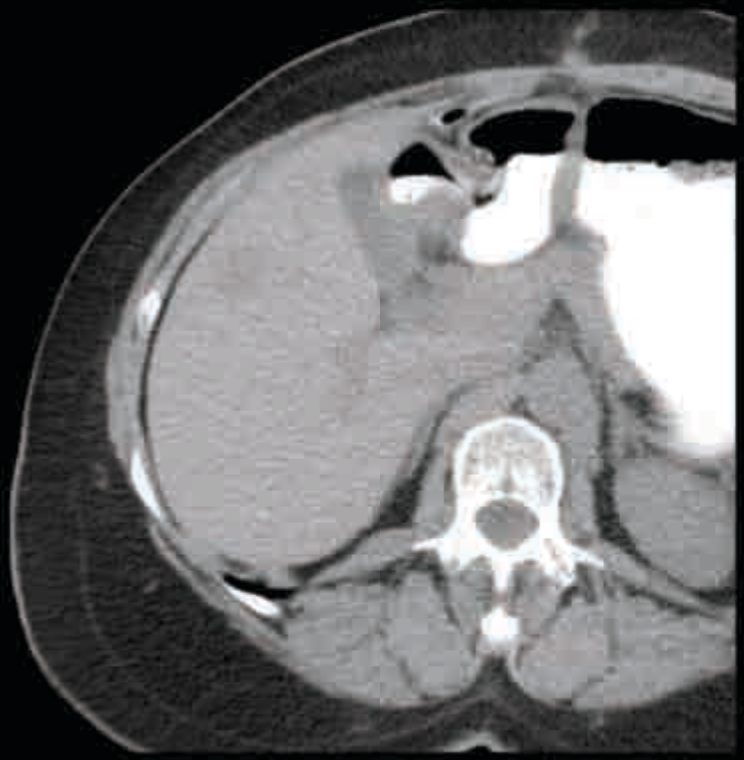
Radiology-Pathology Conference
March 27, 2009

Lisa Siripun, MD

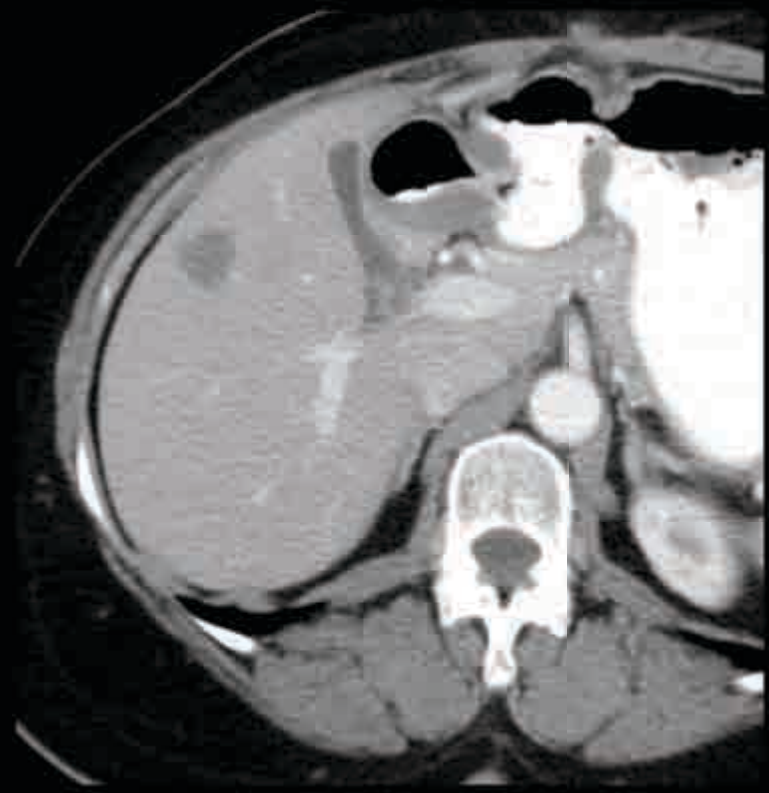
Devang Butani, MD

Case 1

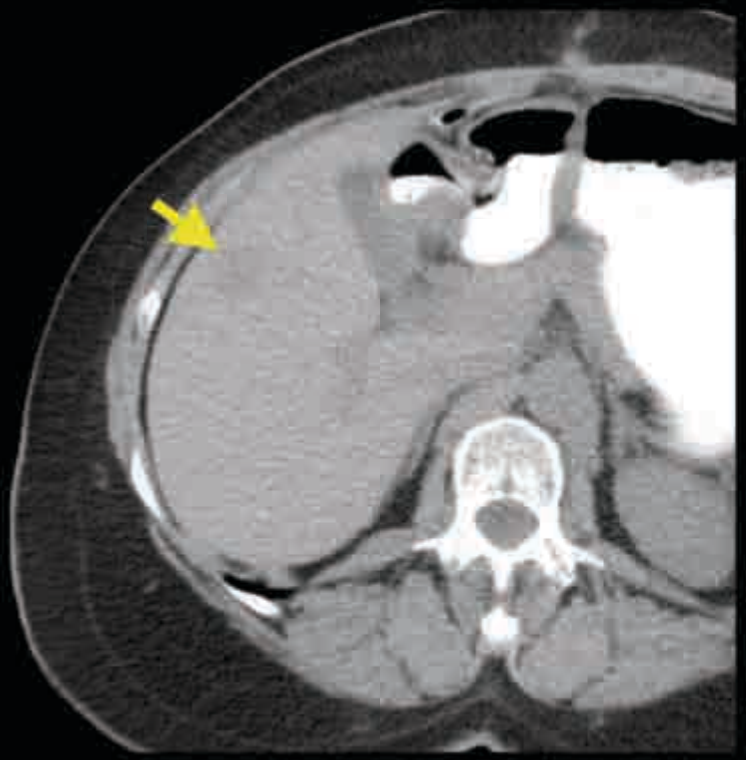
- 62 year-old female



Pre-contrast



Post-contrast



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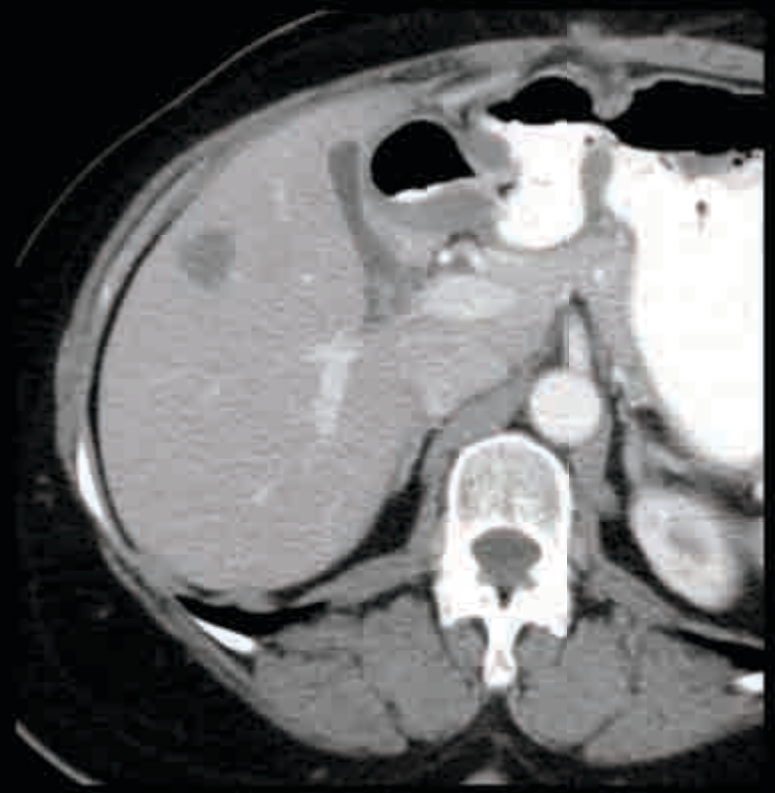

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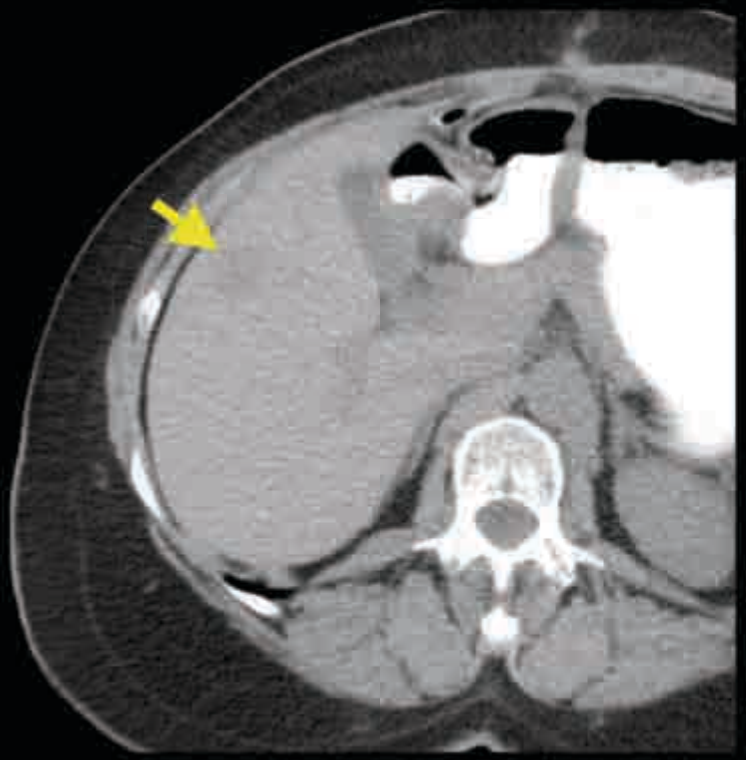

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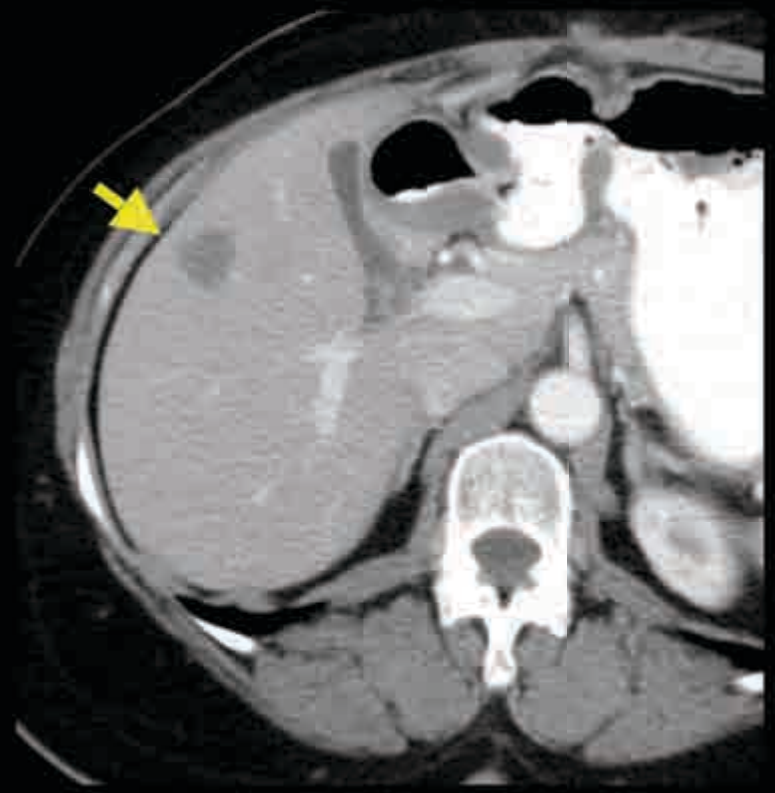

