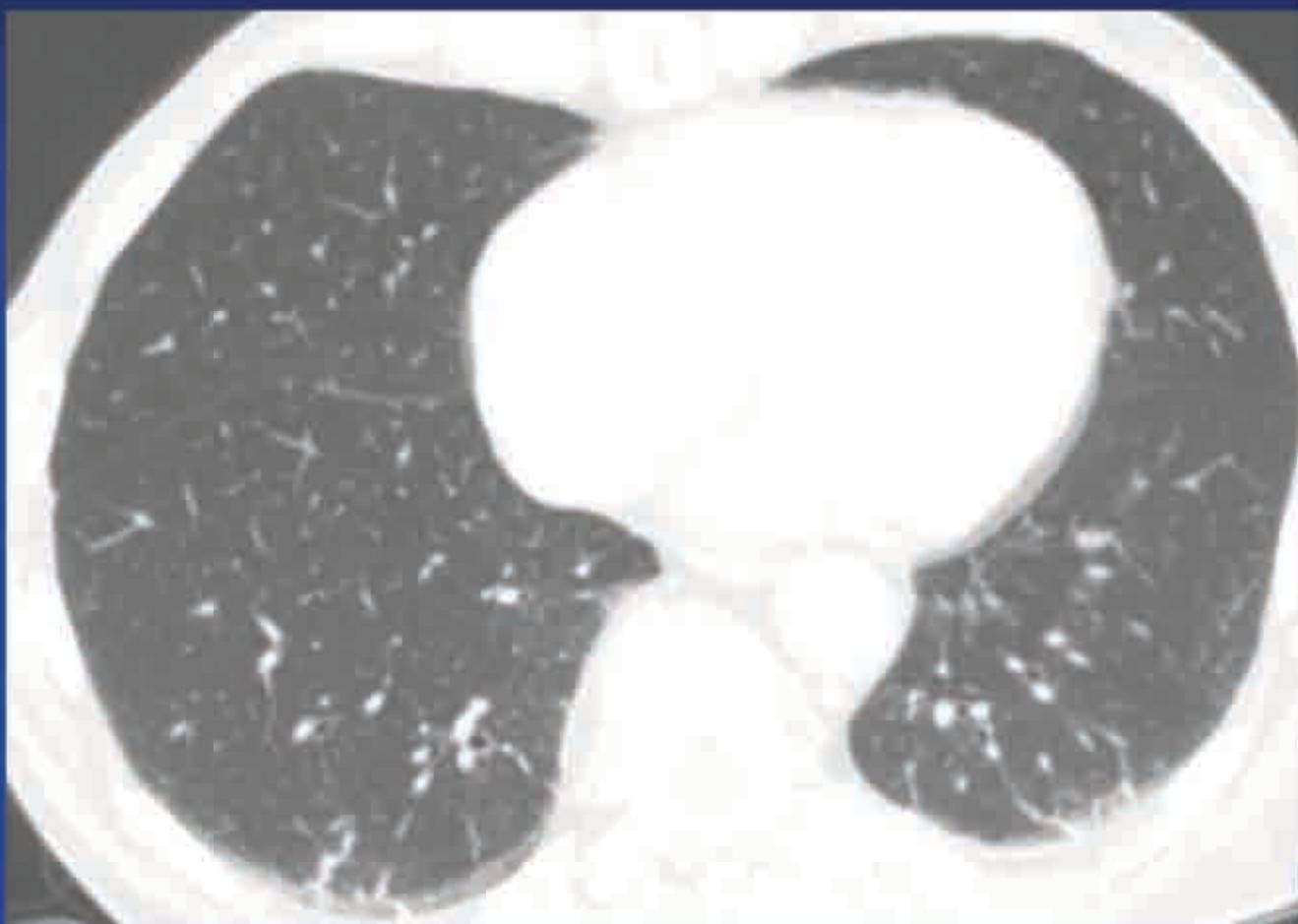
Immunostains:

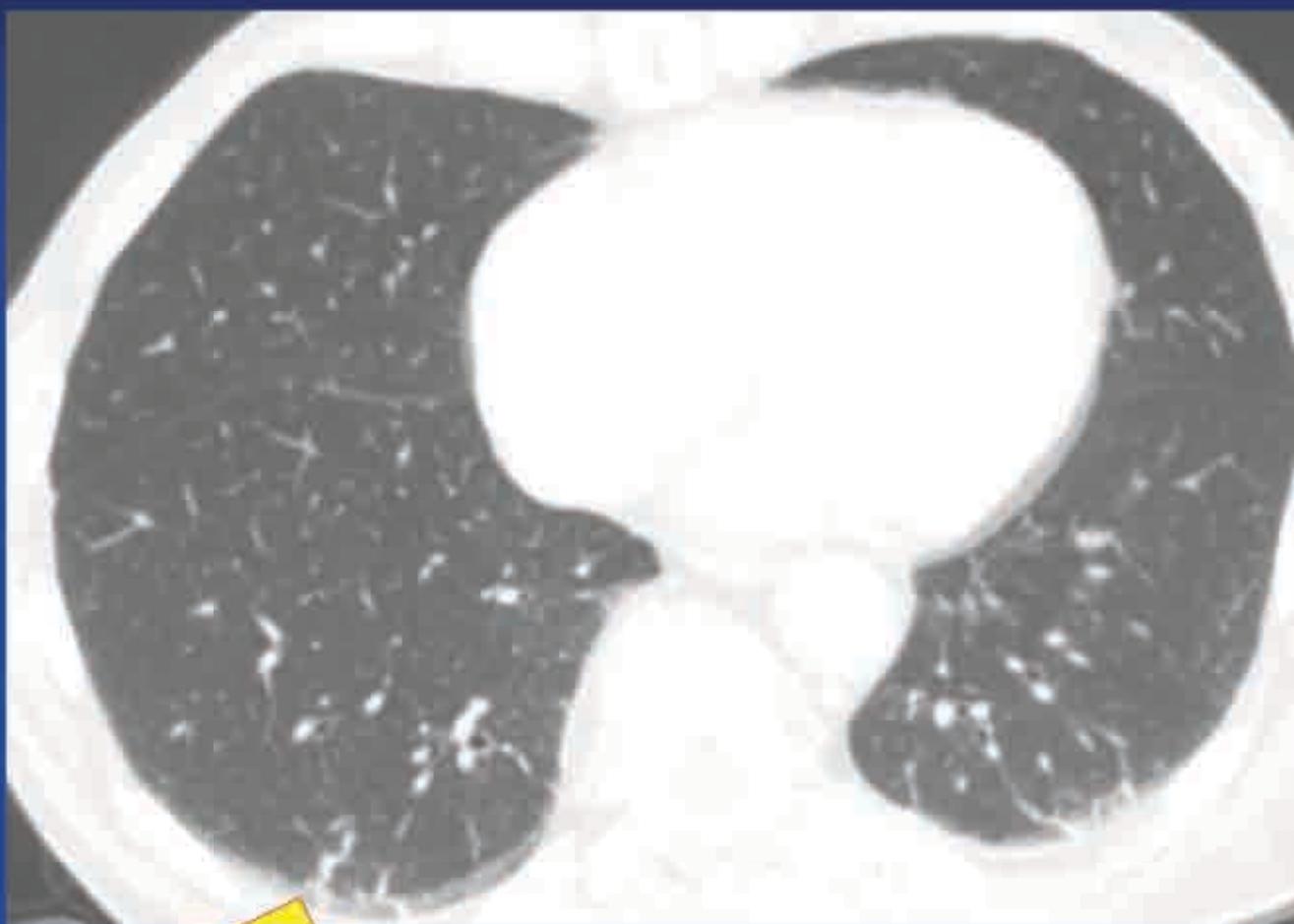
Positive: CK, TTF-1, NapsinA

Negative: S100, PSA, PSAP, PAX8, RCC

Radiation Change

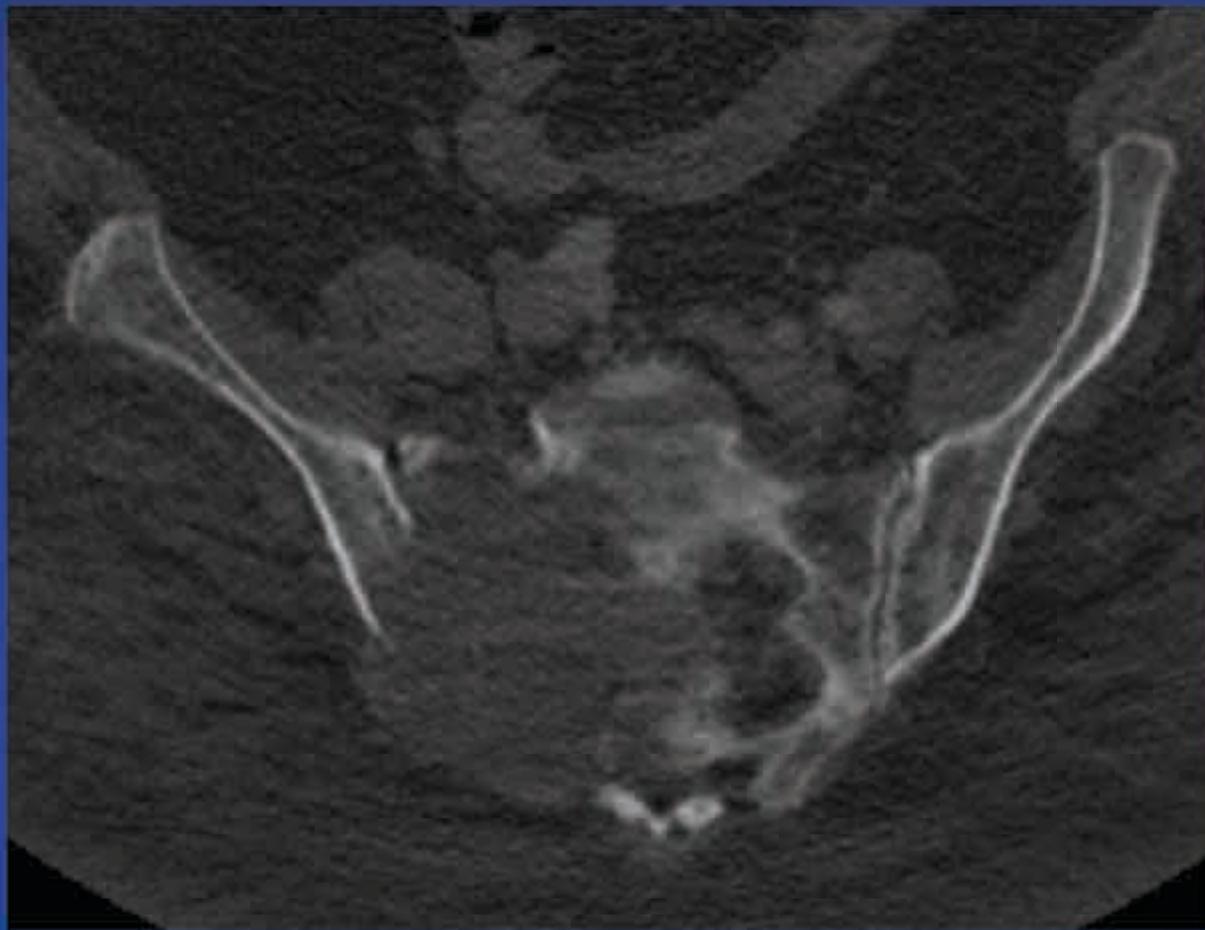
- Radiation changes can disappear over time or persist
- Hypocellular smears
- Increased size of cells, low N:C
- Multinucleation or binucleation
- Hyperchromatic smudgy nuclei or vacuolated nuclei, round, +/- nucleoli
- Dense cytoplasm, often vacuolated