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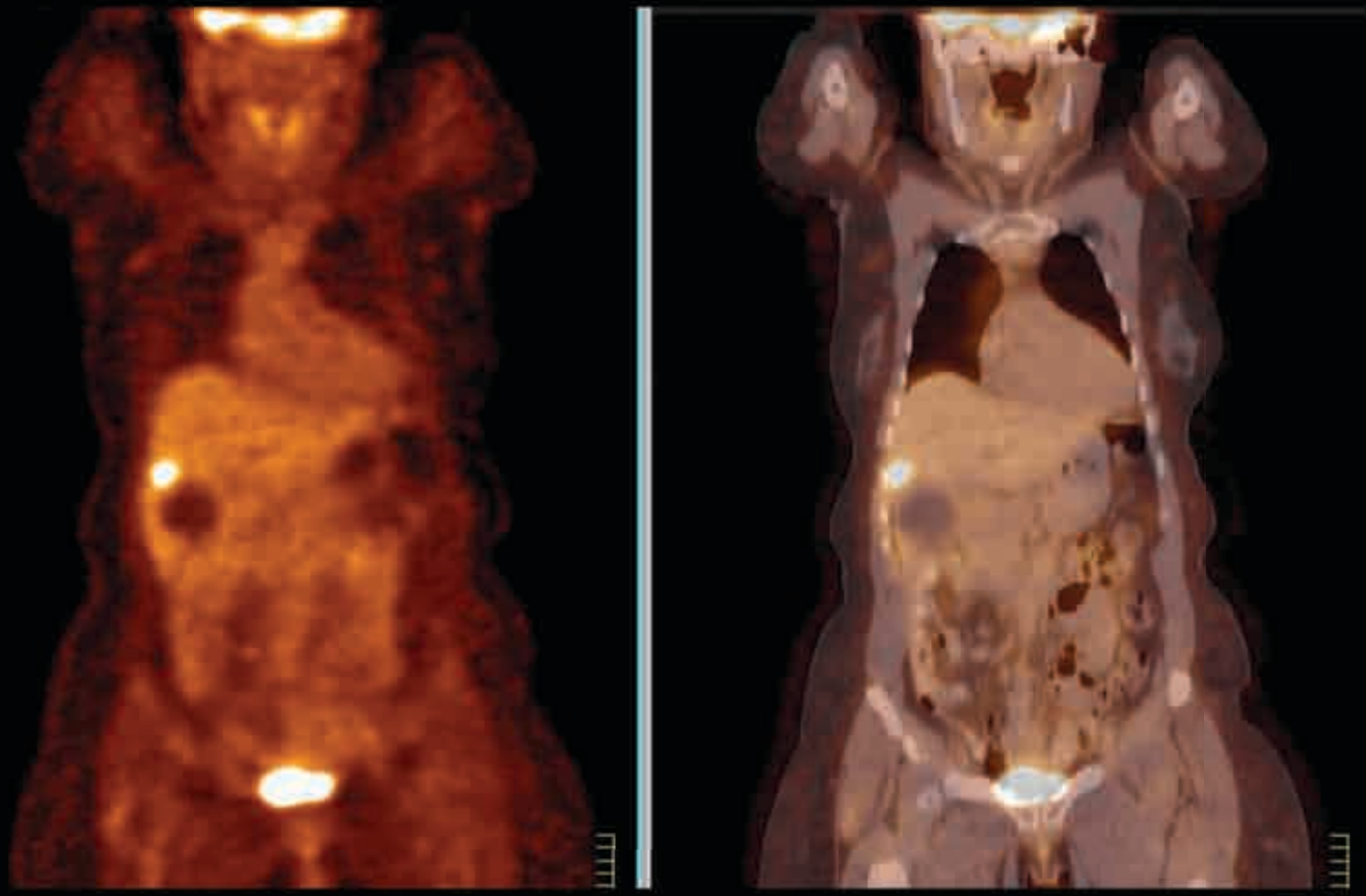
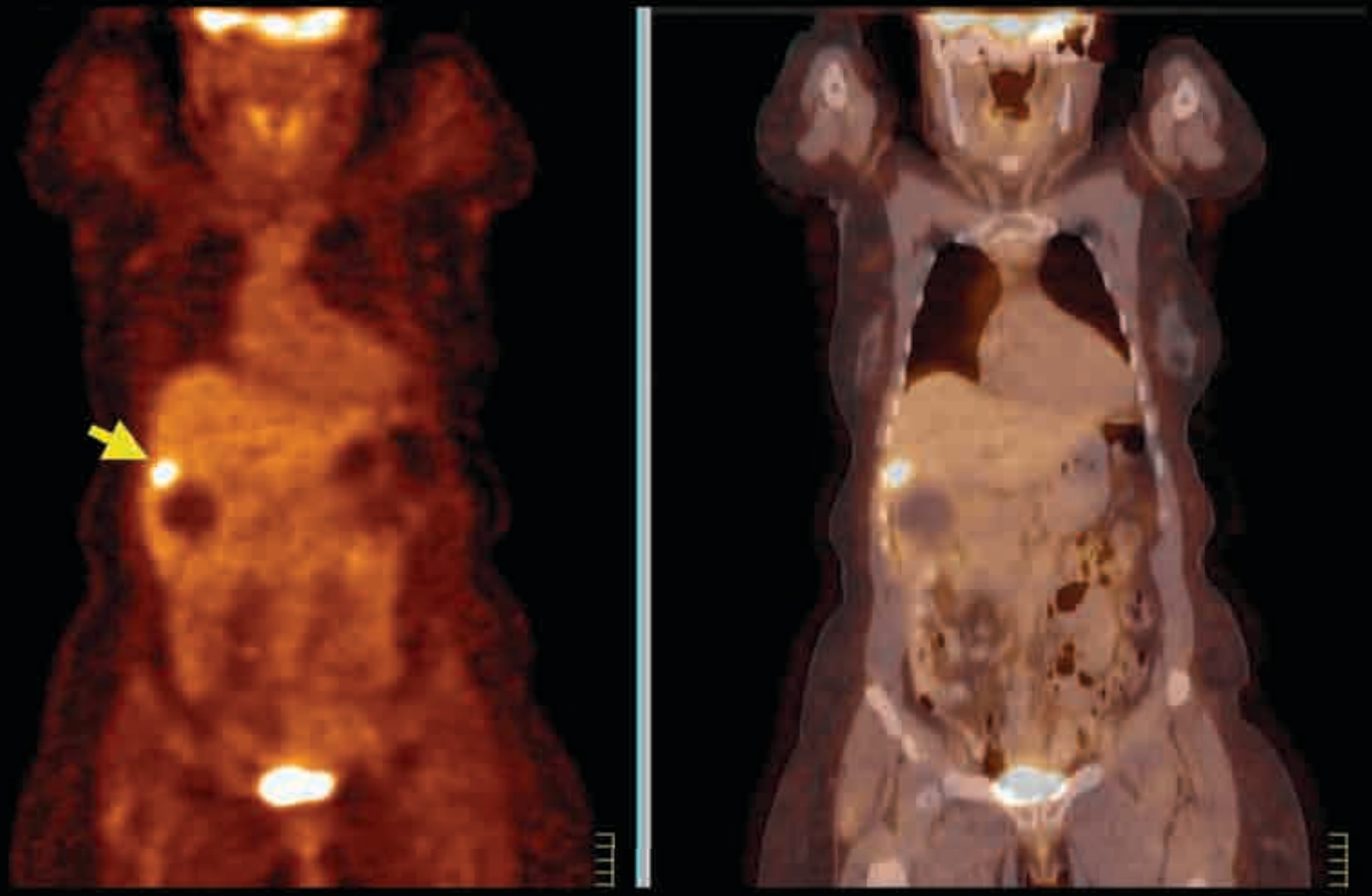
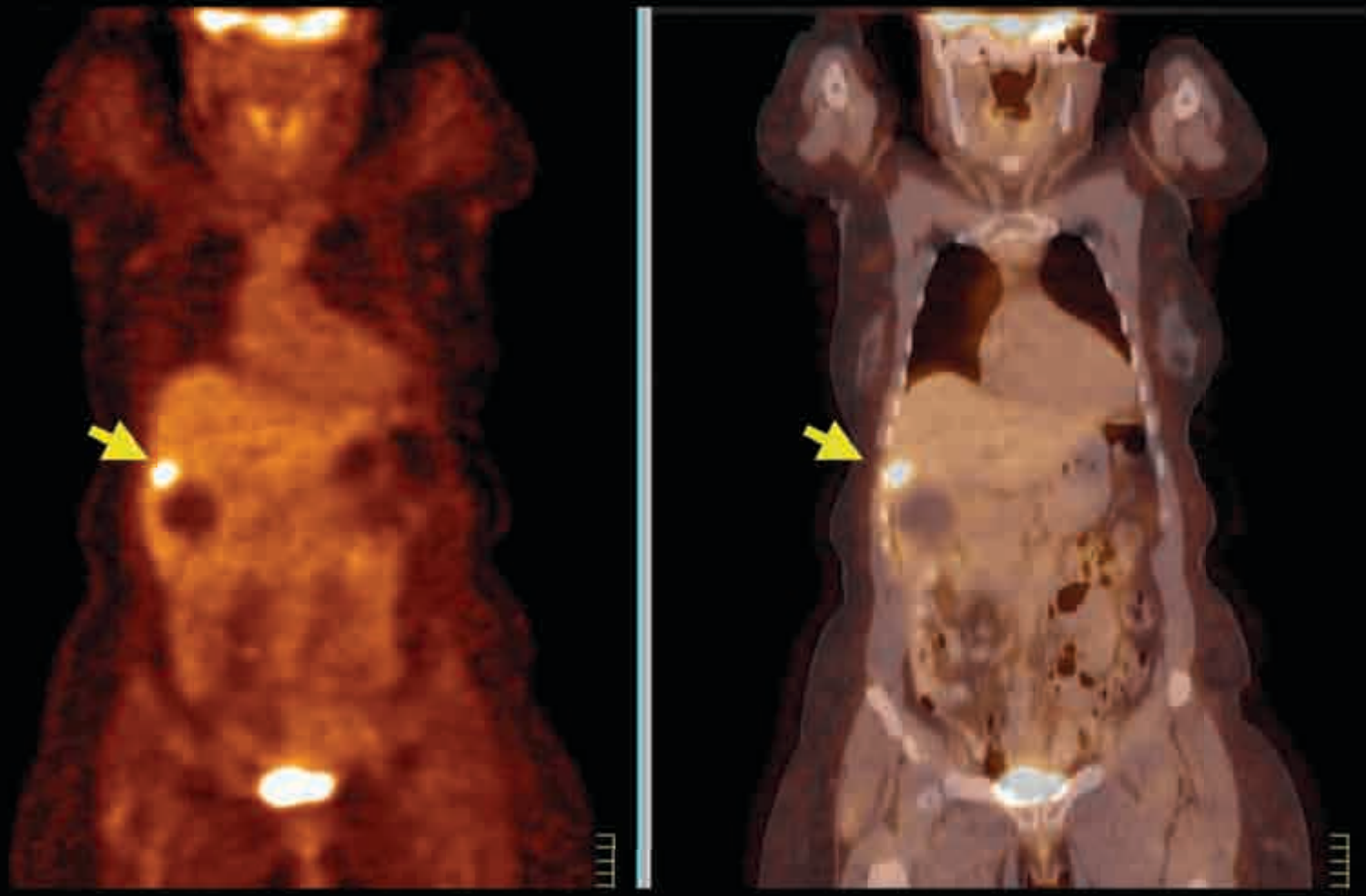
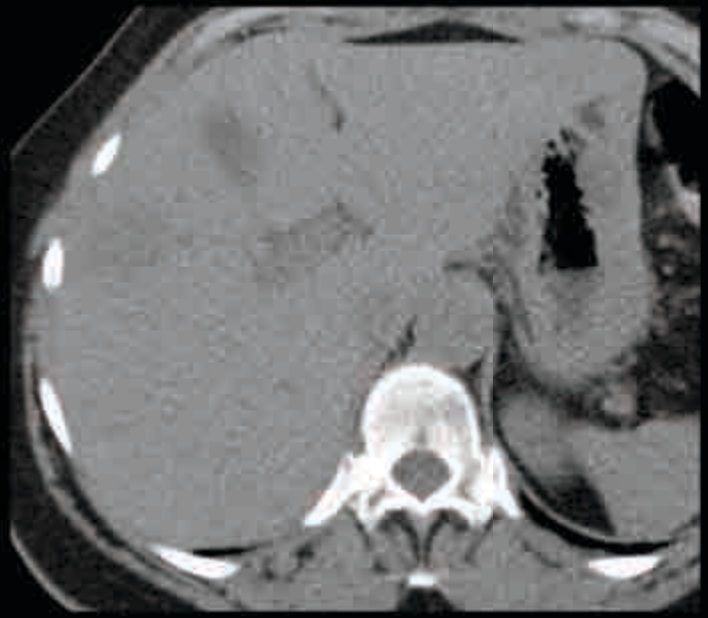


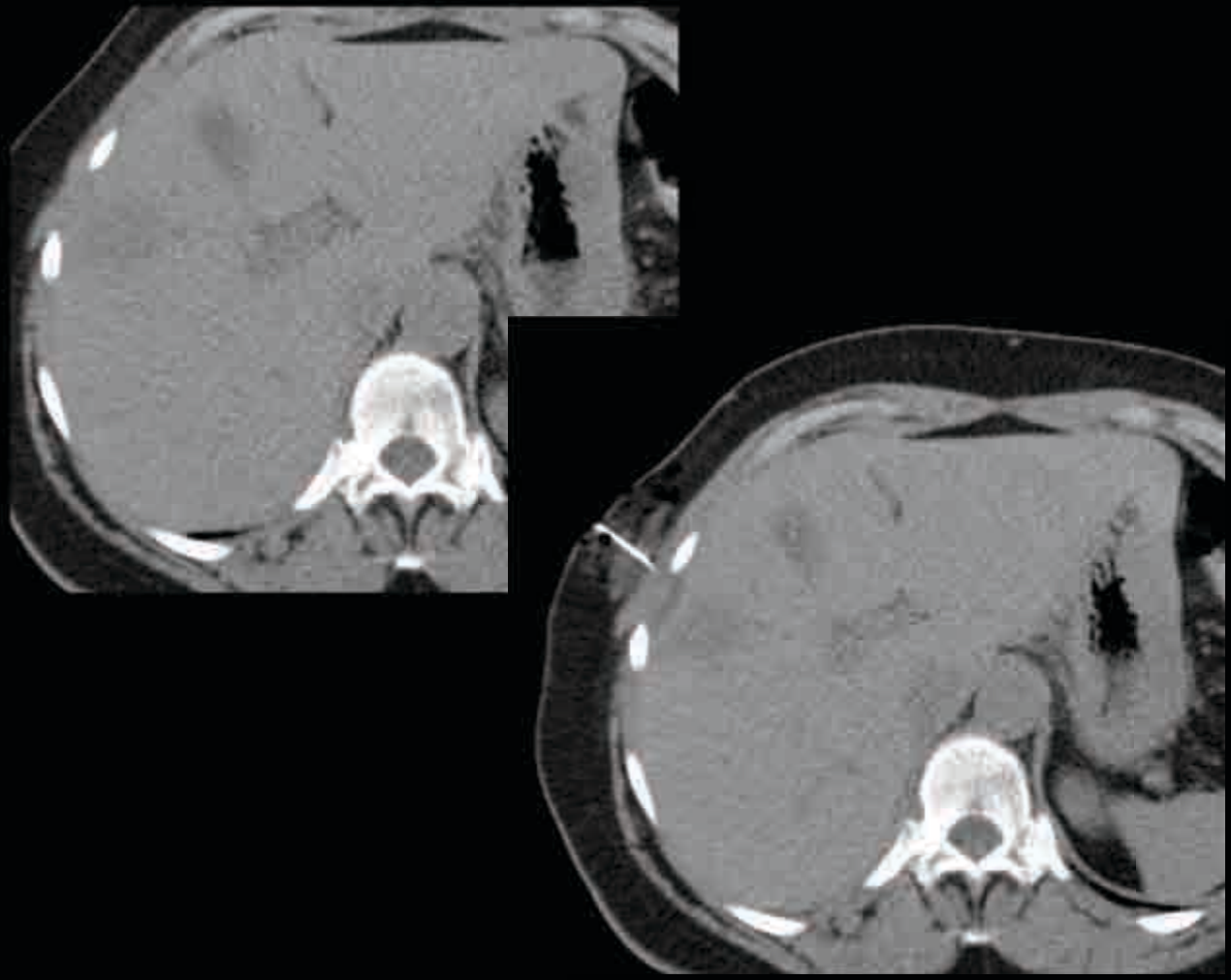


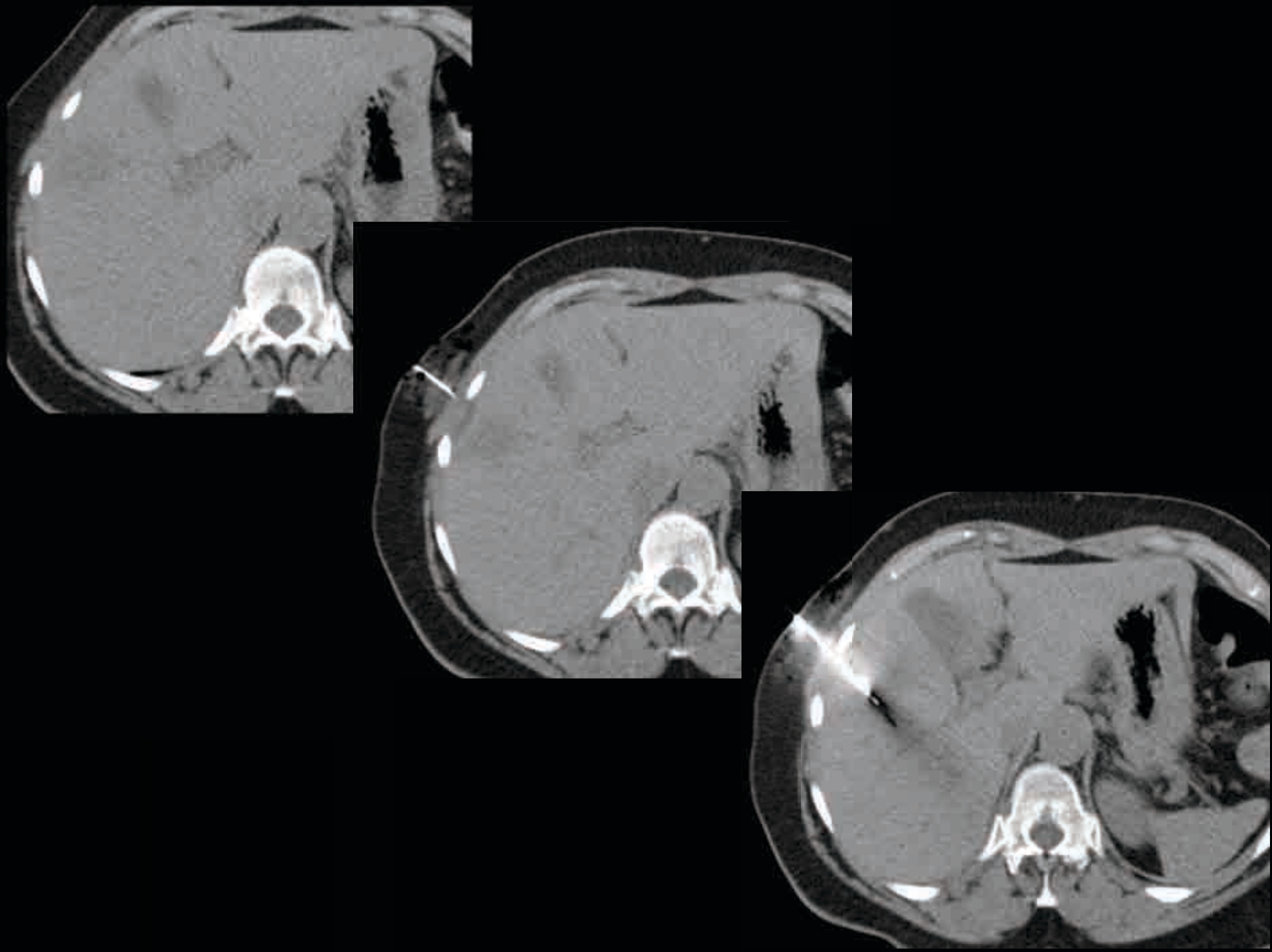


Differential diagnoses Hypodense, hypermetabolic liver lesion

- Primary malignant tumor : Hepatoma, lymphoma, intrahepatic cholangiocarcinoma
- Metastasis : colon, stomach, pancreas, breast and lung
- Benign tumor : Adenoma
- Abscess