Case 4

**47 yo female presents with
radicular pain in her right
lumbosacral region**



DDx Destructive lesion of sacrum

DDx Destructive lesion of sacrum

- Metastases

- Lung, Breast, RCC, Thyroid

DDx Destructive lesion of sacrum

- Metastases
 - Lung, Breast, RCC, Thyroid
- Multiple Myeloma

DDx Destructive lesion of sacrum

- Metastases
 - Lung, Breast, RCC, Thyroid
- Multiple Myeloma
- Lymphoma

DDx Destructive lesion of sacrum

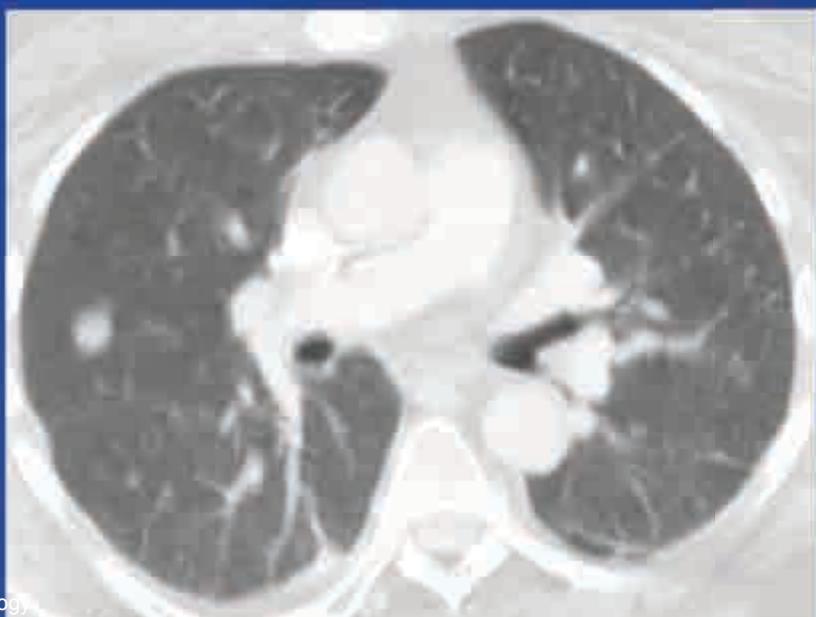
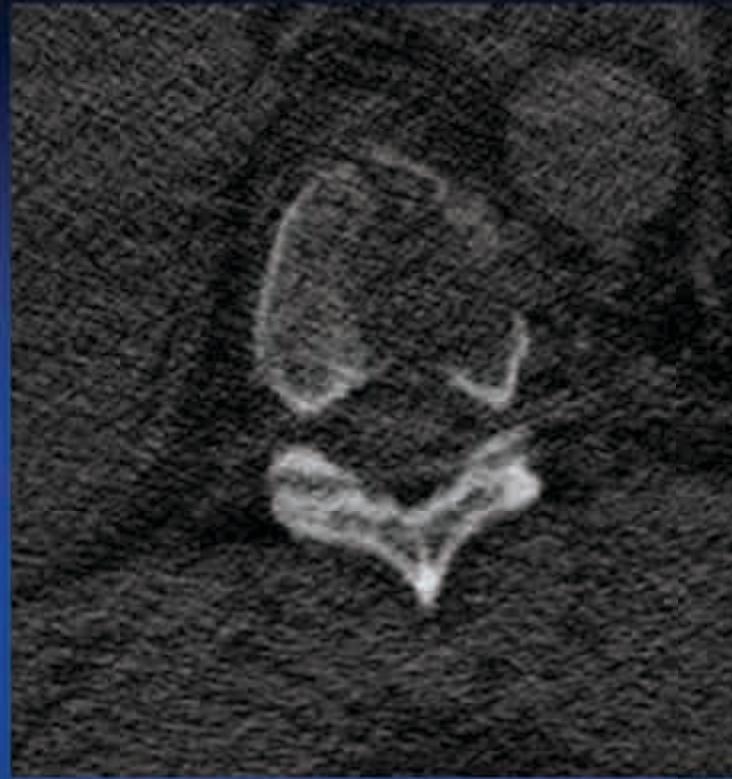
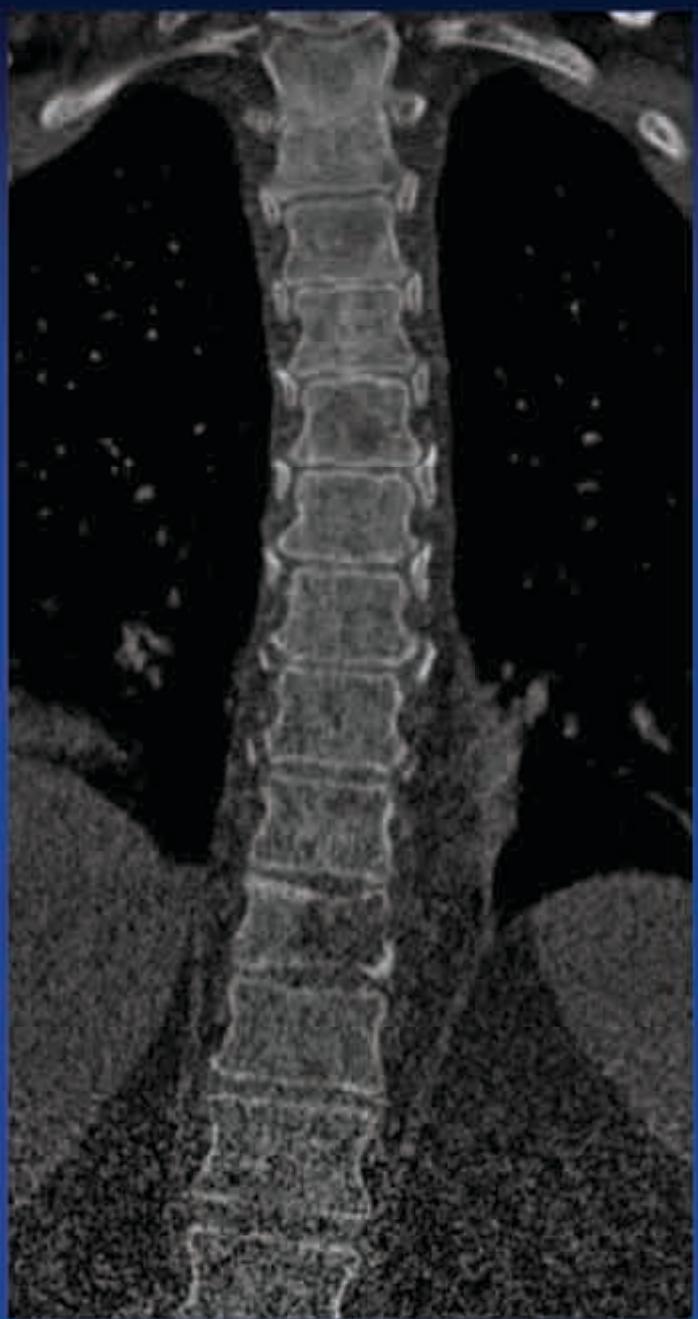
- Metastases
 - Lung, Breast, RCC, Thyroid
- Multiple Myeloma
- Lymphoma
- Chondrosarcoma

DDx Destructive lesion of sacrum

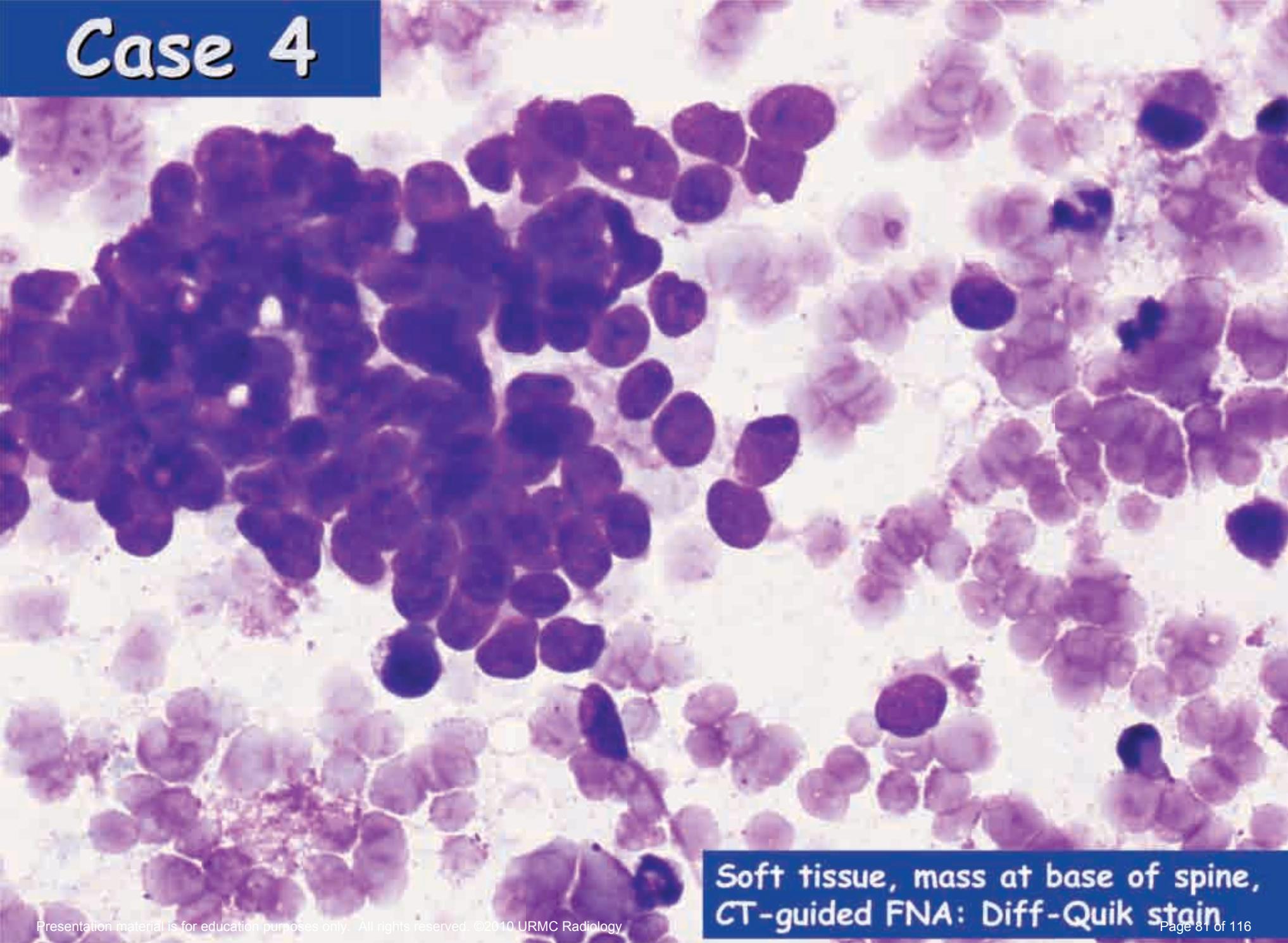
- Metastases
 - Lung, Breast, RCC, Thyroid
- Multiple Myeloma
- Lymphoma
- Chondrosarcoma
- Chordoma

DDx Destructive lesion of sacrum

- Metastases
 - Lung, Breast, RCC, Thyroid
- Multiple Myeloma
- Lymphoma
- Chondrosarcoma
- Chordoma
- Giant Cell Tumor