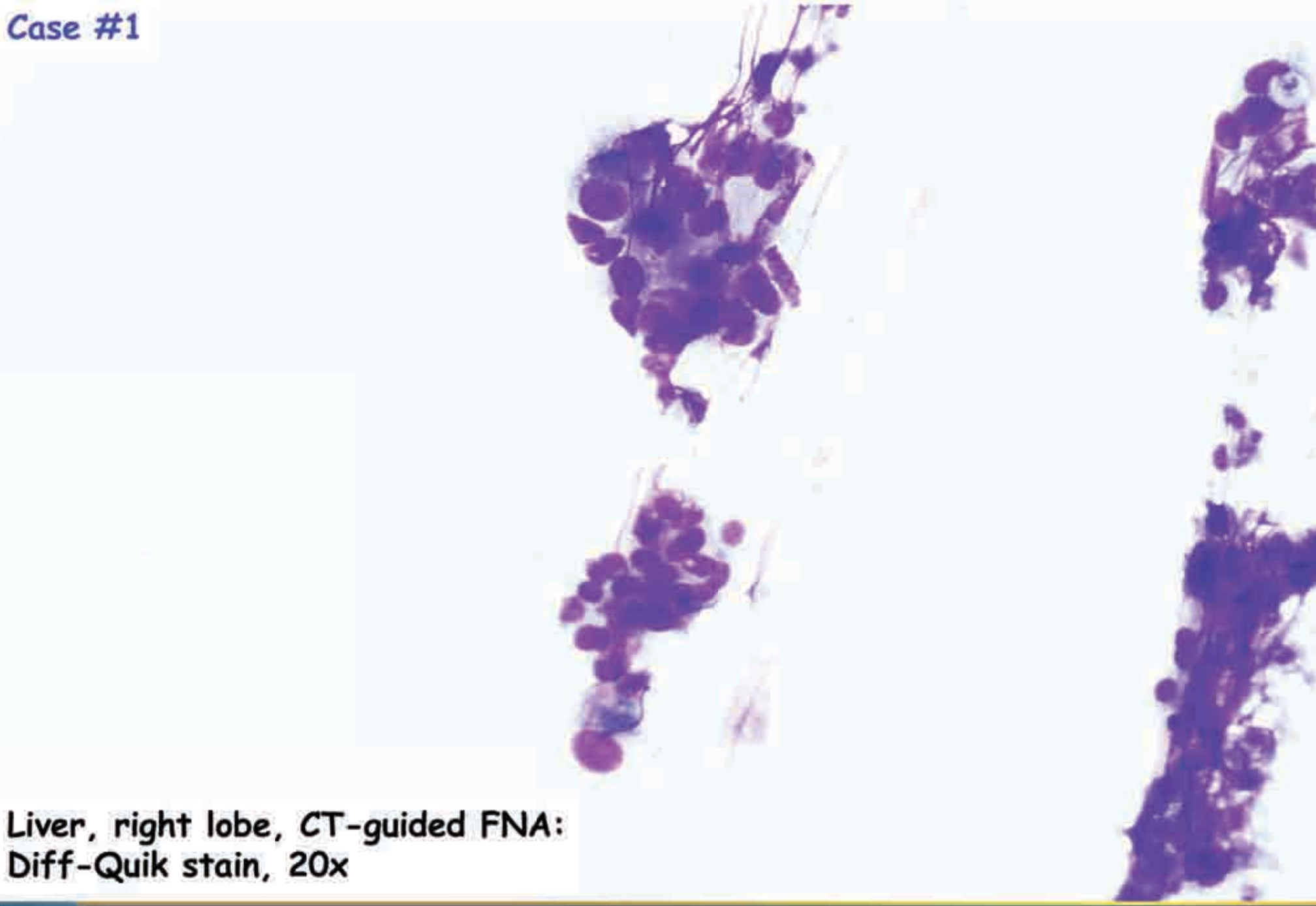
Radiology / Pathology Conference

Stacie Canacci, M.D.

MEDICINE of THE HIGHEST ORDER

UNIVERSITY of ROCHESTER MEDICAL CENTER

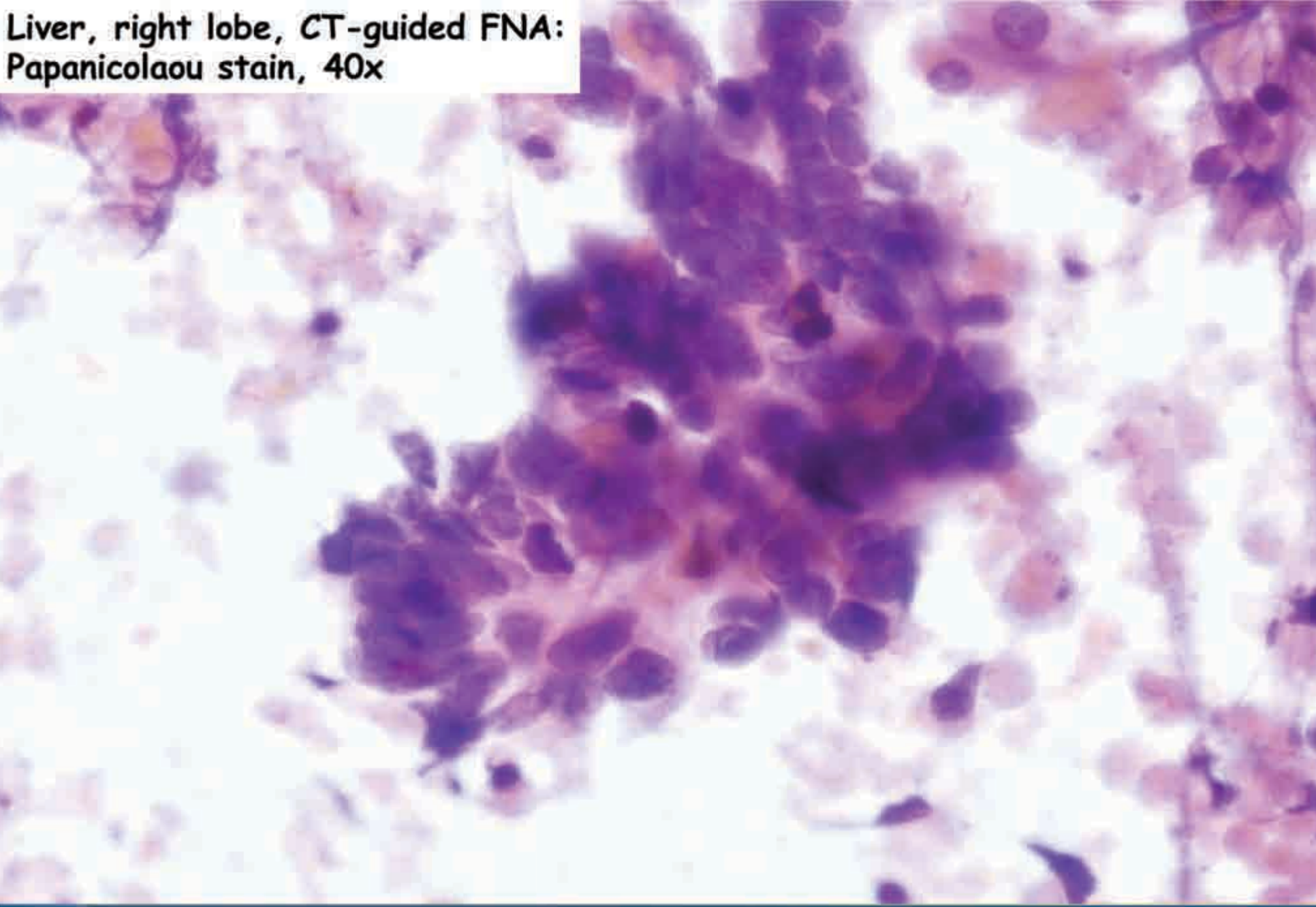
Case #1



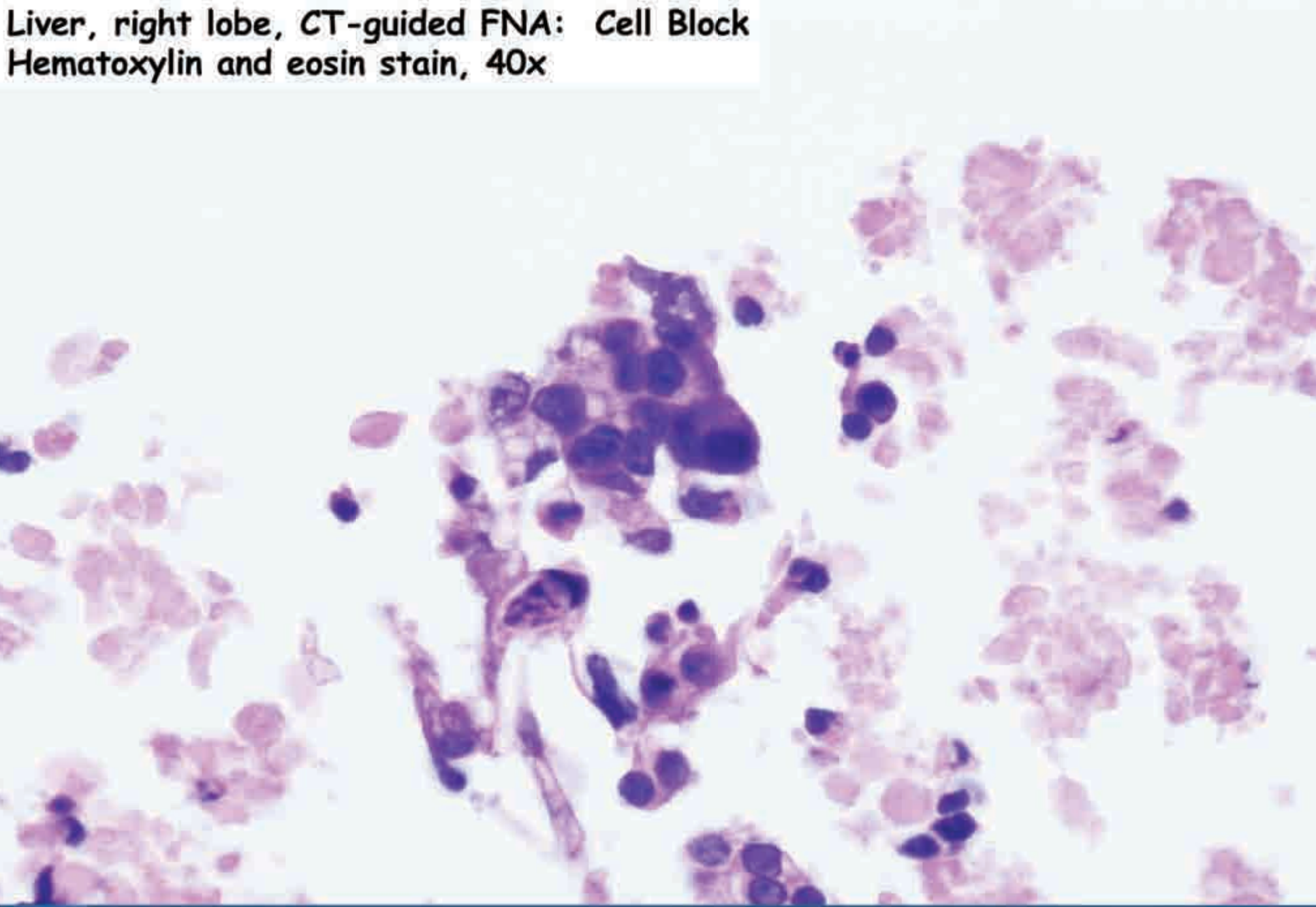
Liver, right lobe, CT-guided FNA:
Diff-Quik stain, 20x

Liver, right lobe, CT-guided FNA:
Diff-Quik stain, 40x

Liver, right lobe, CT-guided FNA:
Papanicolaou stain, 40x



Liver, right lobe, CT-guided FNA: Cell Block
Hematoxylin and eosin stain, 40x



Liver, right lobe, CT-guided fine needle aspiration:

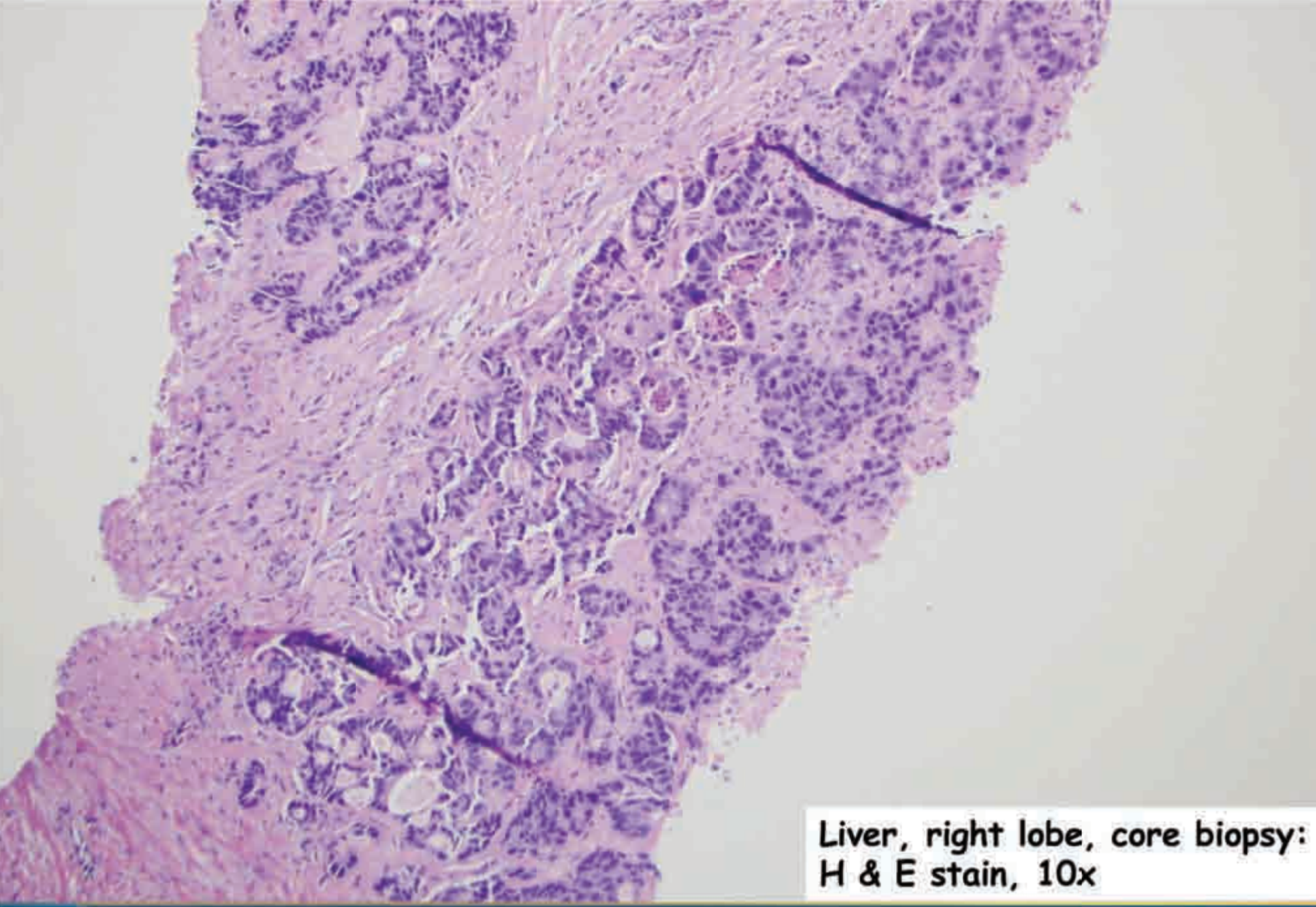
Malignant tumor cells present derived from metastatic adenocarcinoma consistent with origin from colon.

Comment: Extensive necrosis is identified.

Cell block and cytologic preparations examined.

Liver, right lobe, core biopsies:

Metastatic adenocarcinoma consistent with colonic origin.