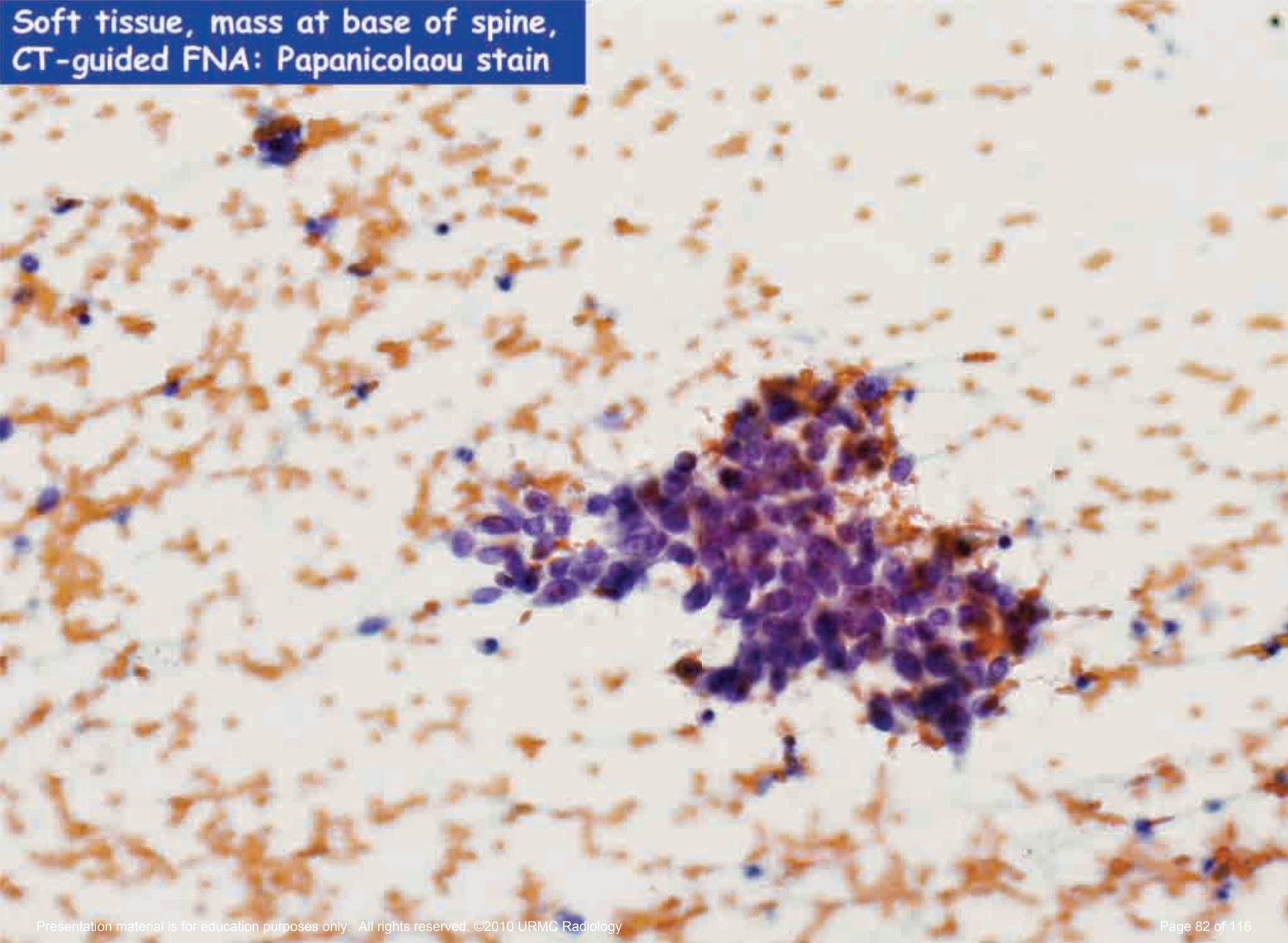


Case 4

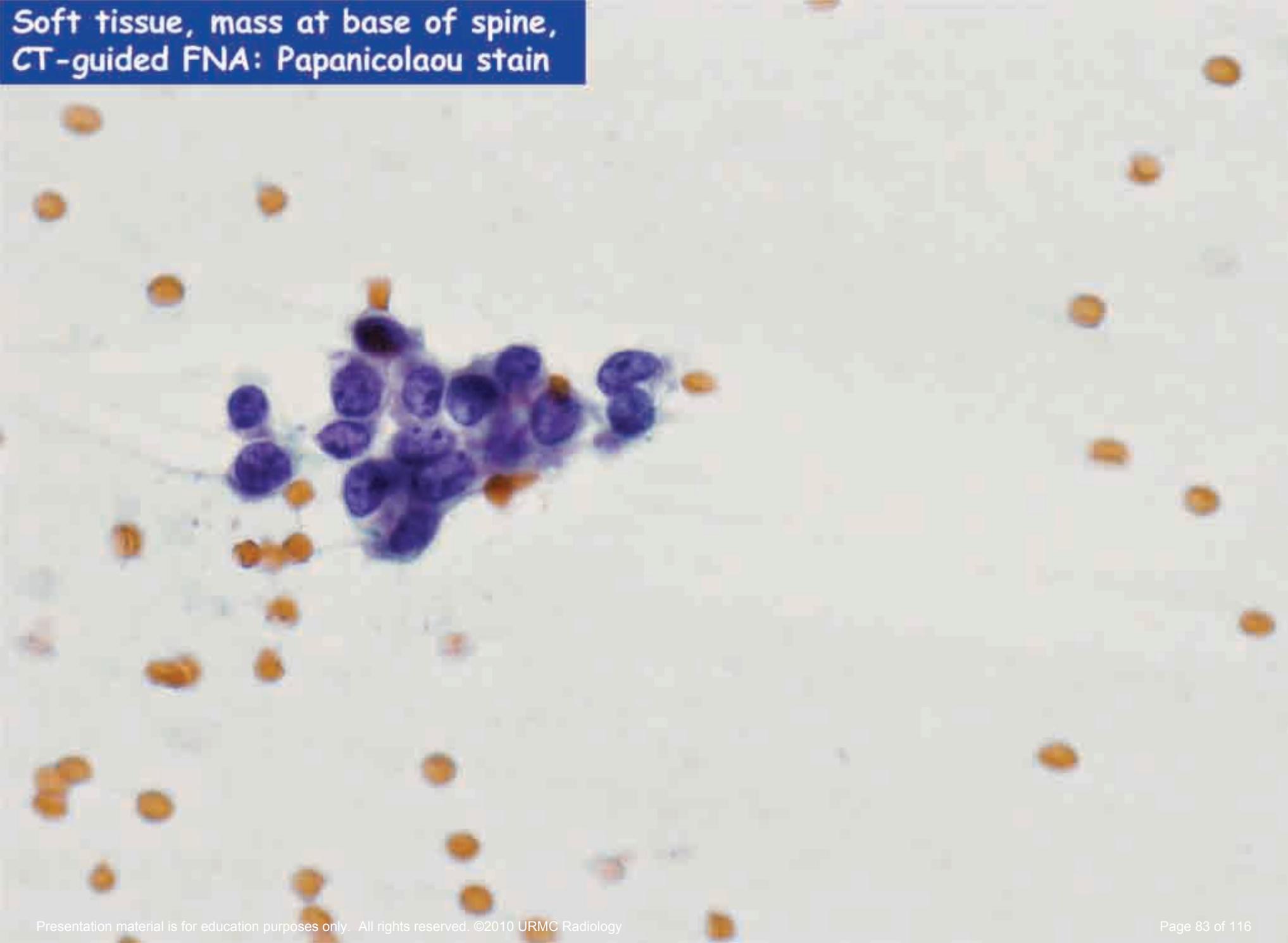


Soft tissue, mass at base of spine,
CT-guided FNA: Diff-Quik stain

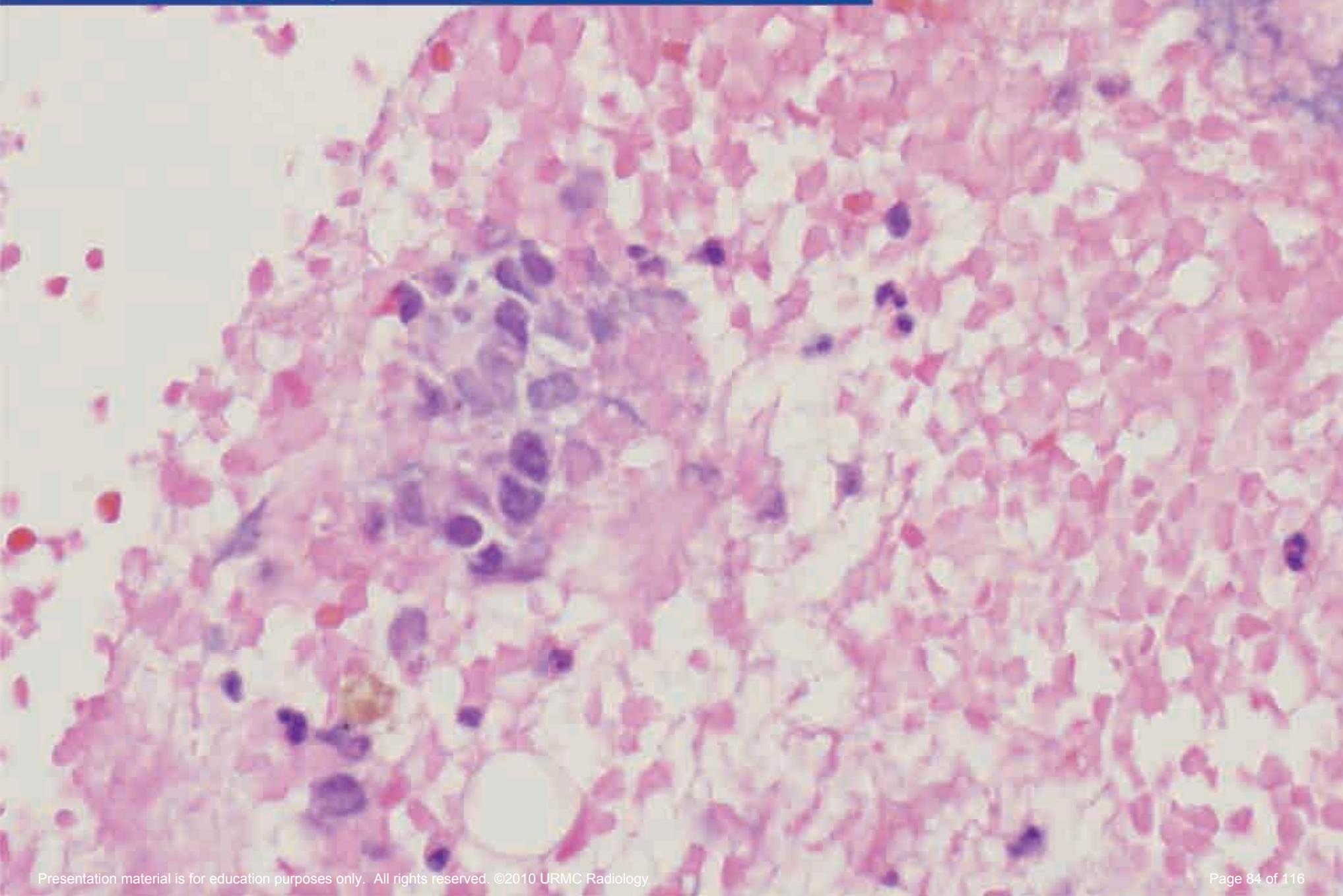
Soft tissue, mass at base of spine,
CT-guided FNA: Papanicolaou stain



Soft tissue, mass at base of spine,
CT-guided FNA: Papanicolaou stain



Soft tissue, mass at base of spine, CT-guided FNA:
Cell Block, hematoxylin & eosin stain



**Soft tissue, mass at base of spine,
CT-guided fine needle aspiration:**

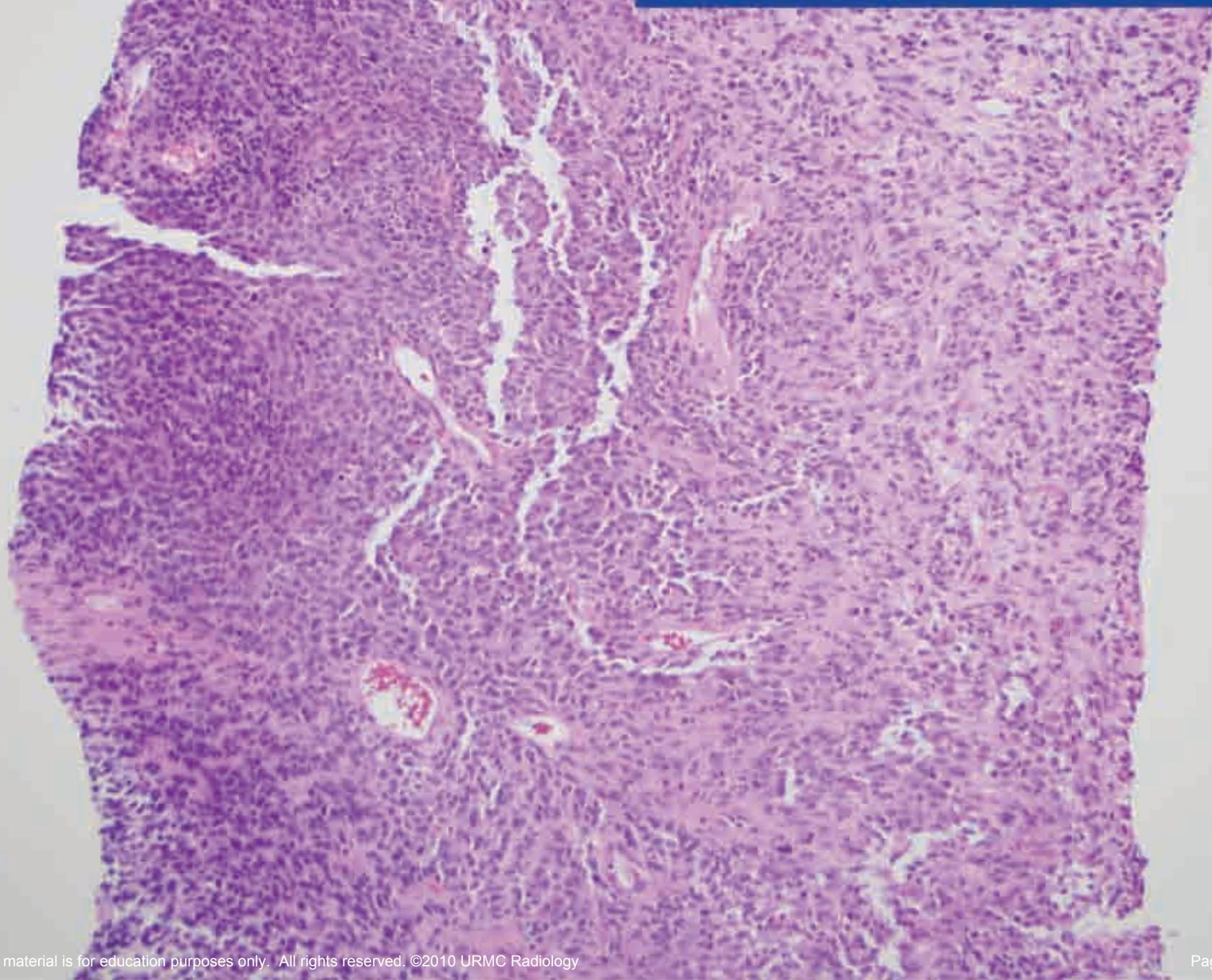
**Malignant tumor cells present consistent
with origin from metastatic melanoma.**

Immunohistochemical stains:

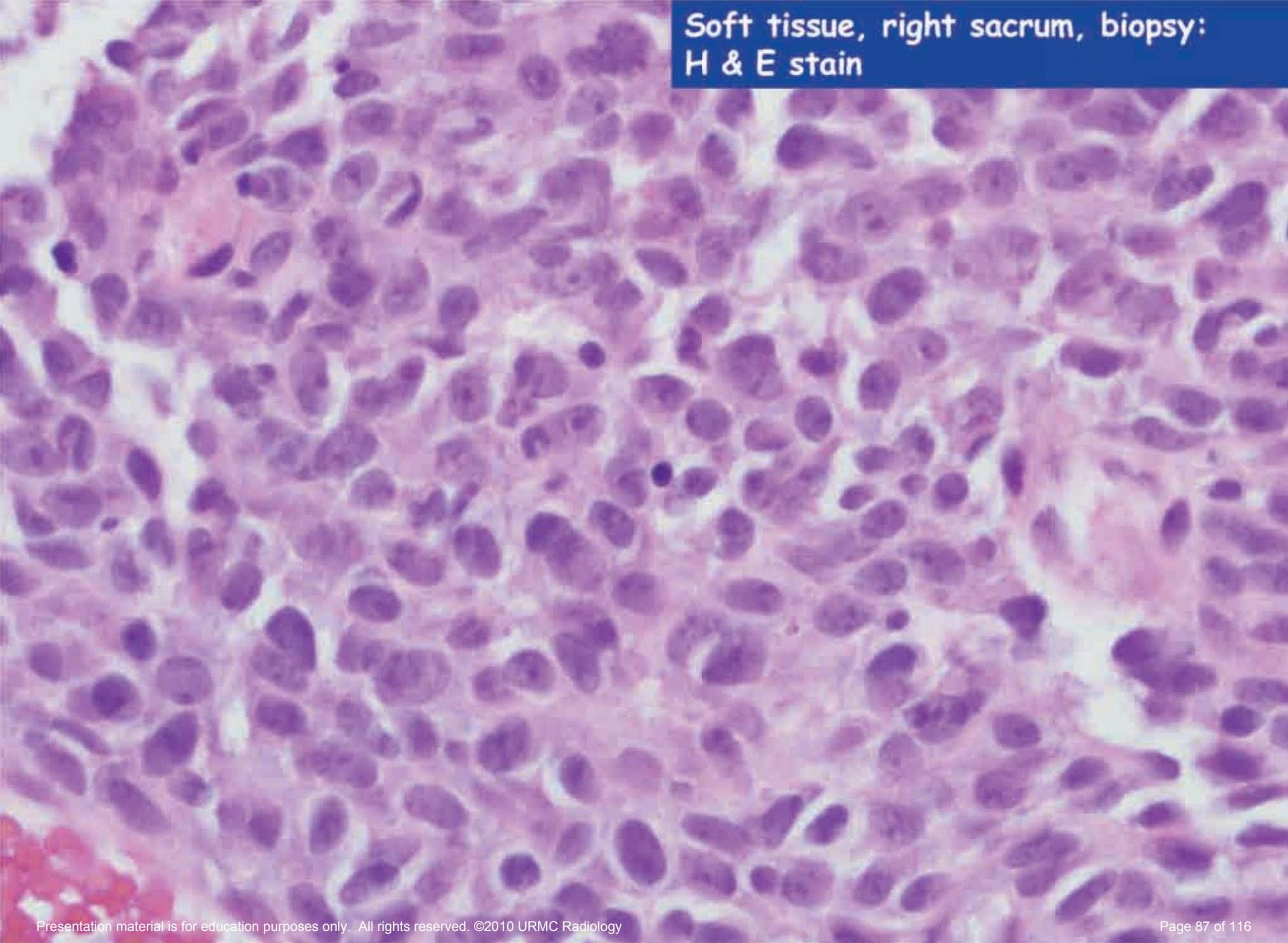
Positive: S100

Negative: Cytokeratin, MelanA

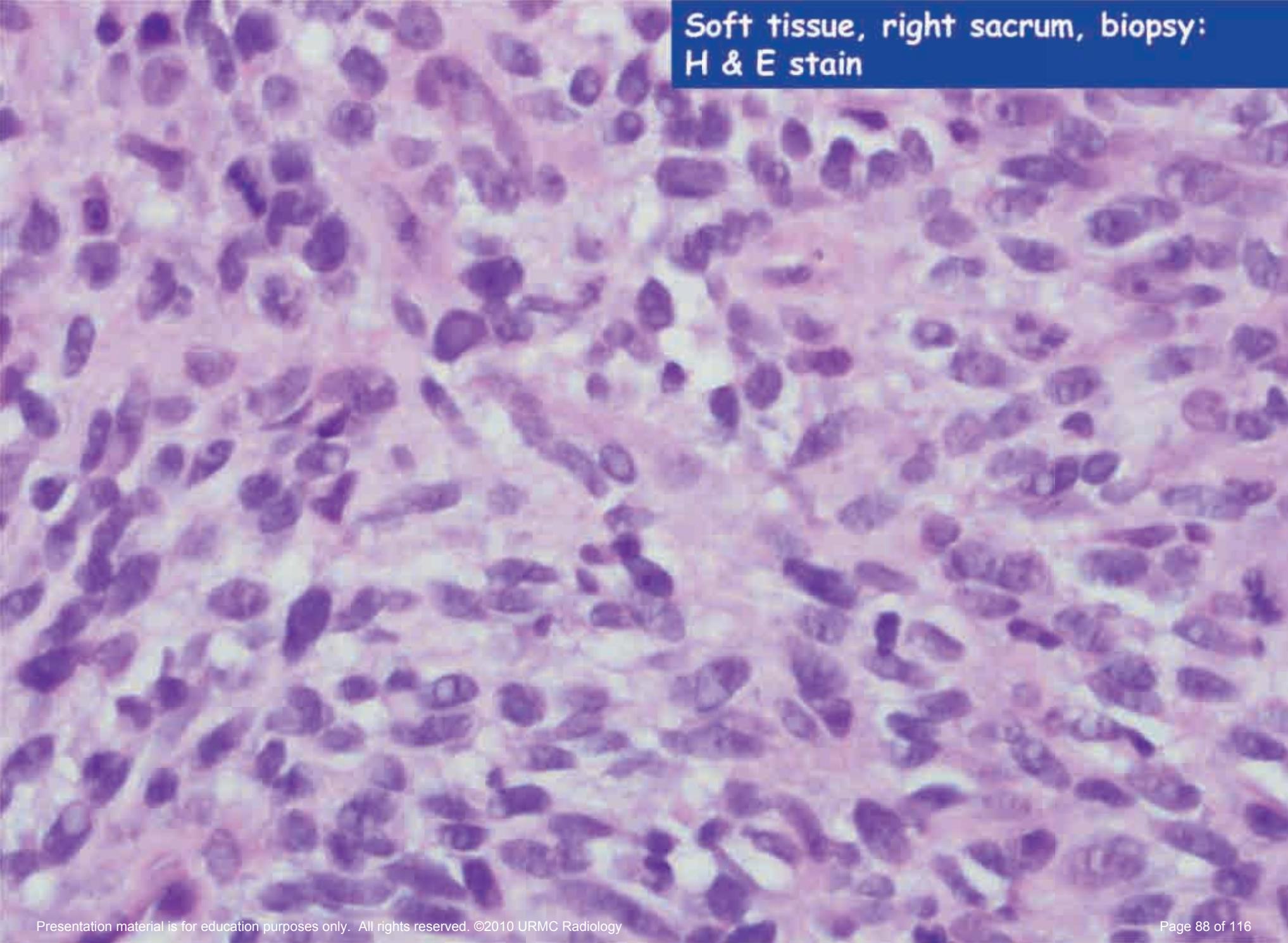
Soft tissue, right sacrum, biopsy:
H & E stain



Soft tissue, right sacrum, biopsy:
H & E stain

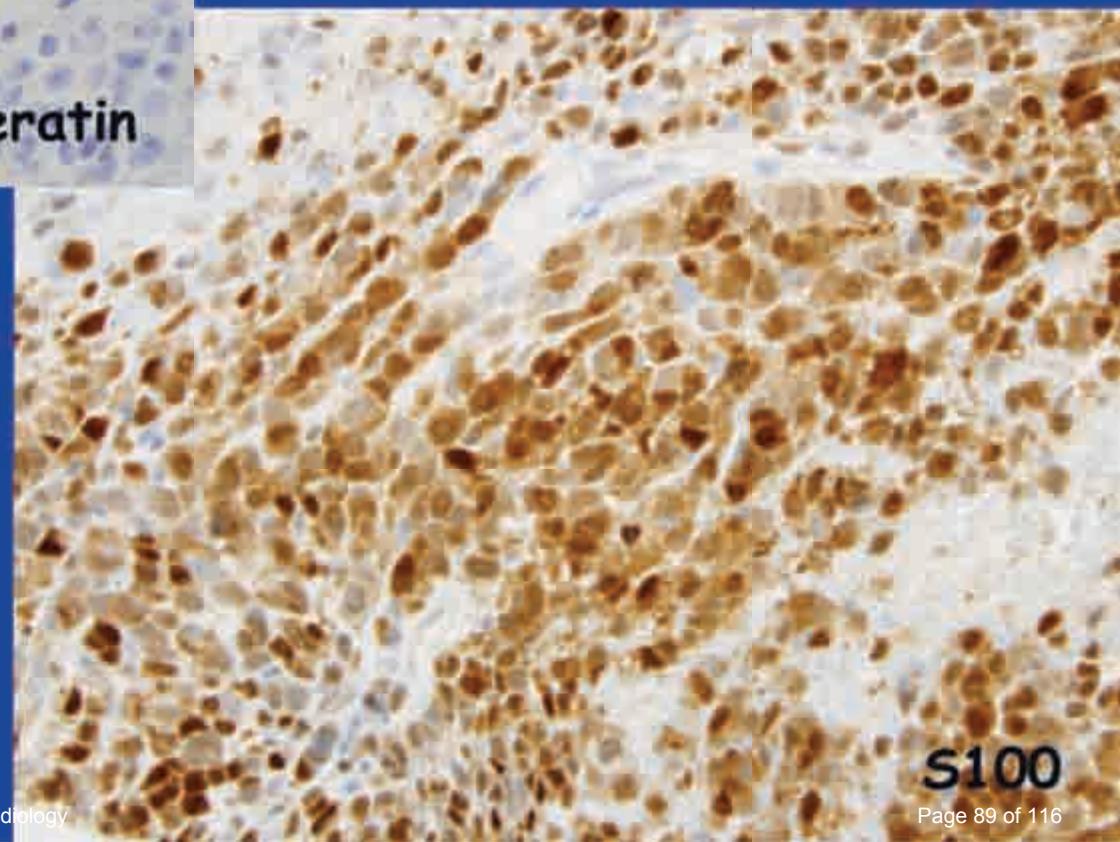


Soft tissue, right sacrum, biopsy:
H & E stain



Soft tissue, right sacrum, biopsy:
Immunohistochemical stains

Cytokeratin



S100

Soft tissue, right sacrum, biopsy:

Malignant neoplasm with areas of necrosis consistent with malignant melanoma.