Liver, right lobe, core biopsy:
H & E stain, 10x

Liver metastasis

- Most common malignant tumor of the liver
- The liver is second most commonly involve

organ by metastatic disease, after the lymph nodes

- Multiple lesions
- Usually no portal vein invasion

Hypovascular mets (more common):

- GI tract, lung, pancreas, most breast cancer

Hypervascular mets:

- Endocrine, renal, thyroid, melanoma, some breast cancer

Liver metastasis

CT:

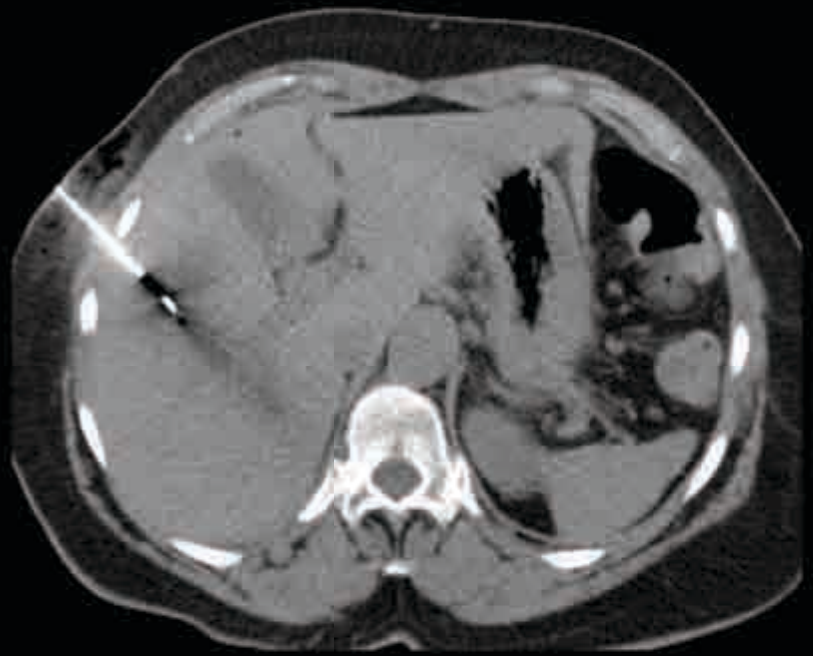
- Variable density
- Hypovascular (more common)
- Detection of calcification, hemorrhage

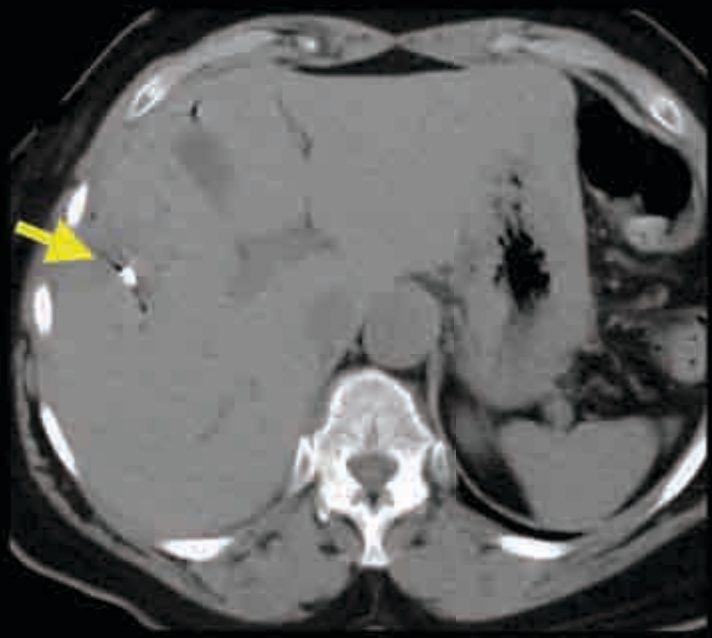
MRI:

- Heterogeneous signal intensity with irregular and indistinct outer margins
- Smooth or irregular central area of high signal intensity with a surrounding ring of lower signal intensity

Treatment

- Resection or ablation for colorectal mets
- Chemoembolization for carcinoid/ neuroendocrine mets
- Chemotherapy for all others

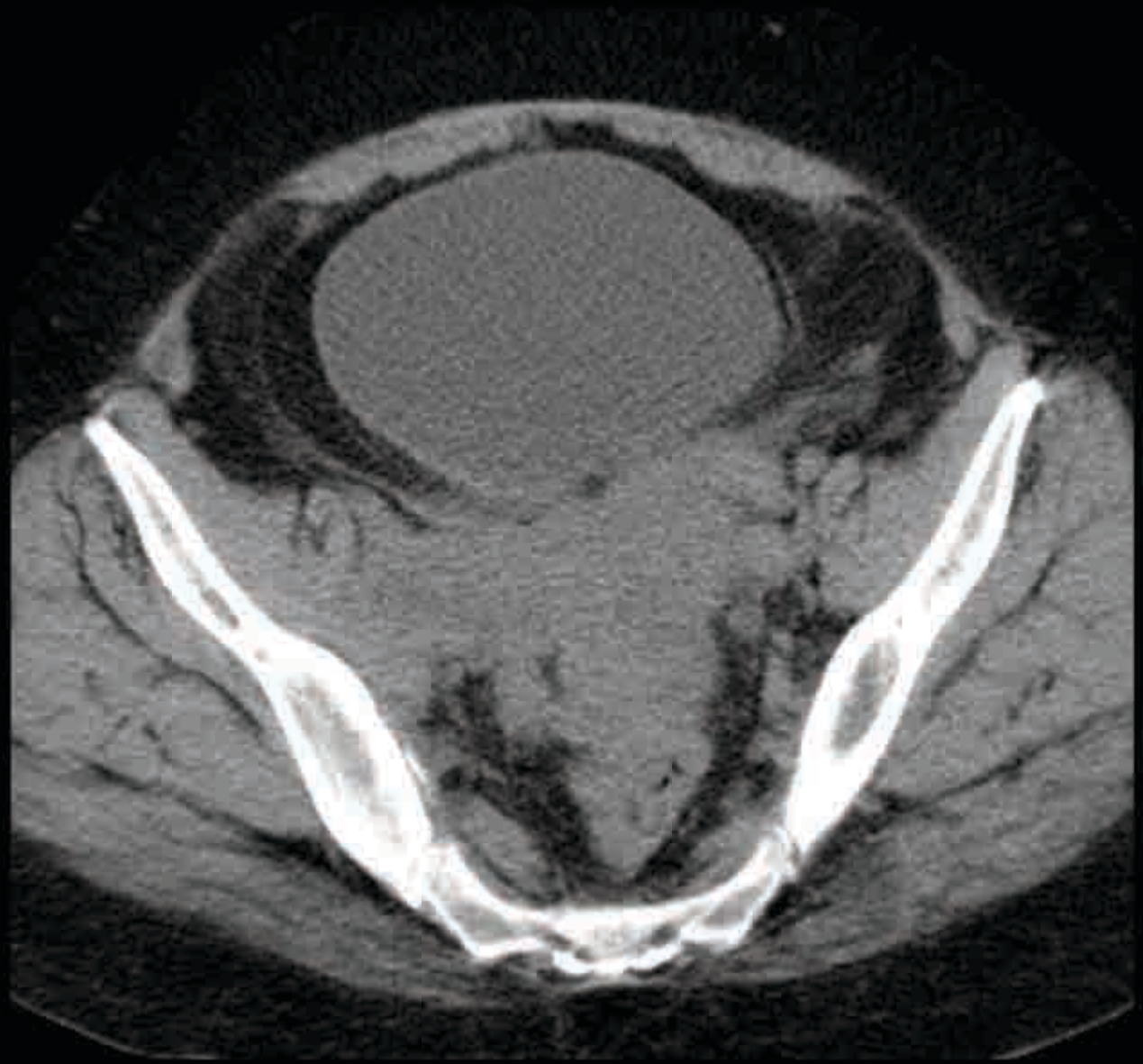


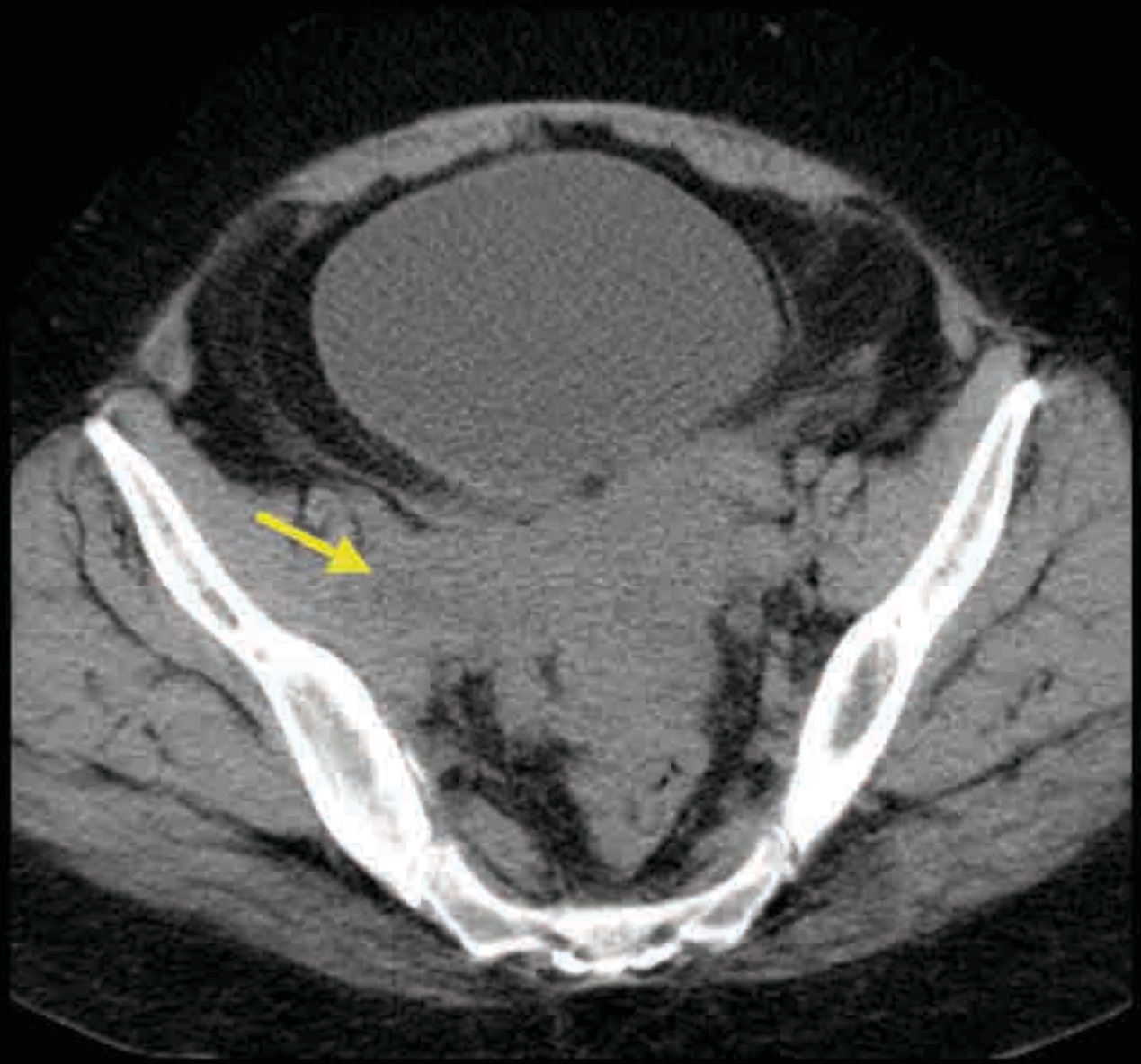


- The fiducial marker was placed within the liver lesion
- This patient underwent stereotactic body radiation therapy

Case 2

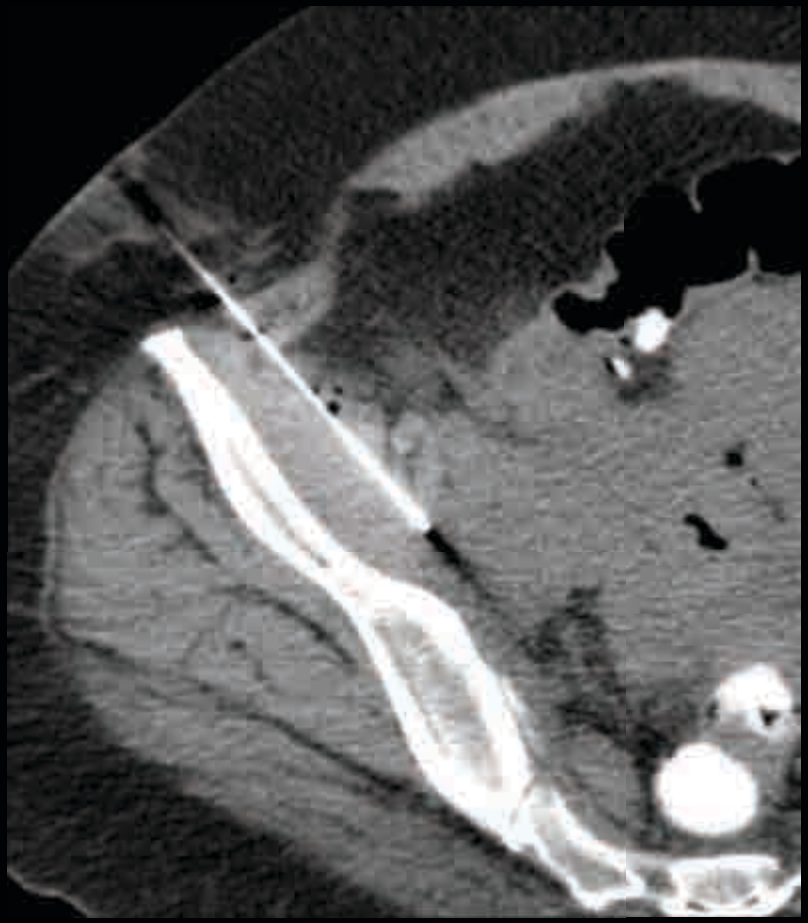
- 44 year-old female with renal failure and weight loss





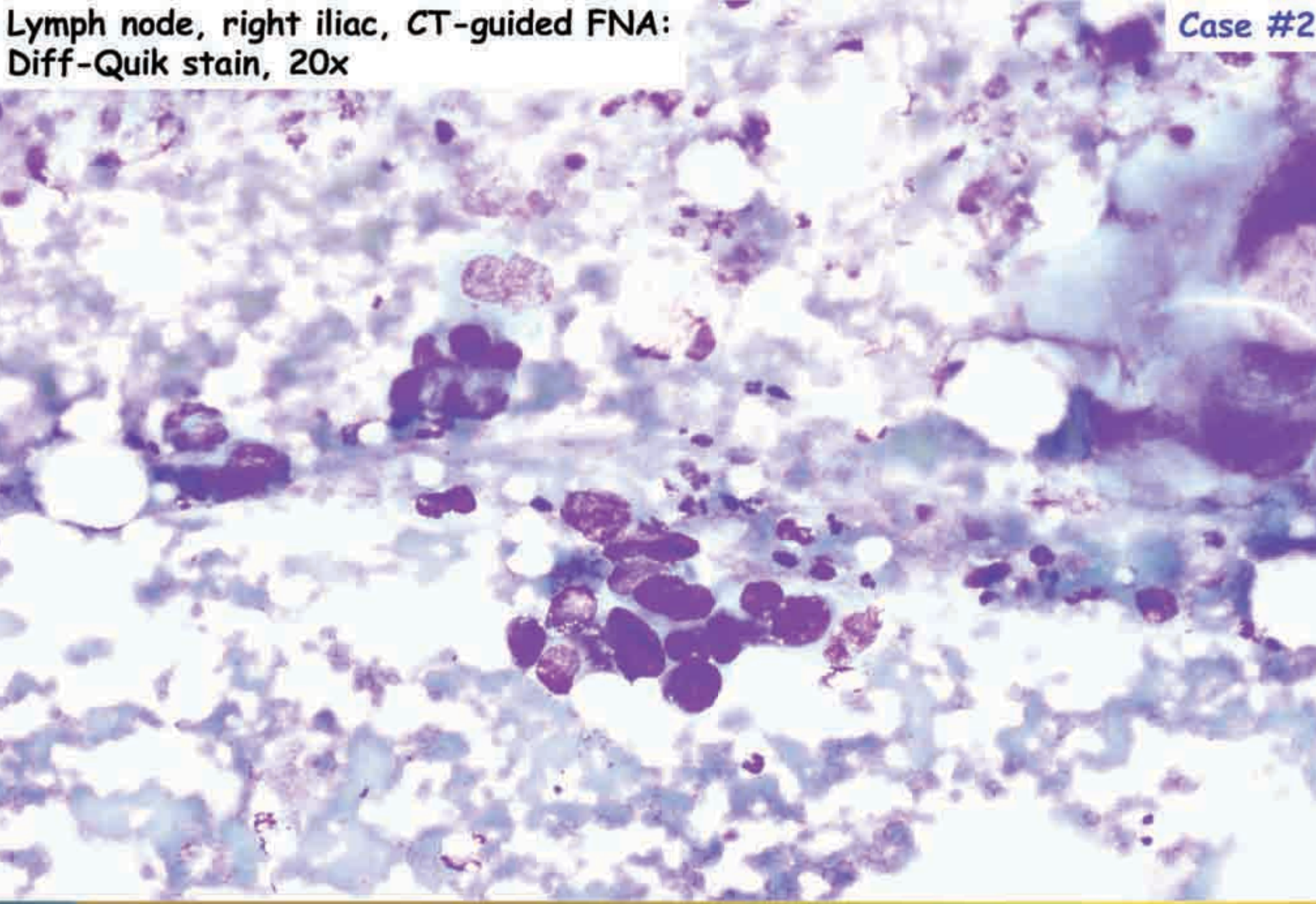
Differential diagnoses

- Bladder tumor: TCC (90%), squamous cell, adenocarcinoma, lymphoma, rhabdomyosarcoma, leiomyoma
- Colon cancer
- Lymphadenopathy
- Uterine and cervical mass: fibroid, endometrial cancer, leiomyosarcoma, cervical cancer
- Ovarian mass

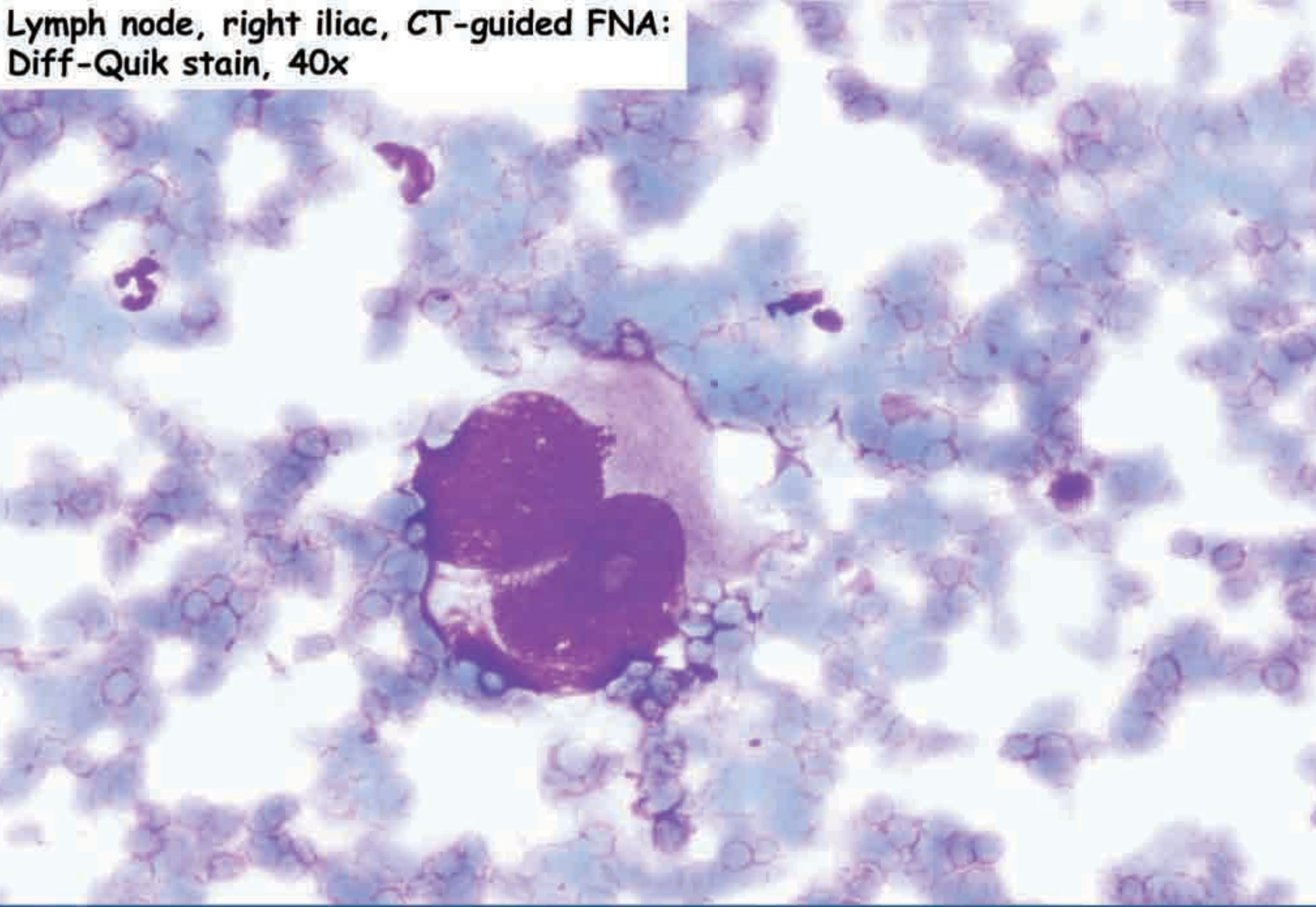


Lymph node, right iliac, CT-guided FNA:
Diff-Quik stain, 20x

Case #2

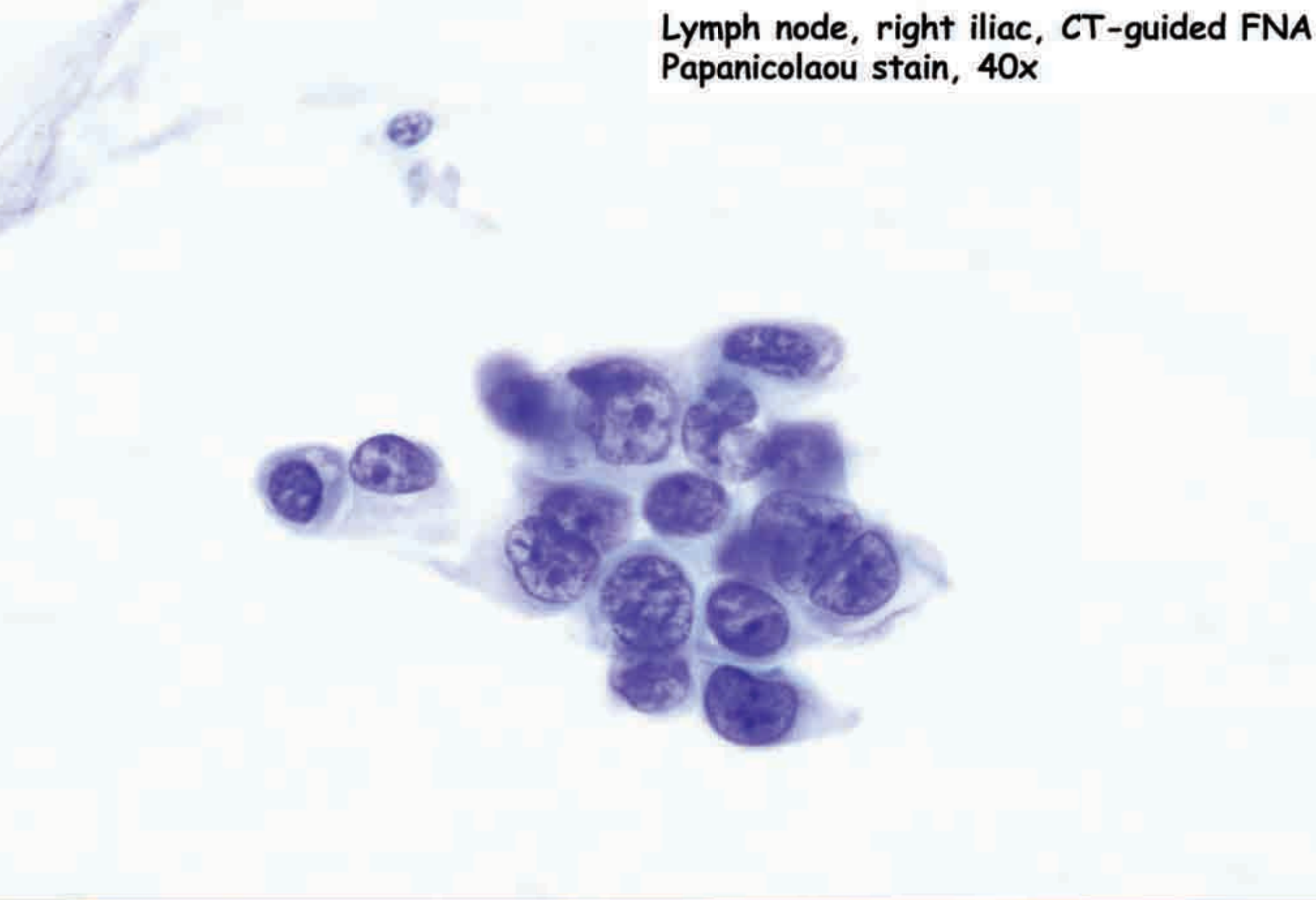


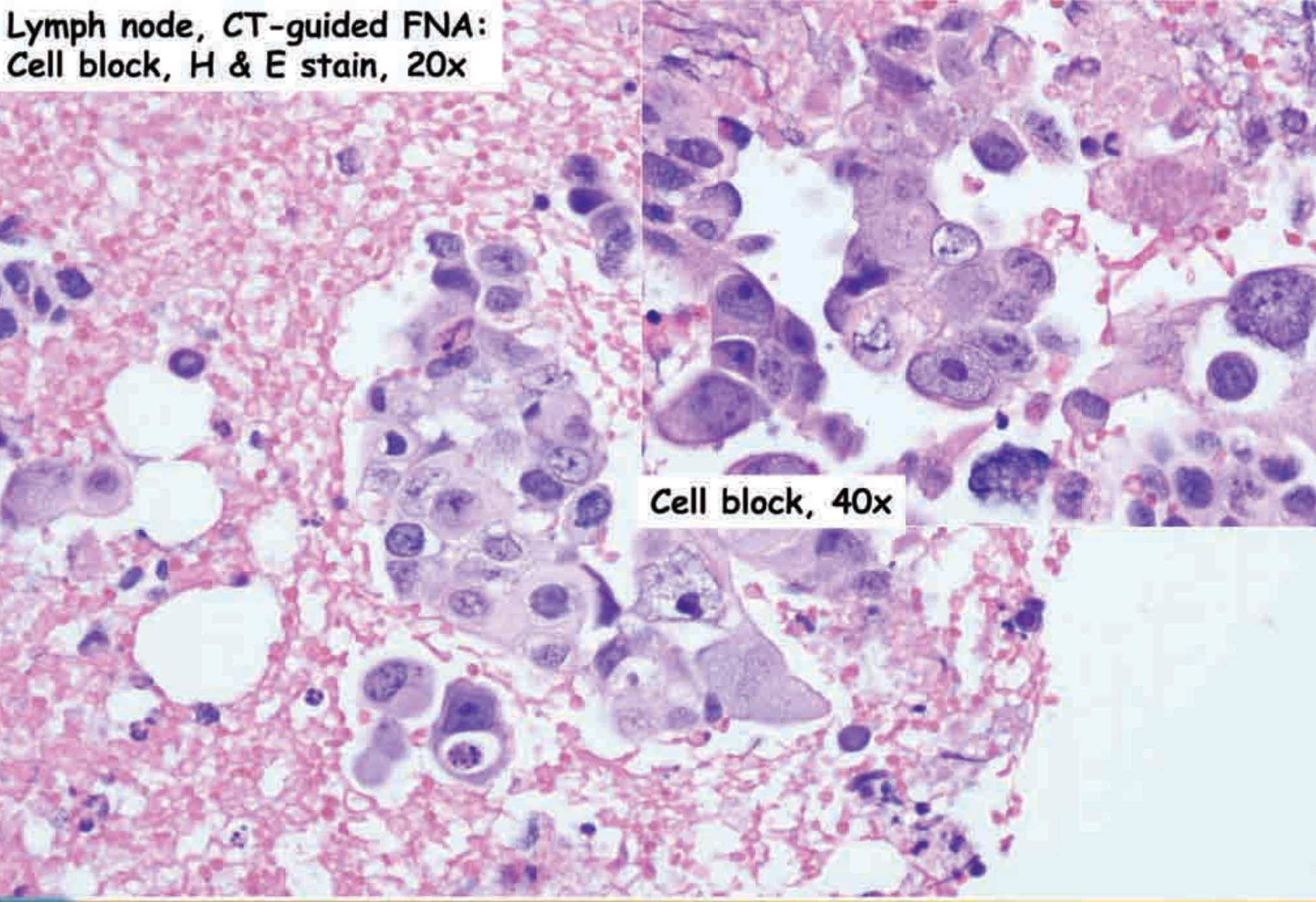
Lymph node, right iliac, CT-guided FNA:
Diff-Quik stain, 40x