Comment: Tumor cells are positive for S100 and negative for cytokeratin. The prior specimen (2009) was also reviewed.

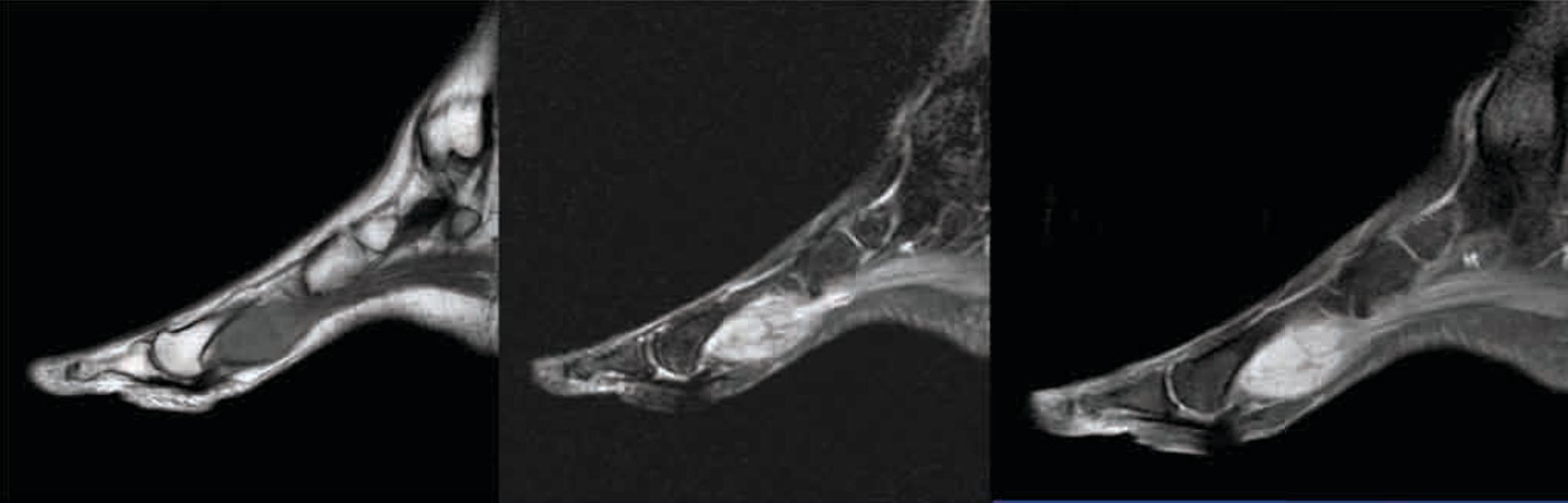
Metastatic Melanoma

- Most common site harboring metastatic disease = lymph nodes
- Metastatic carcinoma is by far the most common type of malignancy affecting the skeleton
- Bones of the axial and proximal appendicular skeleton such as vertebral column, large bones, ribs and skull - more commonly involved by metastasis
- Clinical history is essential
- Negative staining for Cytokeratin
- Positive staining for S100, HMB45, and MelanA

Case 5

29 yo female presents with
discomfort while walking
and her “left shoe feels tighter”

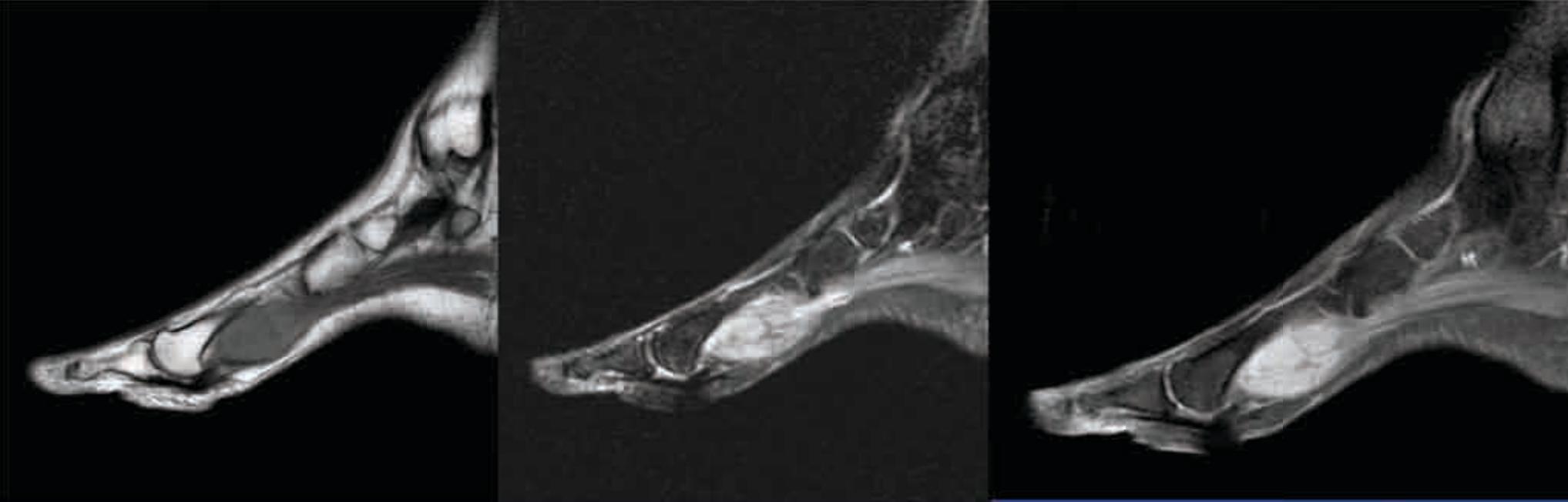




Isointense on T1

Hyperintense on T2

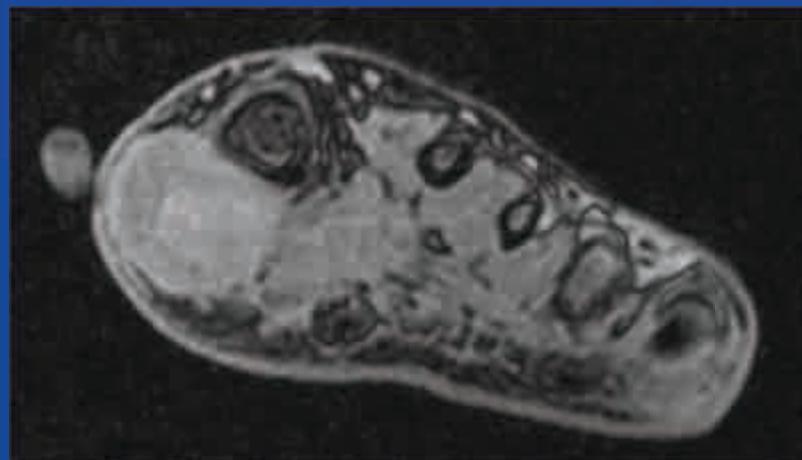
Enhancement on fat-sat
T1 post contrast



Isointense on T1

Hyperintense on T2

**Enhancement on fat-sat
T1 post contrast**



▼ COMMON

- Bursitis
- Tendon, Injury
- Plantar Fasciitis
- Ganglion Cyst
- Plantar Fibroma
- Morton Neuroma
- Gouty Tophus
- Lipoma, Soft Tissue

▼ LESS COMMON

- Charcot, Neuropathic
- Hemangioma, Soft Tissue
- Soft Tissue Abscess
- Giant Cell Tumor Tendon Sheath
- Pigmented Villonodular Synovitis (PVNS)
- Glomus Tumor

▼ RARE

- Rheumatoid Nodule
- Xanthoma (Fibroxanthoma)
- Aneurysm
- Accessory Muscle
- Soft Tissue Neoplasms

▼ COMMON

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- Tendon, Injury
- Plantar Fasciitis
- Ganglion Cyst
- Plantar Fibroma
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- Accessory Muscle
- Soft Tissue Neoplasms

JH S. Wu, MD
May G. Hutchinson, MD

Soft-Tissue Tumors and Tumorlike Lesions: A Systematic Imaging Approach¹

Soft-tissue tumors are frequently encountered by radiologists in everyday clinical practice. Characterization of these soft-tissue lesions remains problematic, despite advances in imaging. By systematically using clinical history, lesion location, size, location on radiographs, and signal intensity characteristics on magnetic resonance images, one can (a) determine the diagnosis for the subset of determinate lesions that have characteristic clinical and imaging features and (b) narrow the differential diagnosis for lesions that demonstrate indeterminate characteristics. If a lesion cannot be characterized as a benign entity, the lesion should be reported as indeterminate, and the patient should undergo biopsy to exclude malignancy.