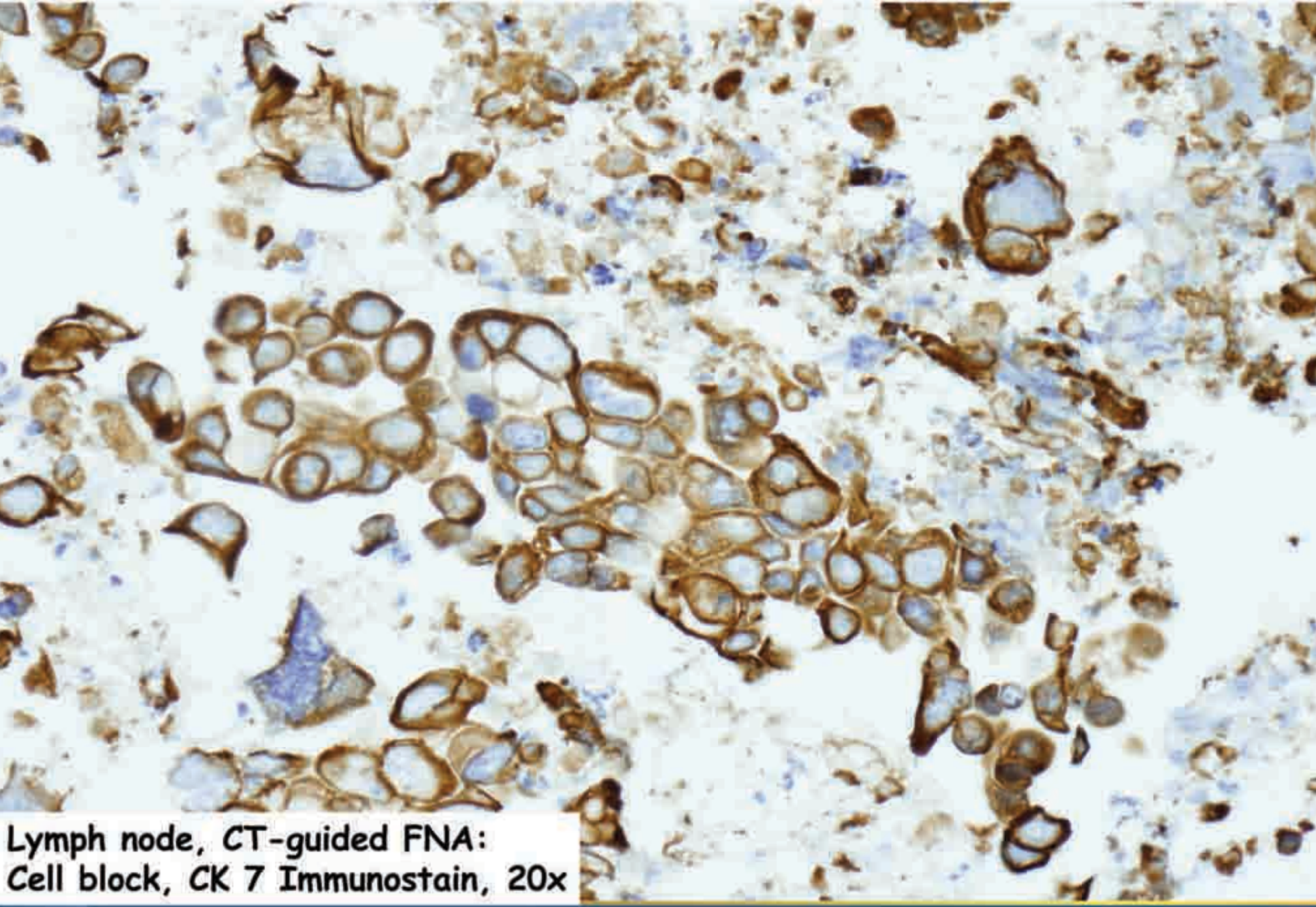


Lymph node, right iliac, CT-guided FNA:
Papanicolaou stain, 20x

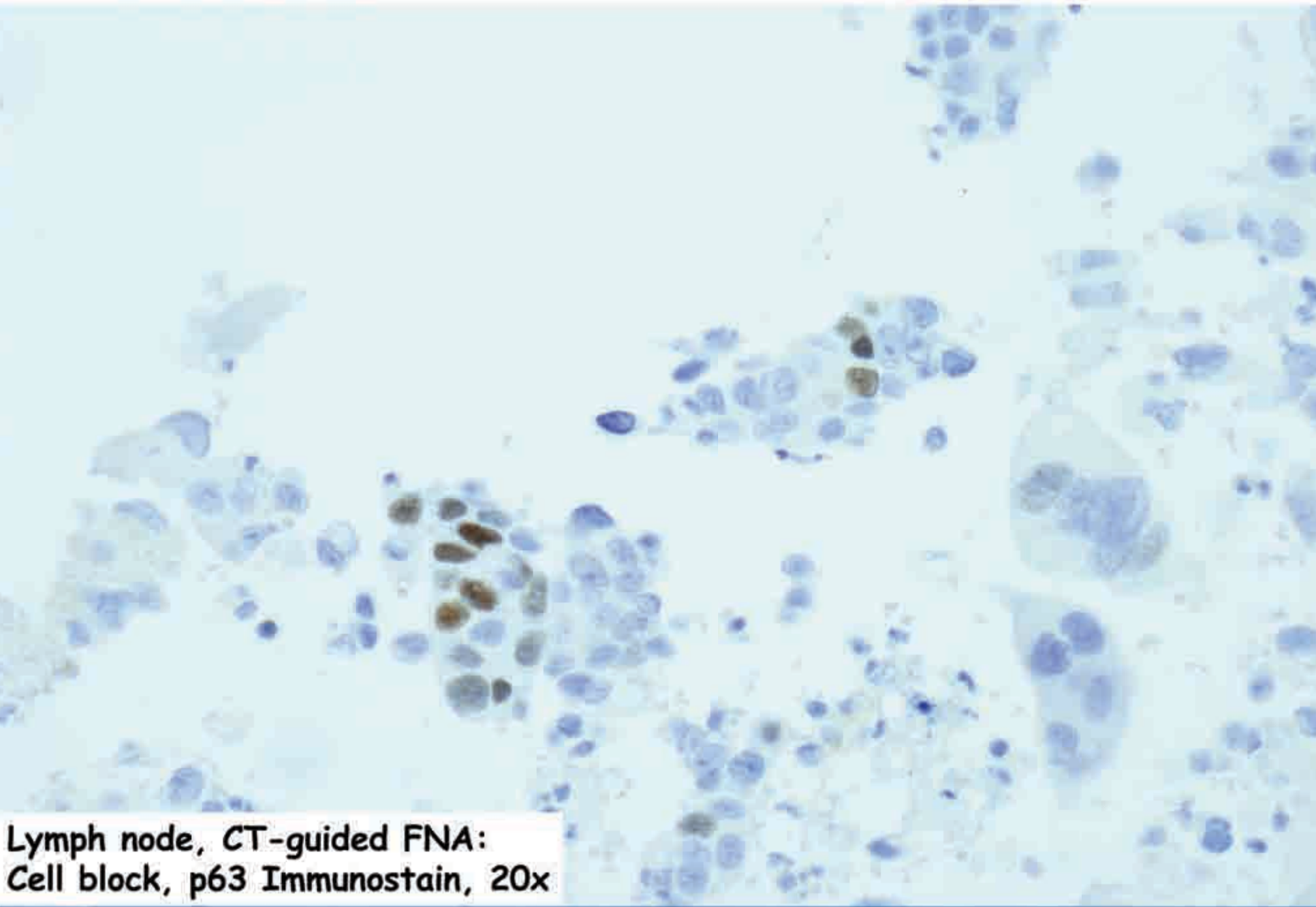
Lymph node, right iliac, CT-guided FNA
Papanicolaou stain, 40x



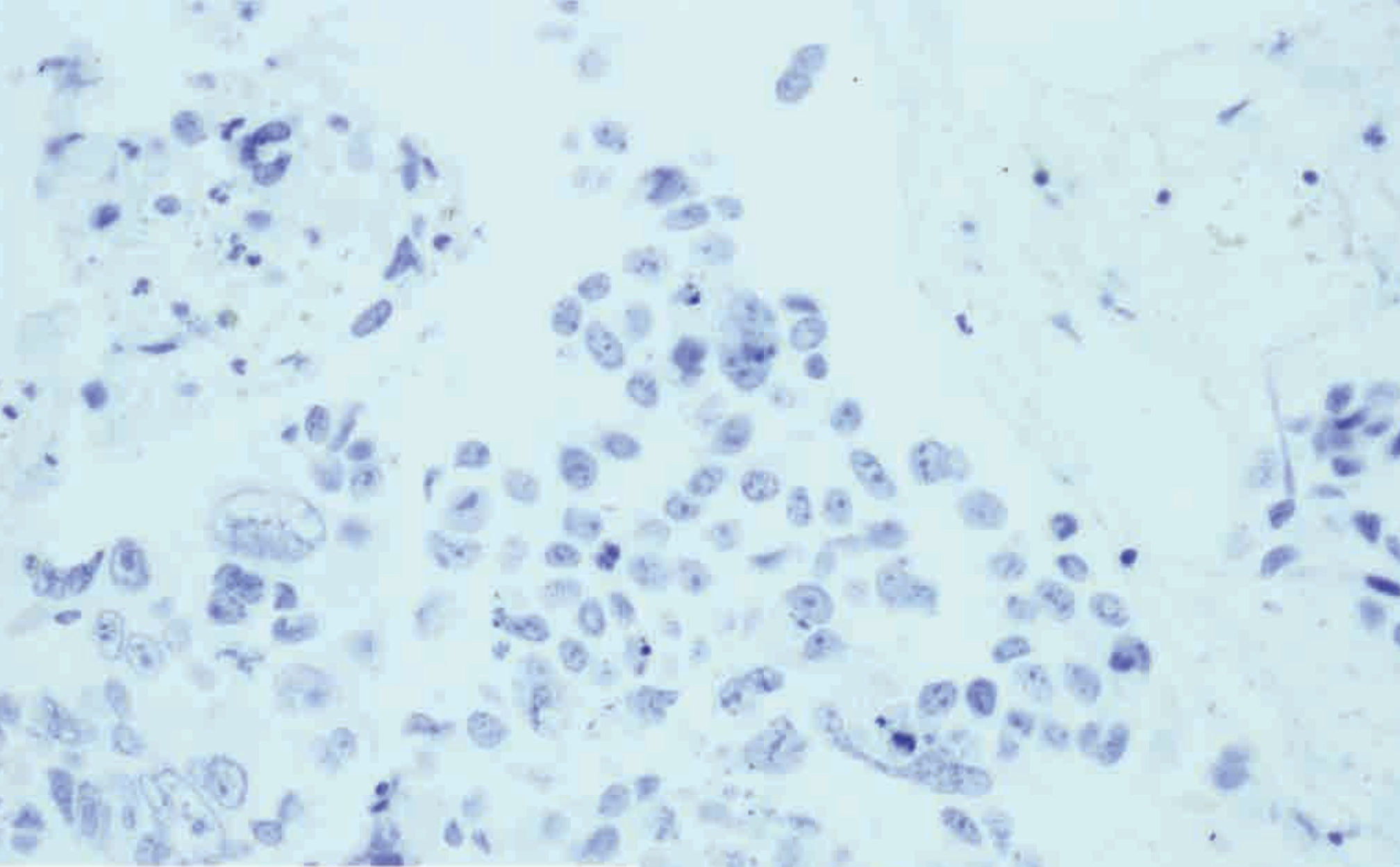




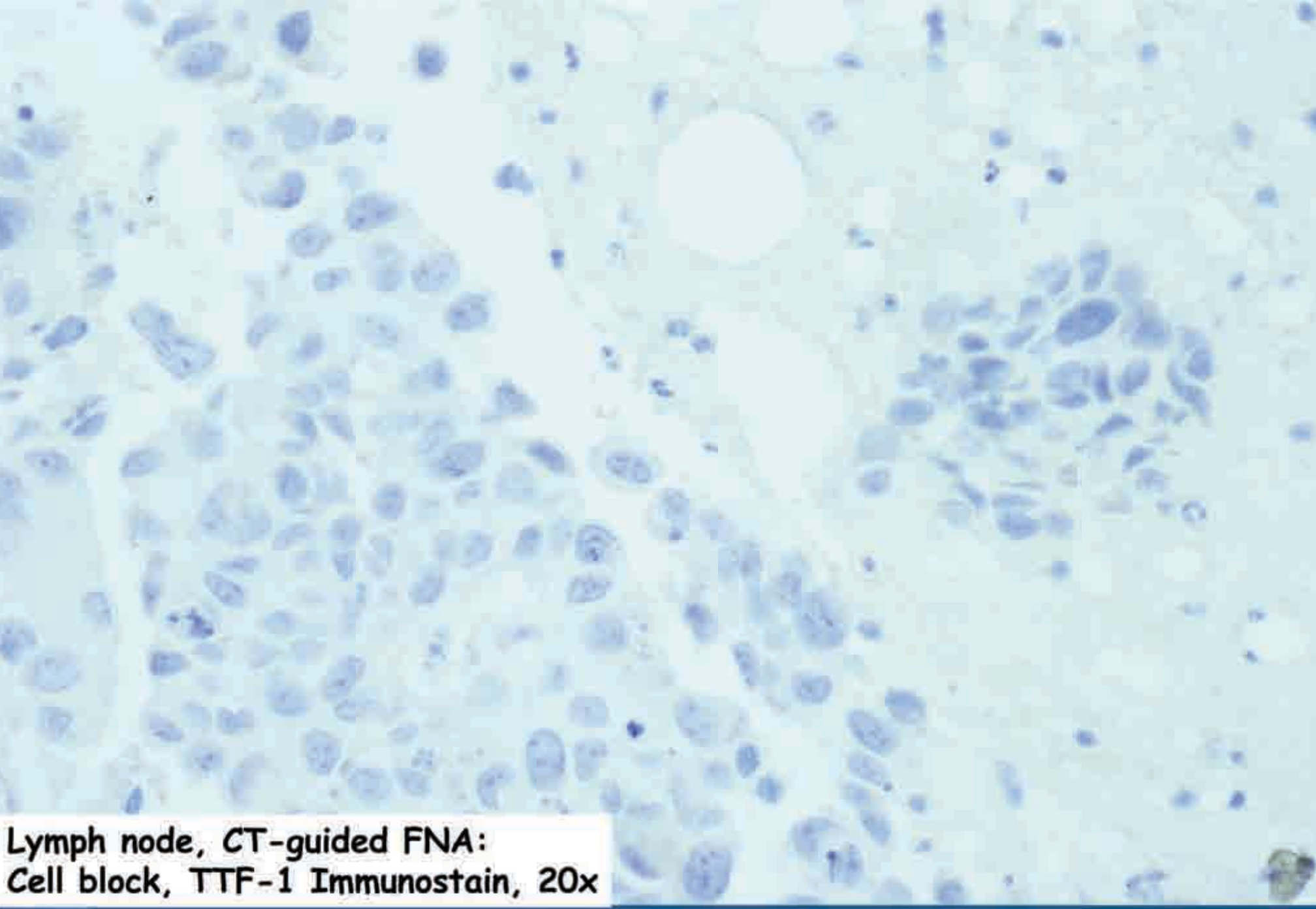
Lymph node, CT-guided FNA:
Cell block, CK 7 Immunostain, 20x



Lymph node, CT-guided FNA:
Cell block, p63 Immunostain, 20x



Lymph node, CT-guided FNA:
Cell block, CK 20 Immunostain, 20x



Lymph node, CT-guided FNA:
Cell block, TTF-1 Immunostain, 20x

Lymph node, right iliac, CT-guided fine needle aspiration:

Malignant tumor cells present derived from metastatic high grade urothelial carcinoma.

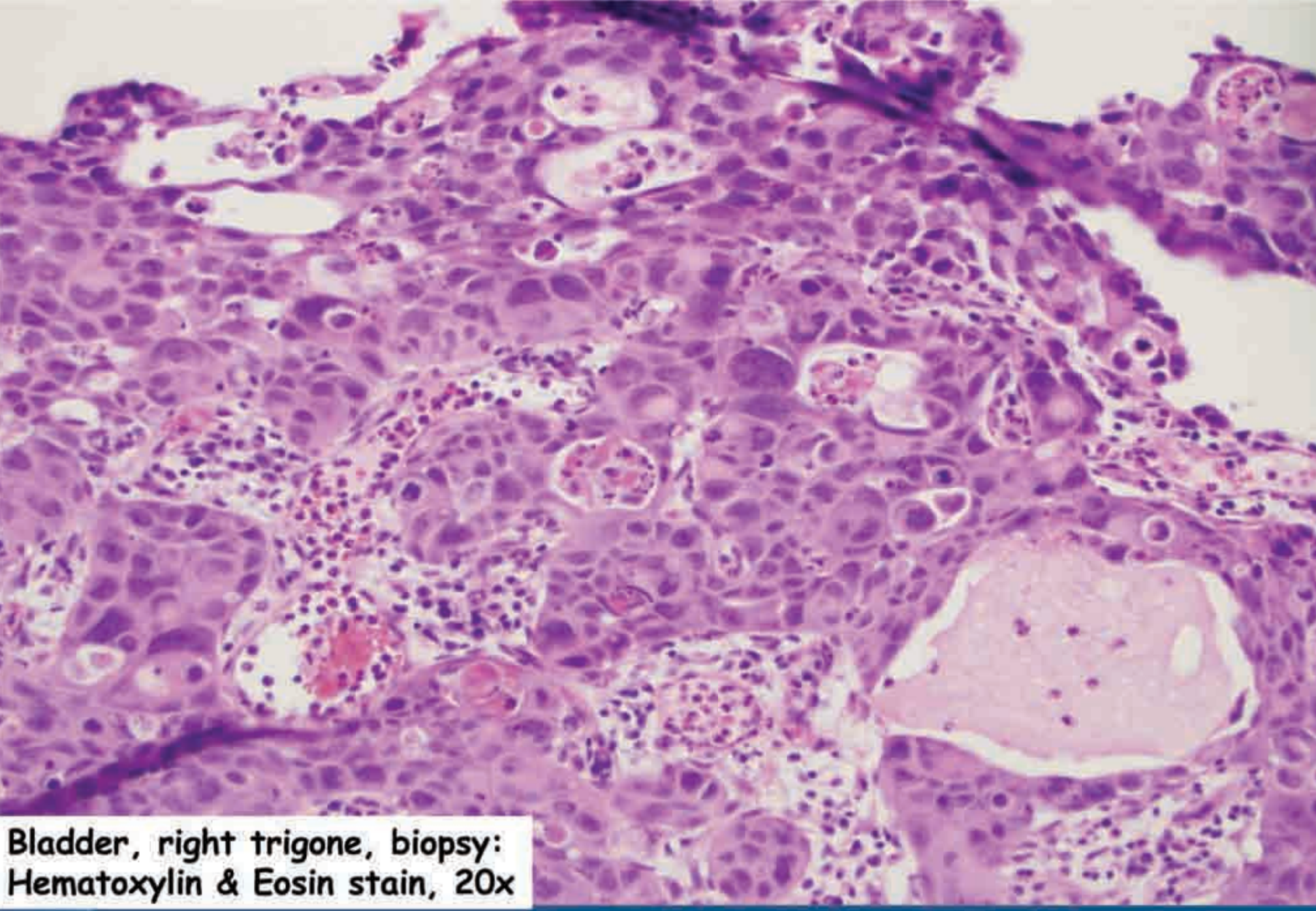
Comment: The tumor is morphologically identical to previous biopsy. Immunohistochemical stains do not mark with TTF-1 or CK 20. They do mark with CK7 and focally with p63. These results may be seen with urothelial carcinoma showing squamous differentiation.

Cell block and cytologic preparations examined.

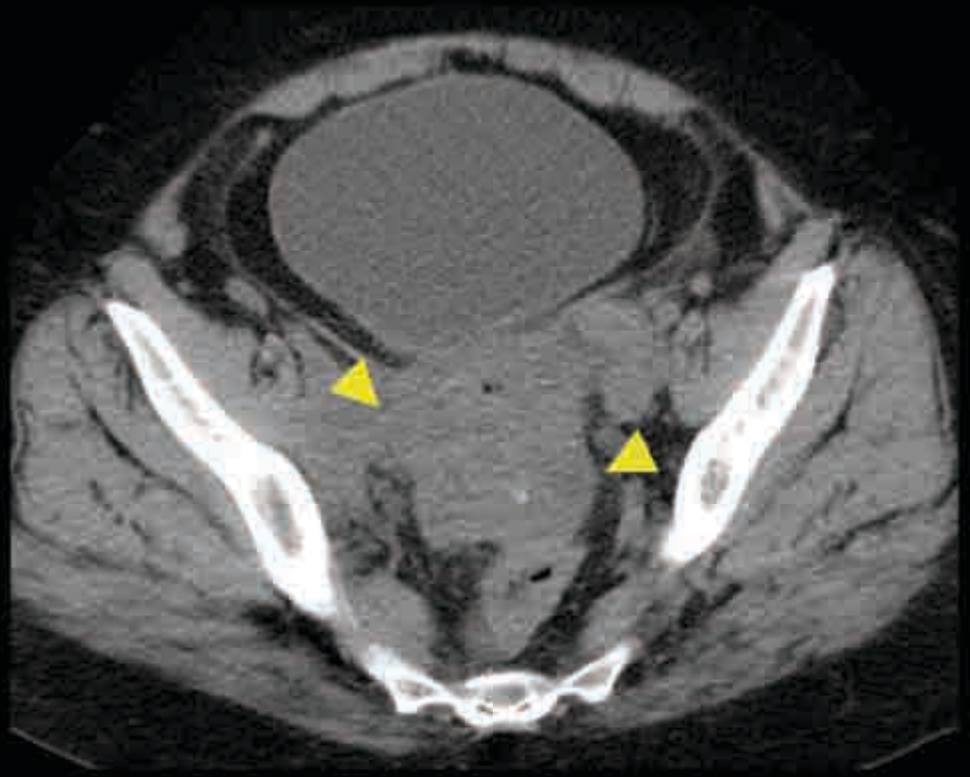
Bladder, right trigone, biopsy:

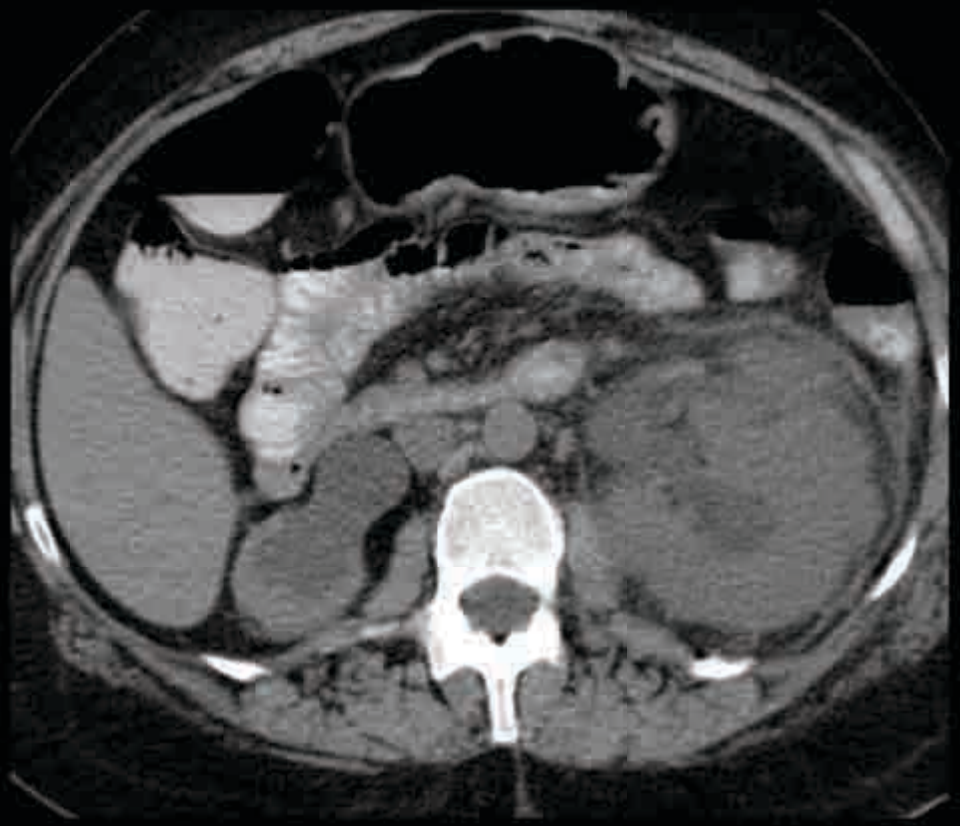
High grade invasive urothelial carcinoma.

Bladder, right trigone, biopsy:
Hematoxylin & Eosin stain, 4x



Bladder, right trigone, biopsy:
Hematoxylin & Eosin stain, 20x





CT for bladder cancer

- CT urography (CTU) : evaluate the entire urinary system because urothelial tumor may have multifocal disease
- CTU can detect direct perirenal, periureteral, and extravesical tumor spread, lymphadenopathy and distant metastases
- CTU requires a shorter examination time compared with traditional excretory urography and has greater accuracy for detecting urothelial lesions

CT for bladder cancer

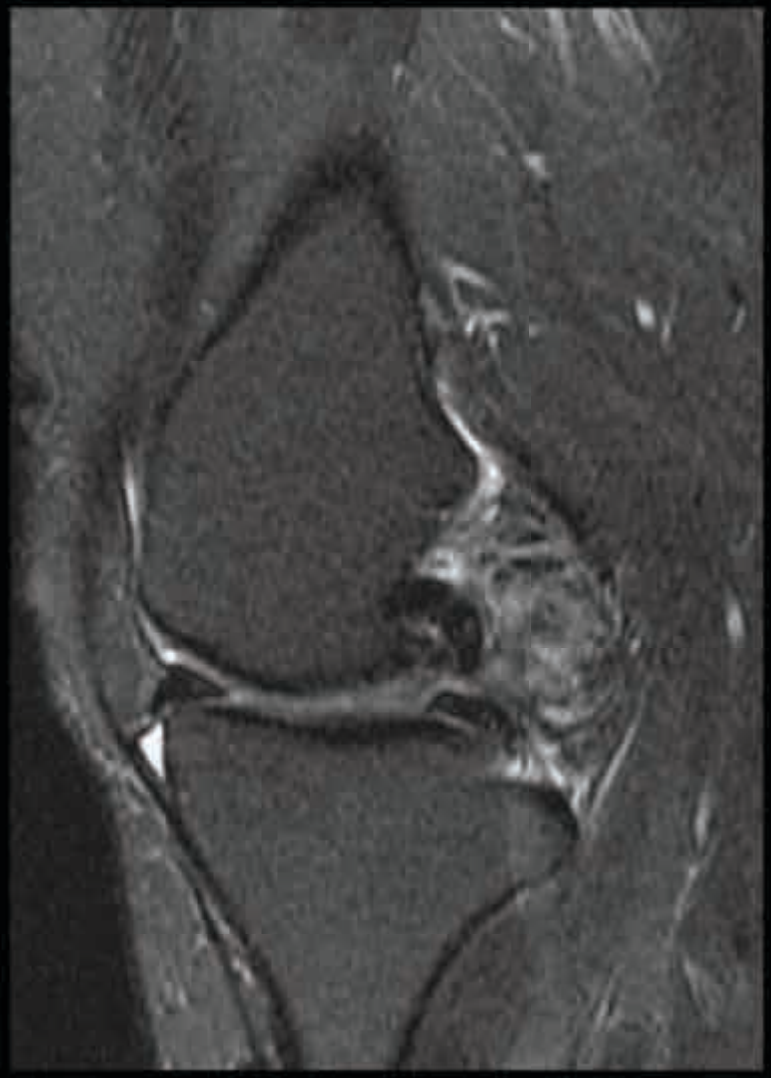
- Bladder cancer : tumor growth along the bladder wall, including papillary, sessile, infiltrating, mixed, or flat intraepithelial growth
- Focal, nodular soft tissue tumor or focal asymmetric bladder wall thickening
- Retraction of the bladder wall may be present

- Early enhancement
- Distant metastasis occurs late in the course and especially at the time of recurrence: bones, lungs, brain, and liver

Case 3

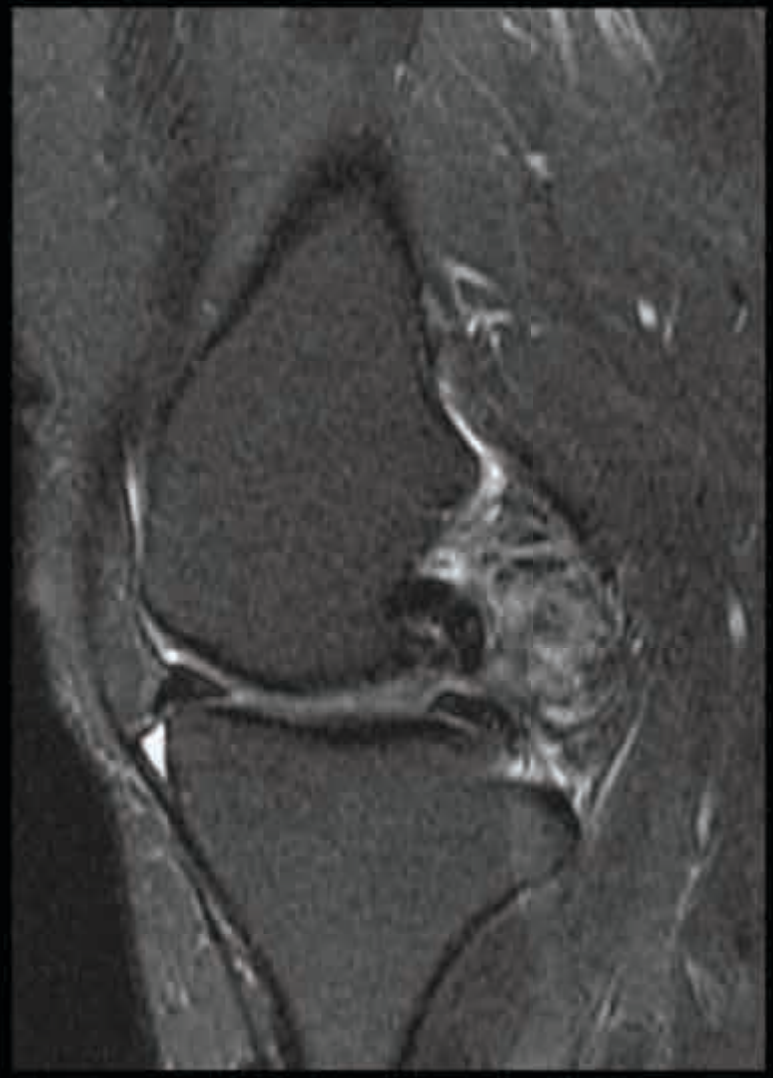
- 57 year-old female with right knee pain and swelling