→ RADIOL 2009

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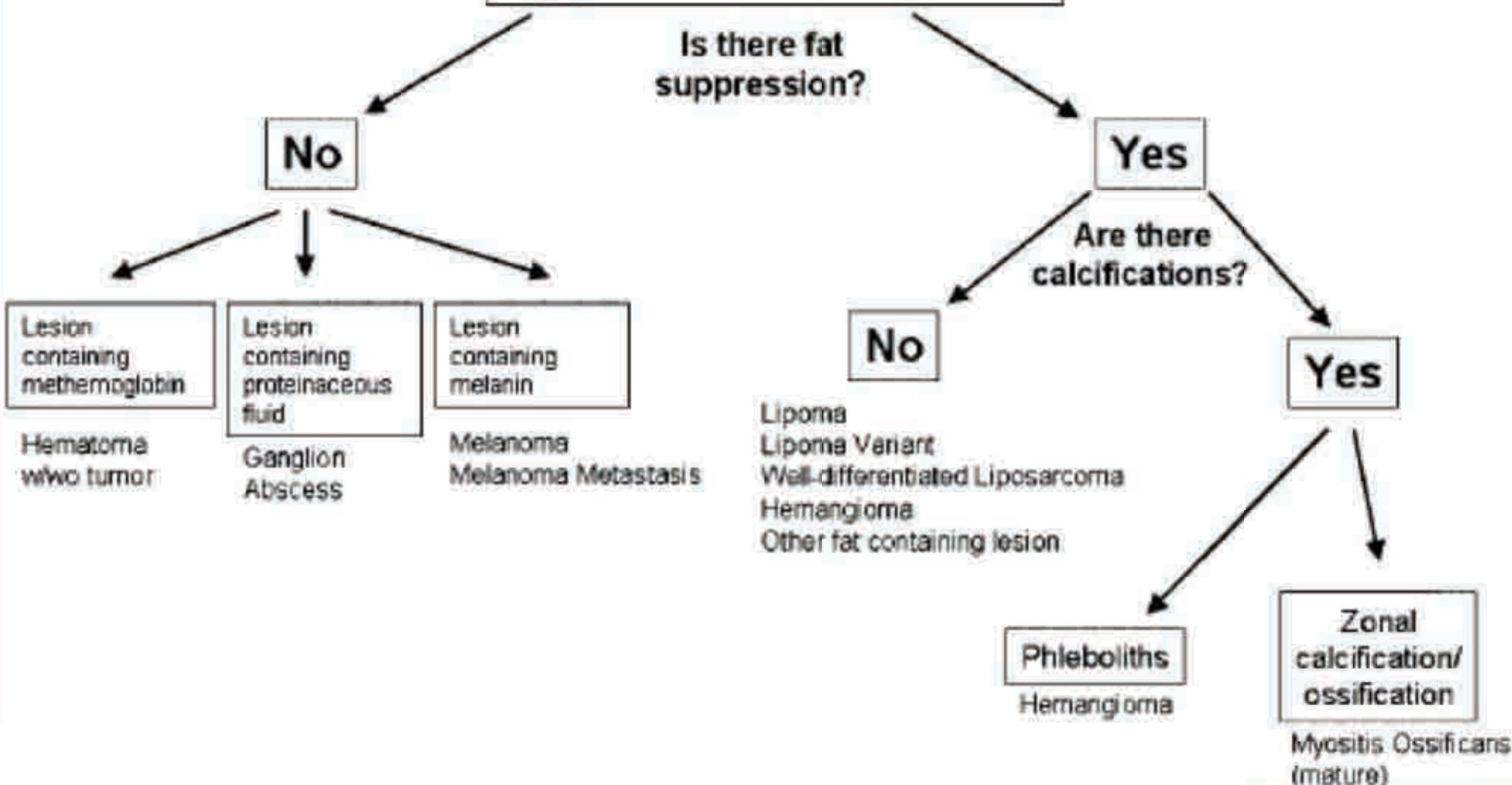
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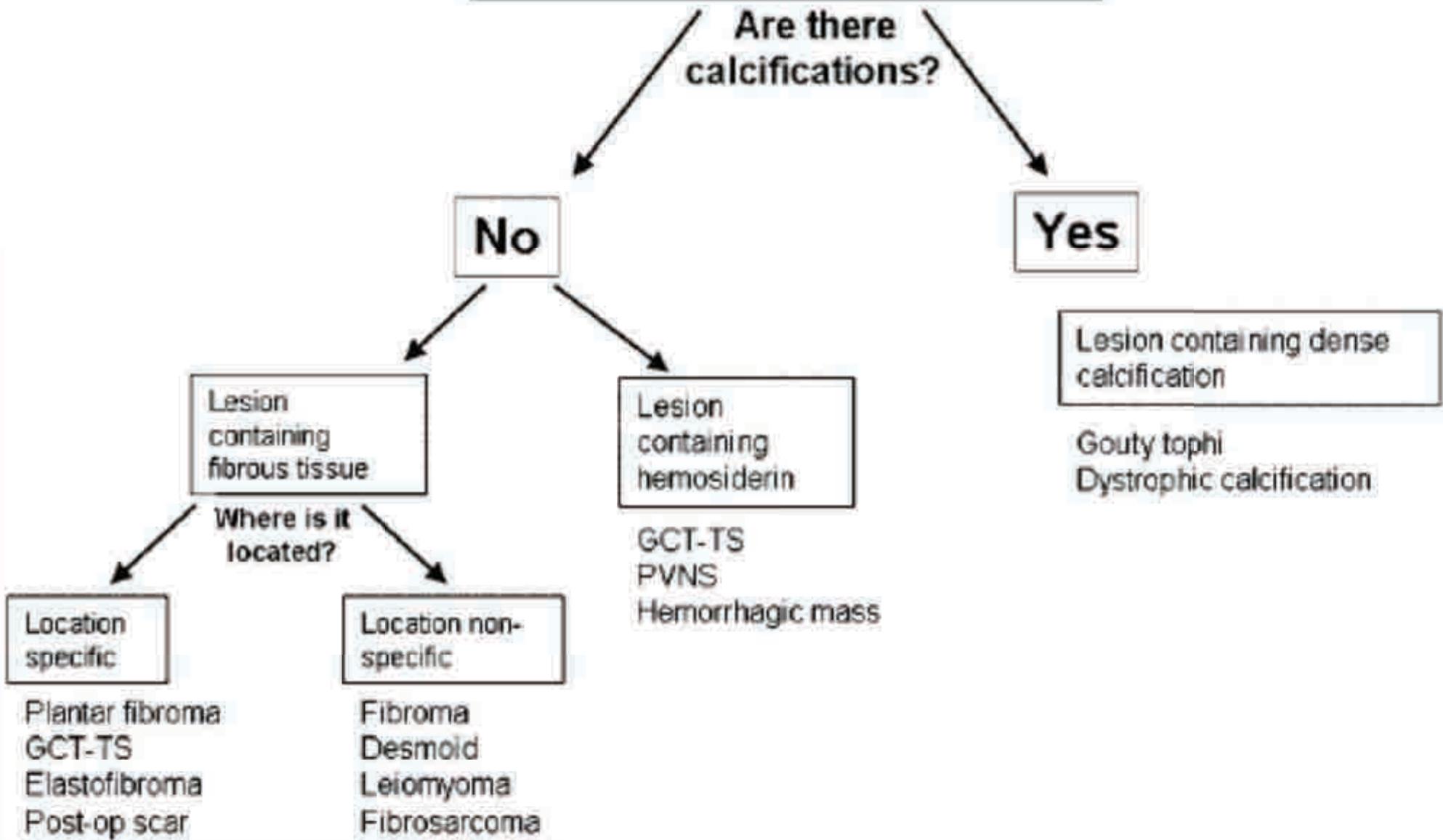
Lesion Characterization on the Basis of SI on MR Images

Appearance	Lesion
T1 hyperintense	
Lesion containing fat	Lipoma, lipoma variant, well-differentiated liposarcoma , hemangioma, myositis ossificans (mature)
Lesion containing methemoglobin	Hematoma
Lesion containing proteinaceous material	Ganglion, abscess
Lesion containing melanin	Melanoma
T2 hypointense	
Lesion containing fibrosis	Scar tissue, plantar fibroma , elastofibroma , desmoid , fibrosarcoma , GCT of tendon sheath , lymphoma (occasionally)
Lesion containing dense calcification	Gouty tophi, dystrophic calcification
Lesion containing hemosiderin	GCT of tendon sheath
T2 hyperintense (cystlike)	
Fluid-filled lesion	Ganglia, seroma, abscess, epidermoid inclusion cyst
Solid tumor	Myxoid lesion : intramuscular myxoma , myxoid liposarcoma ; PNST ; synovial sarcoma

Hyperintense on T1WI



Hypointense on T2WI



Hyperintense “cyst-like” on T2WI

What is the enhancement pattern?

Rim

Fluid containing lesion

Ganglion
Seroma
Abscess
Epidermoid Inclusion Cyst
Bursa

Internal

Myxomatous tumor

Intramuscular Myxoma
Myxoid Sarcoma

Other

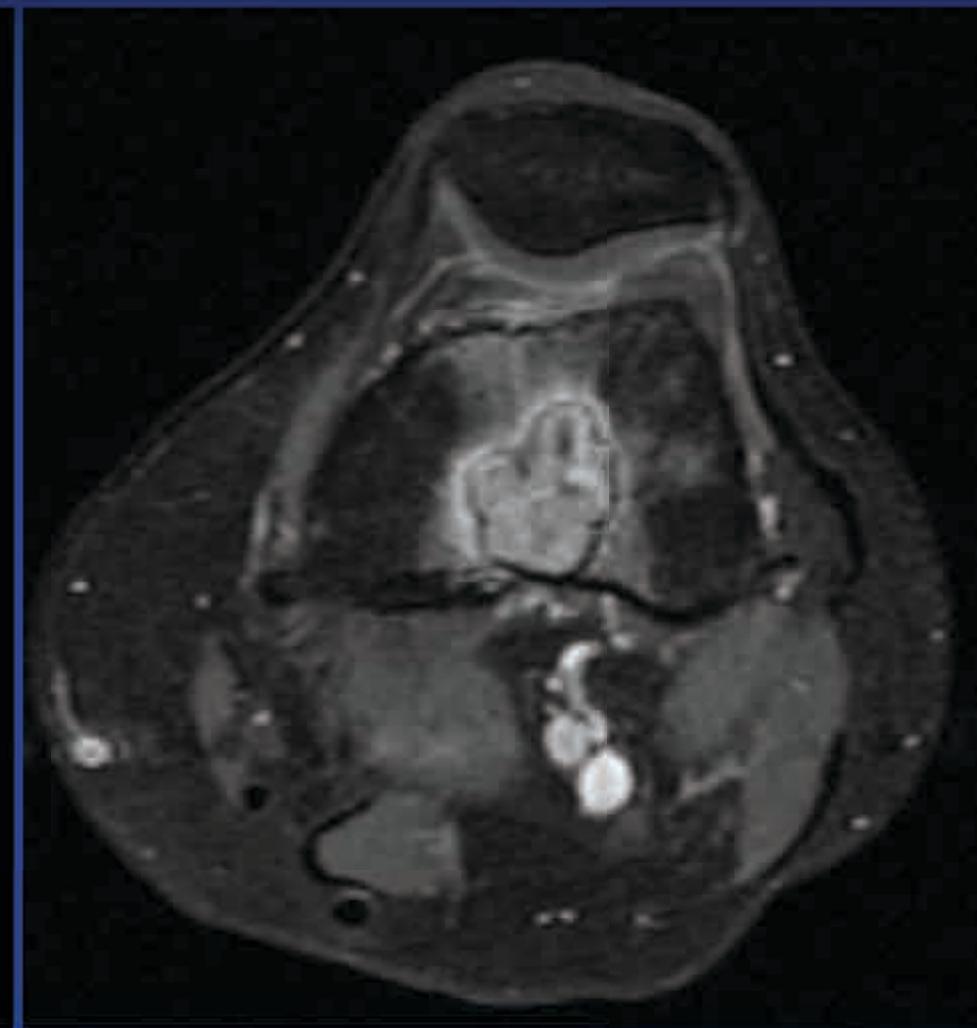
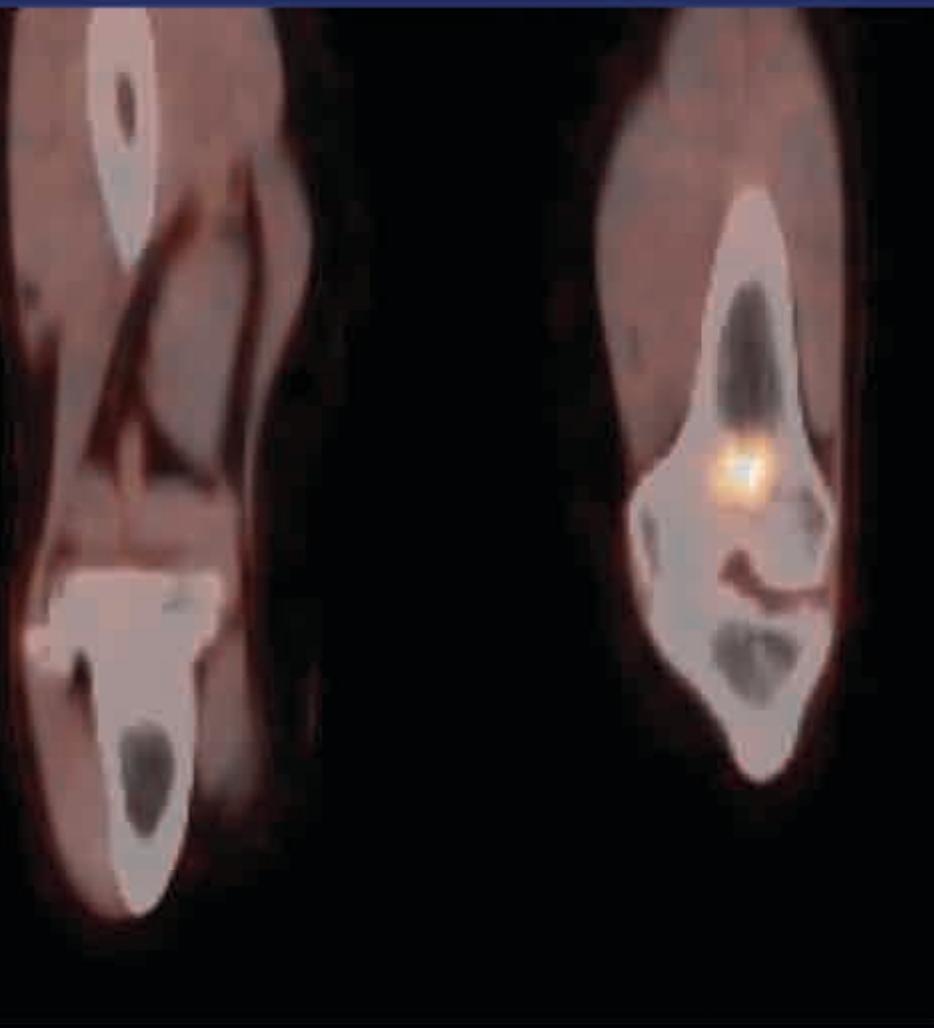
Synovial Sarcoma
PNST
Necrotic tumor

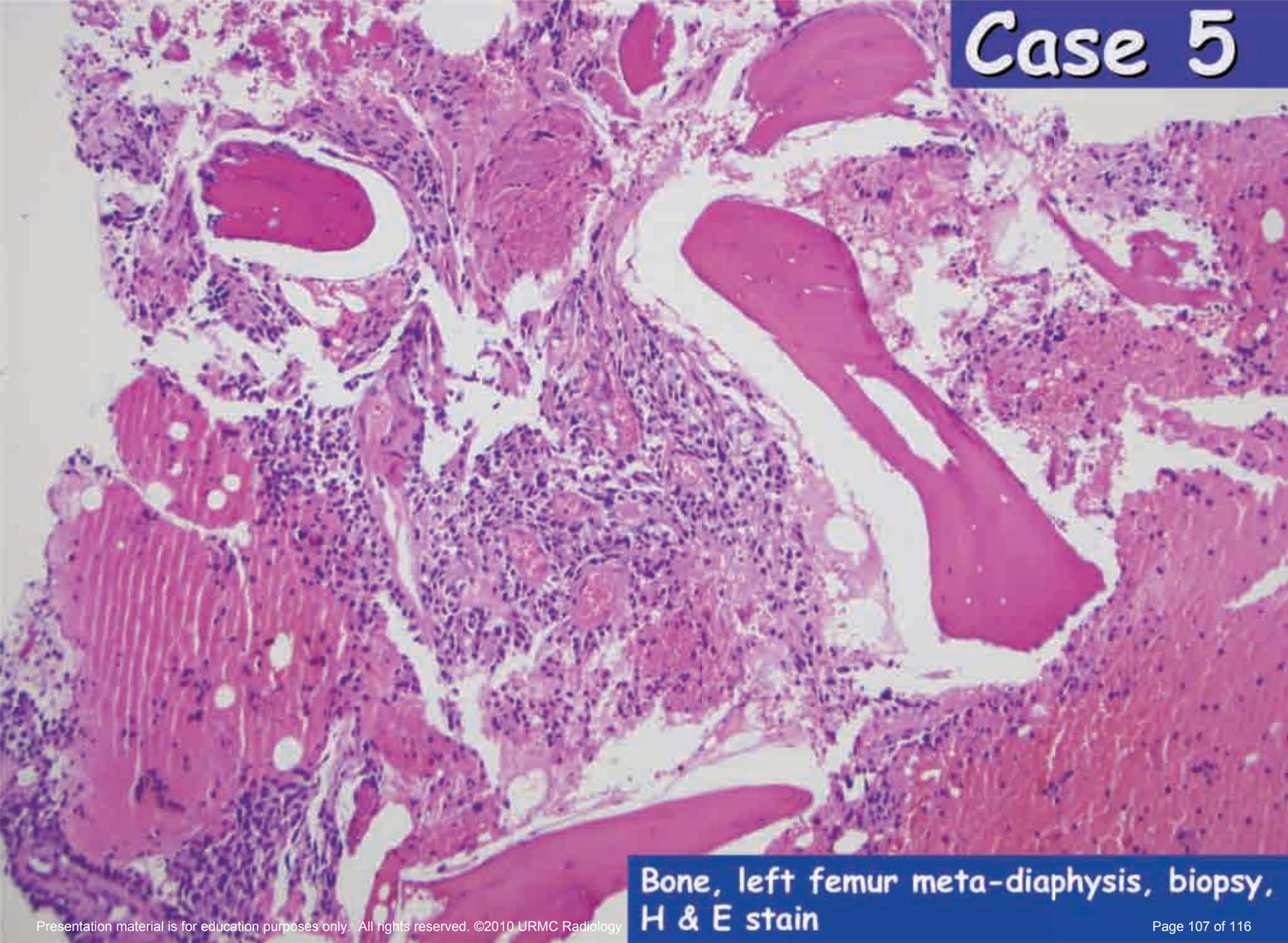




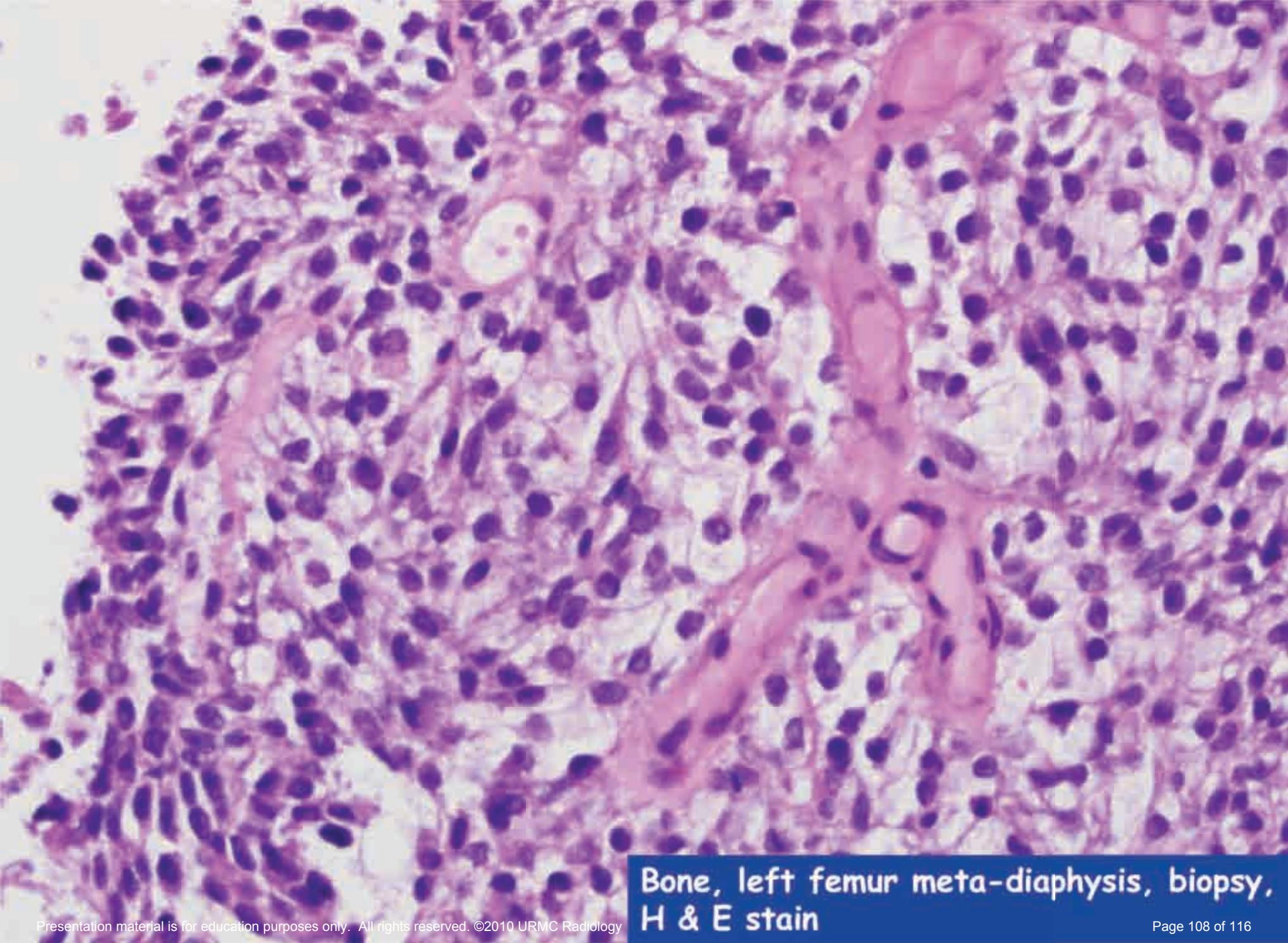








Bone, left femur meta-diaphysis, biopsy,
H & E stain

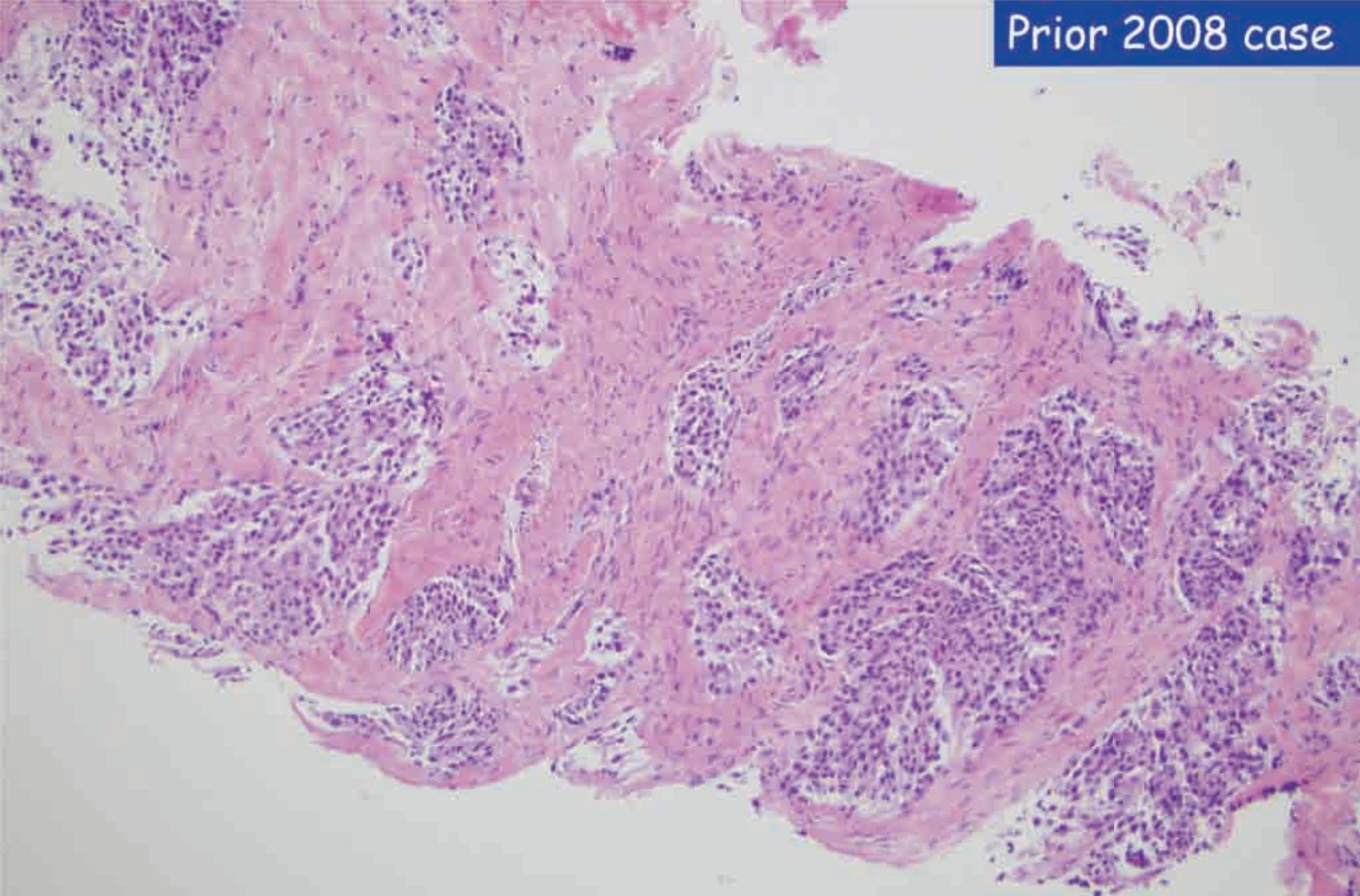


Bone, left femur meta-diaphysis, biopsy,
H & E stain

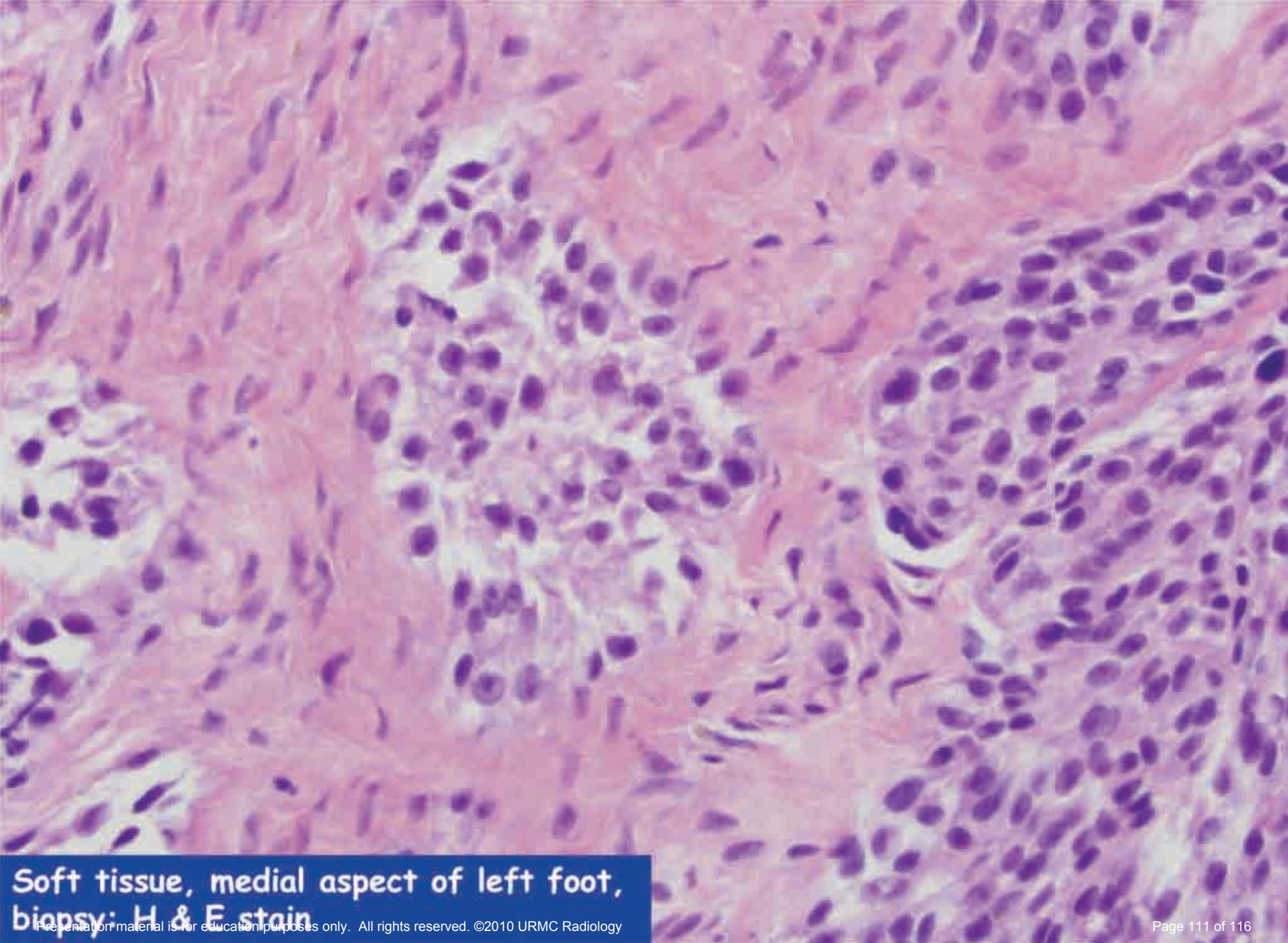
Bone, left femur meta-diaphysis, biopsy:

Metastatic malignant neoplasm consistent
with clear cell sarcoma (melanoma of soft
parts).

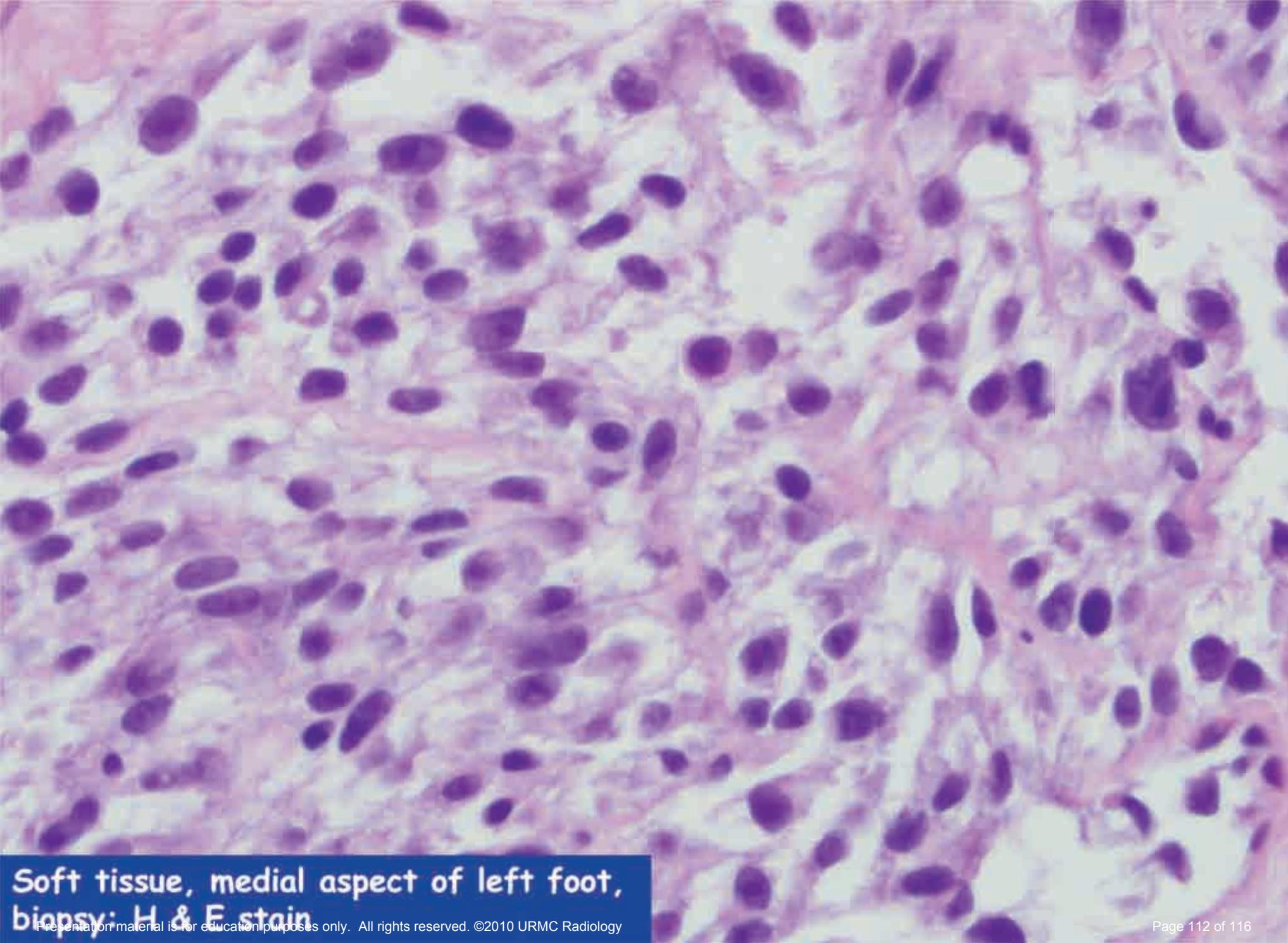
Prior 2008 case



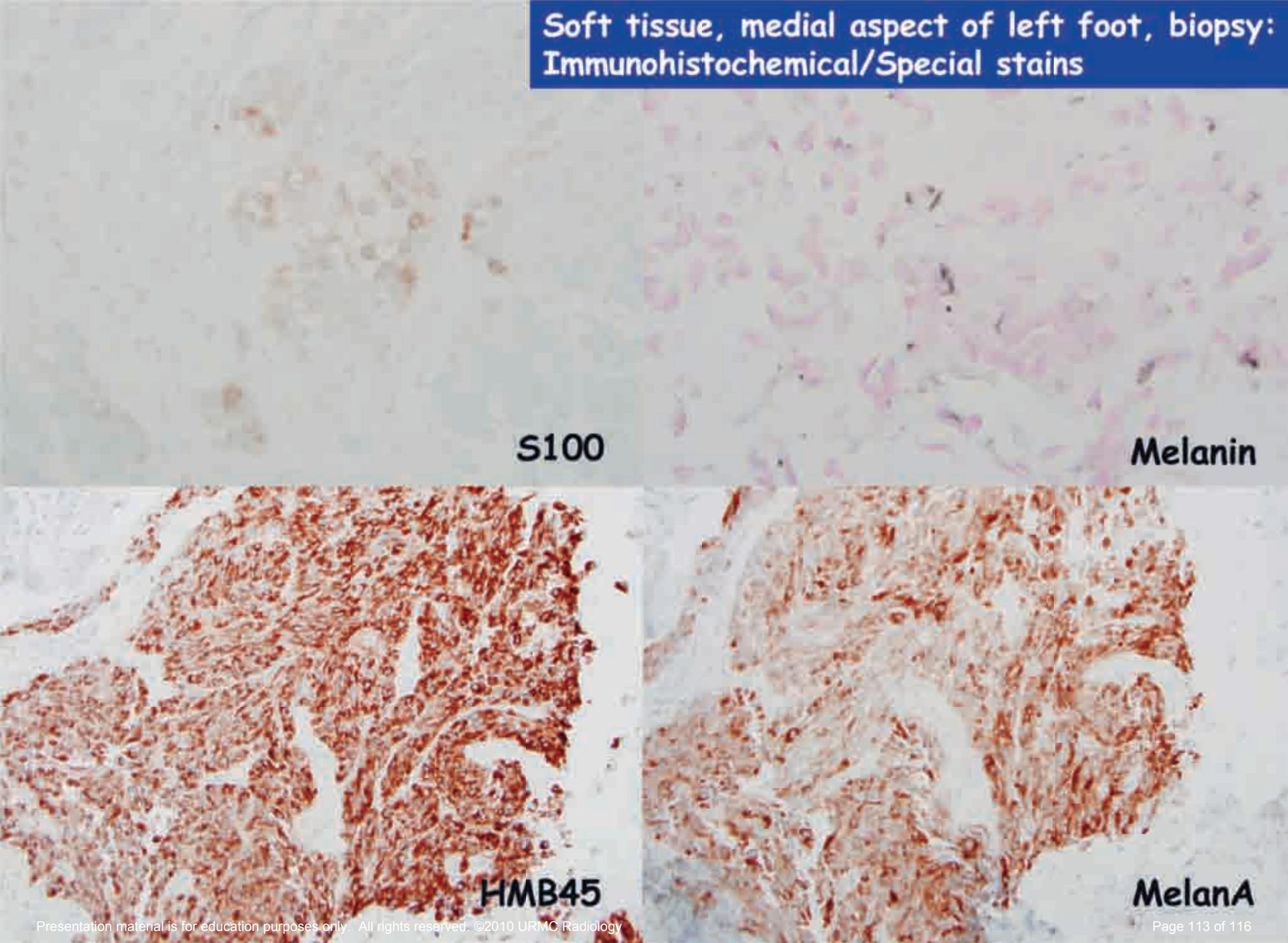
Soft tissue, medial aspect of left foot,
biopsy: H & E stain



Soft tissue, medial aspect of left foot,
biopsy: H & E stain



Soft tissue, medial aspect of left foot,
biopsy: H & E stain



Soft tissue, medial aspect of left foot, biopsy:

Malignant melanoma (clear cell tumor) of soft parts.

Comment: The tendinous and soft tissues of the specimen are infiltrated by packets of clear to eosinophilic small cells, some of which have intracytoplasmic melanin confirmed by melanin stain. The tumor cells are focally positive for S100, MelanA, and HMB45. All of these features, the age of the patient, and site of the lesion are typical of clear cell sarcoma.

Clear cell Sarcoma

- Rare sarcoma of neural crest origin, melanocytic differentiation
- Young adults/adolescents, median age 30
- Presents as slowly growing, painful mass of extremities/limb girdle, associated with fascia, tendon or aponeuroses
- Slow progression, local recurrence common, eventual nodal and distant mets
- Micro: Nested growth pattern with spindled, epithelioid, and giant cells, often necrosis
- Stain with melanoma markers and 2/3 have scattered cells with intracytoplasmic melanin
- $t(12;22)$, ATF1-EWS (not seen in melanoma)

The End