PD



T2

PD



T2

PD

T2

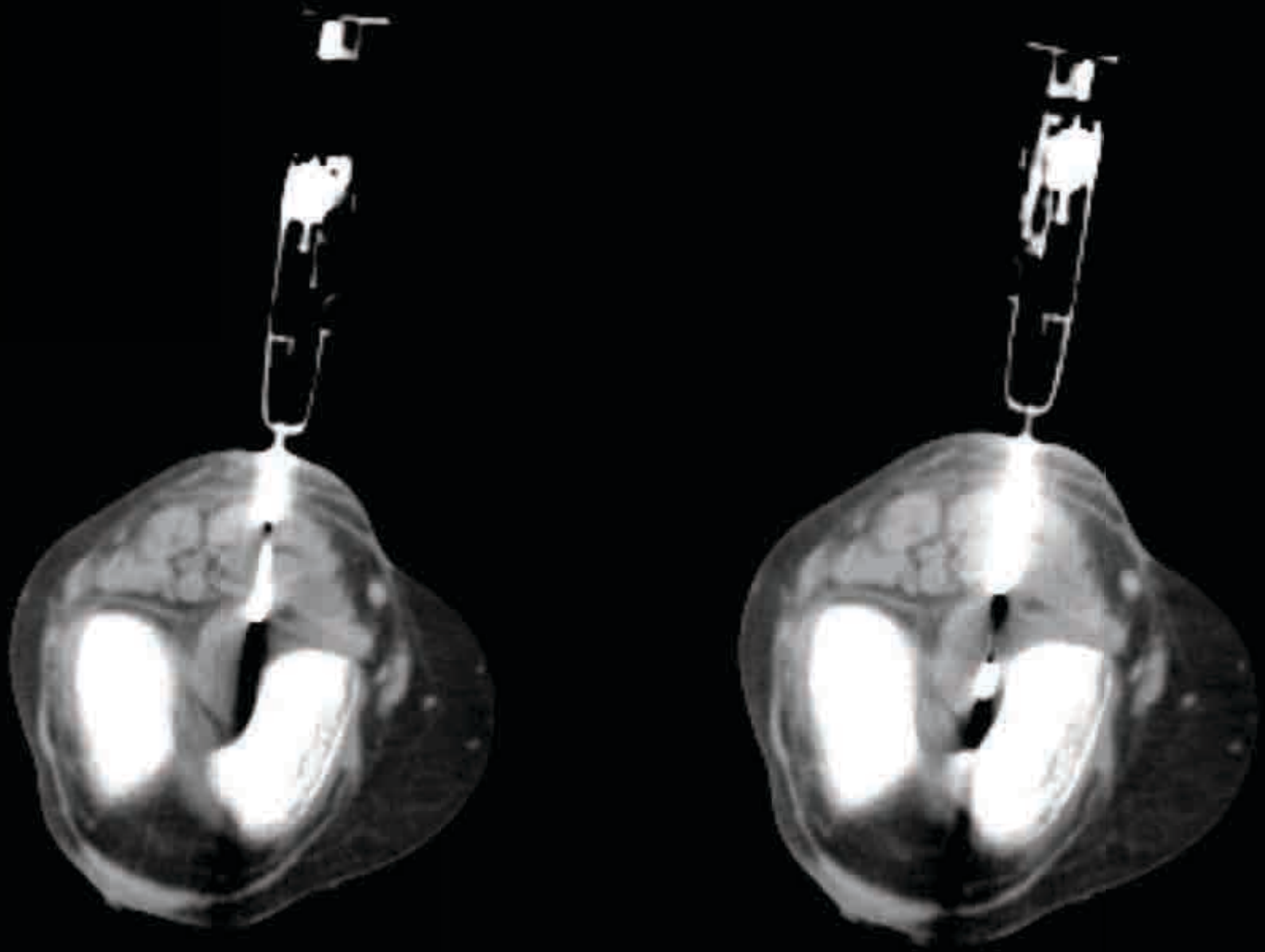
GRE

GRE

GRE

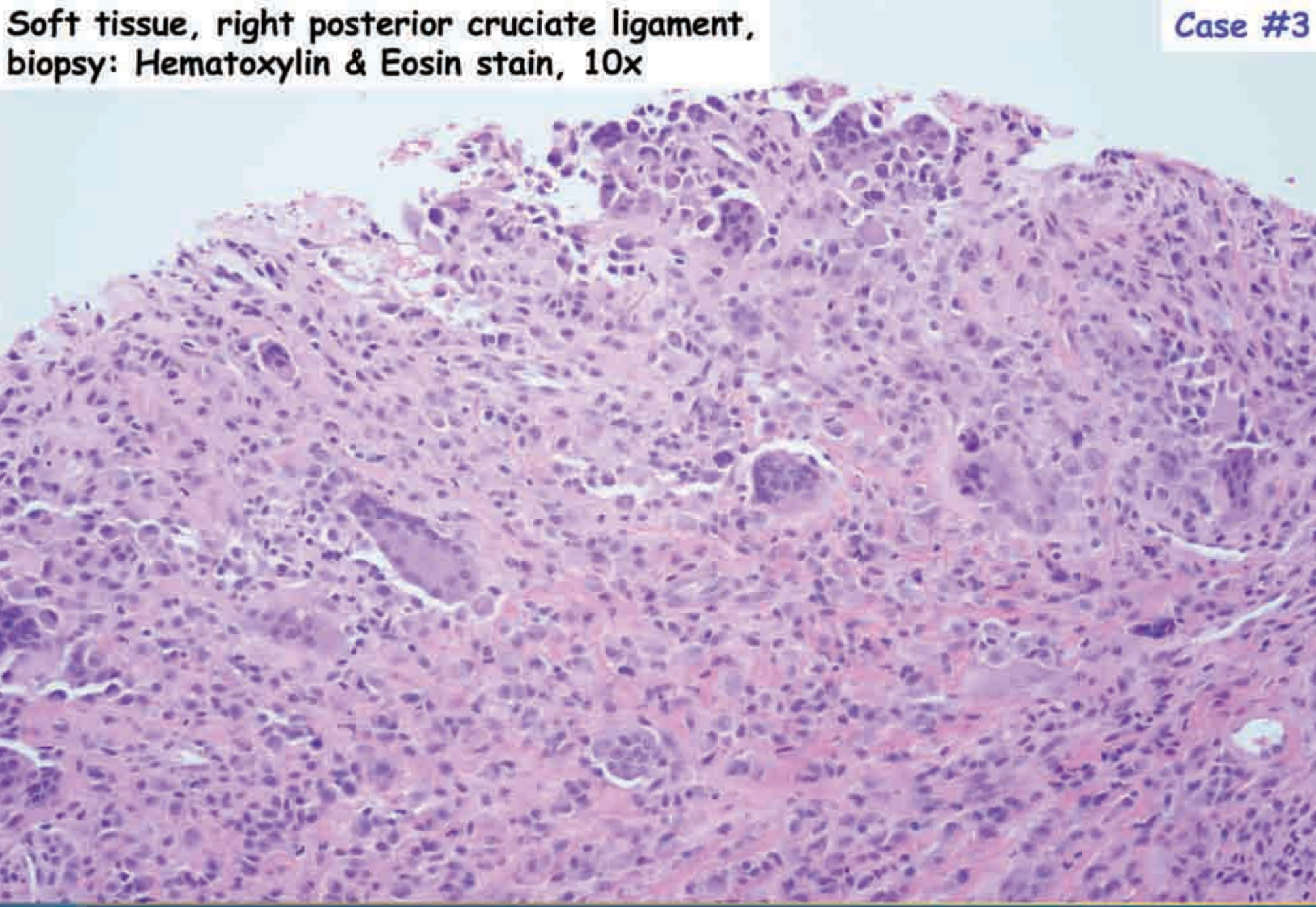
Differential diagnoses

- PVNS
- Synovial osteochondromatosis
- Gout
- Amyloid
- Hemophilic arthropathy
- Nodular synovitis

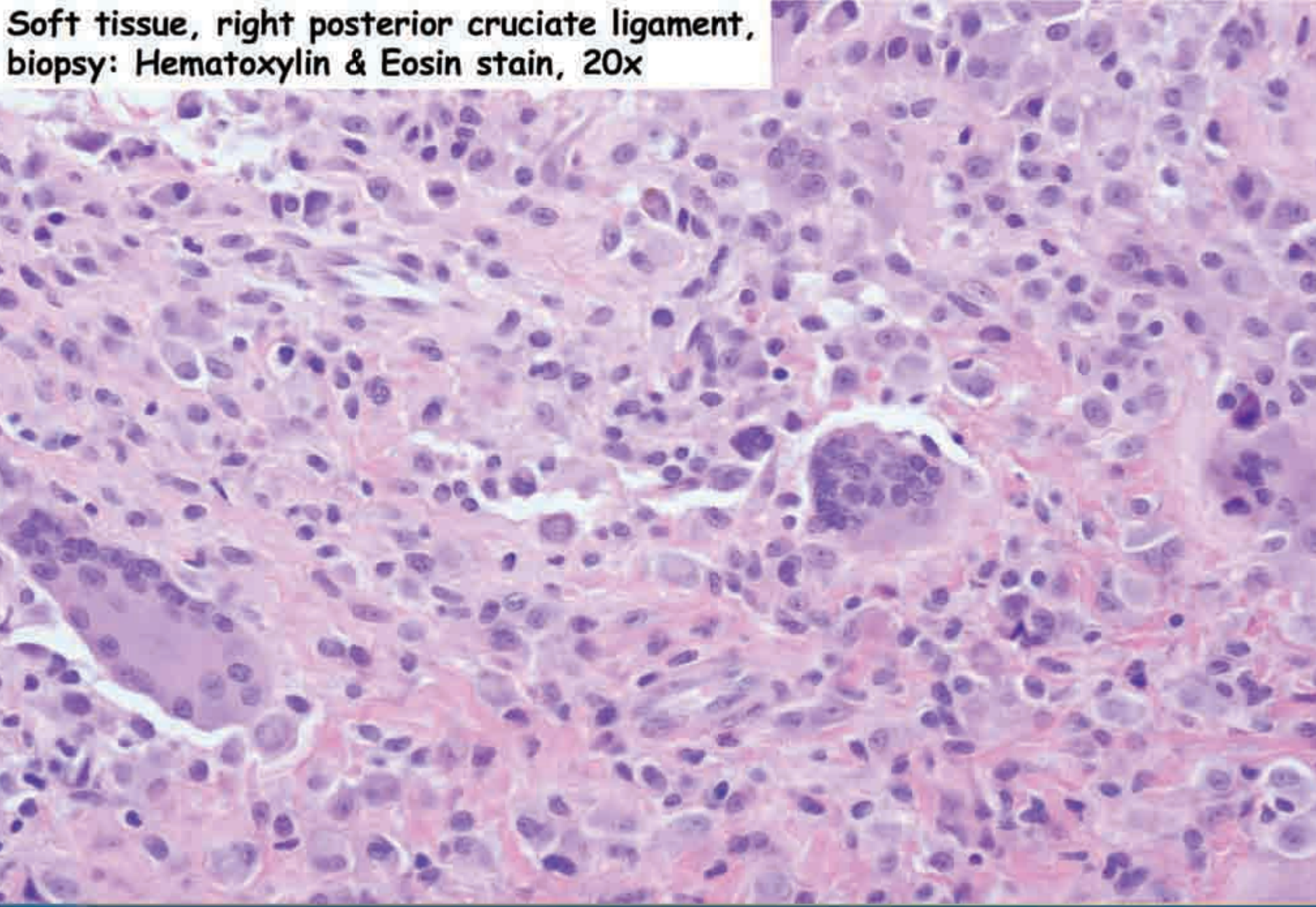


Soft tissue, right posterior cruciate ligament, biopsy: Hematoxylin & Eosin stain, 10x

Case #3



Soft tissue, right posterior cruciate ligament, biopsy: Hematoxylin & Eosin stain, 20x



Soft tissue, right posterior cruciate ligament, biopsy:

Pigmented villonodular synovitis.

PVNS

- PVNS is a monoarticular proliferation of the hemorrhagic synovium which affected joint, bursa and tendon sheath
- Commonly involved sites: knee (80%), hip, elbow and ankle
- Male : Female 1:2
- Peak age : 30-40 years

Clinical manifestation

- Pain
- Swelling
- Limit range of motion
- Monoarticular
- Joint effusion

- Radiograph: joint effusion, erosion and subchondral cysts, secondary degenerative changes
- CT: effusion, soft tissue mass and synovium enhances on post contrast

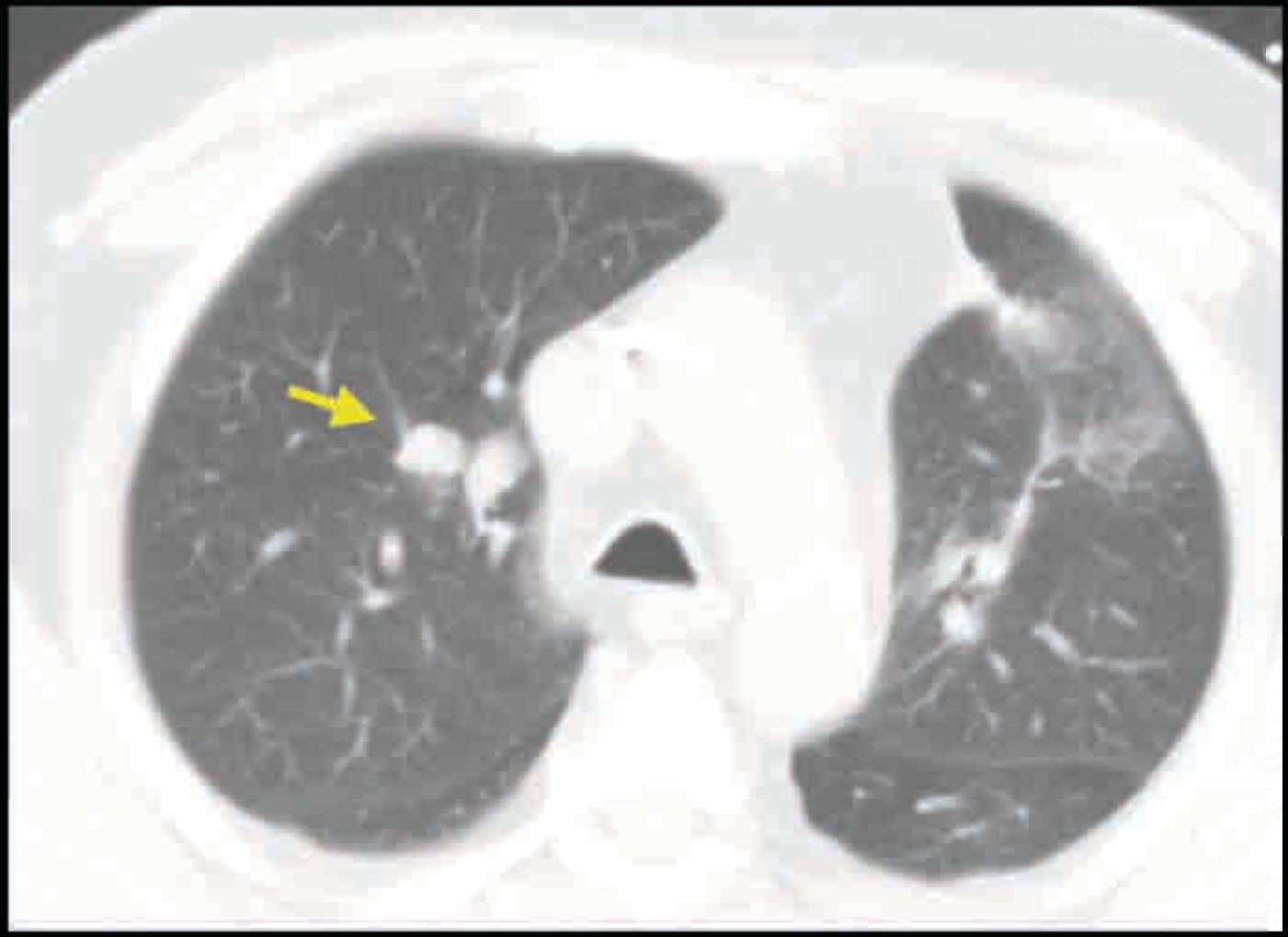
- MRI: Most sensitive
  - Effusion with synovial proliferation, low signal on all sequences with blooms on GRE

Treatment

- Resection with synovectomy (high recurrent rate with incomplete resection)
- Radiation resection following recurrence

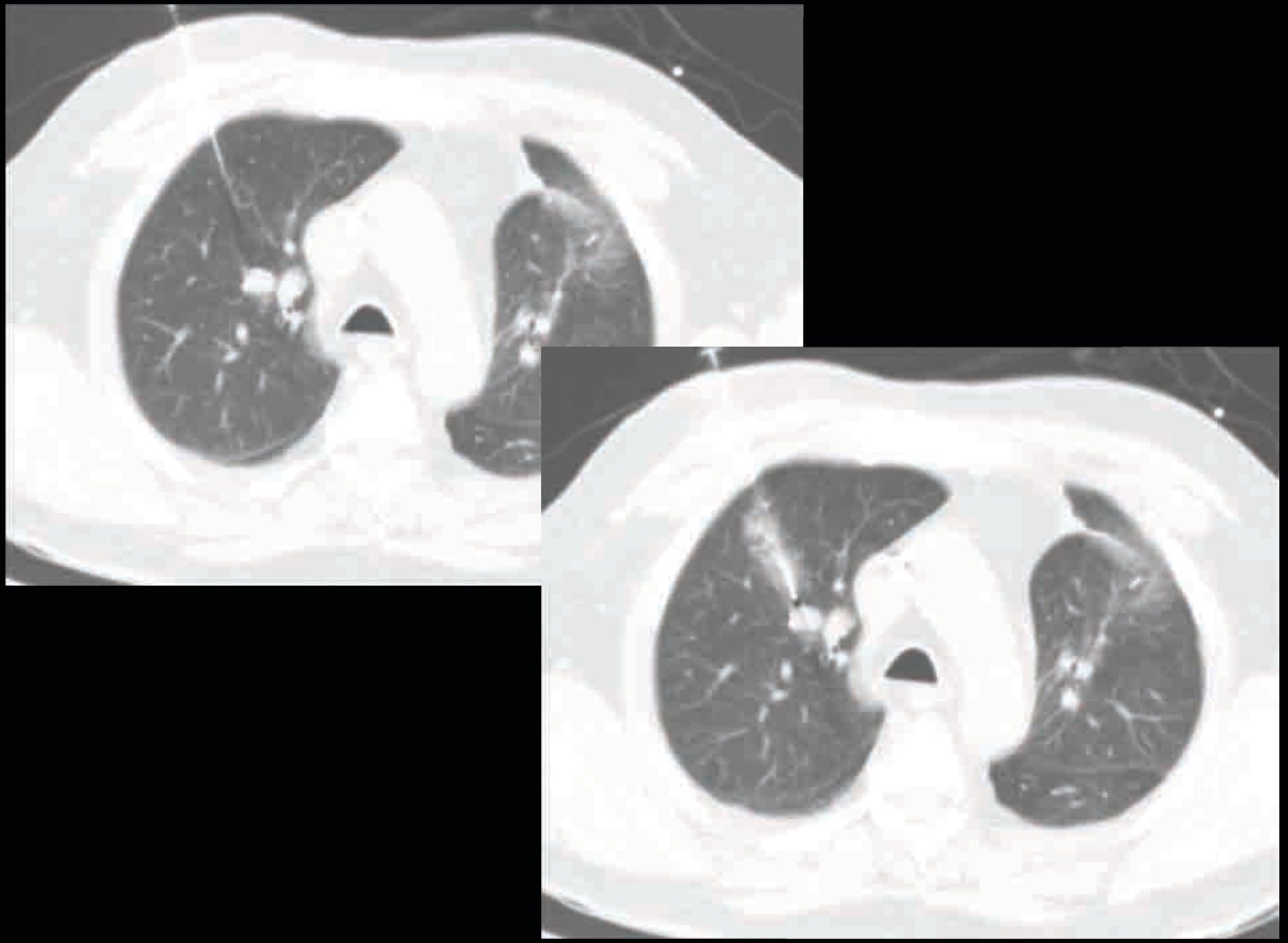
Case 4

- 69 year-old male

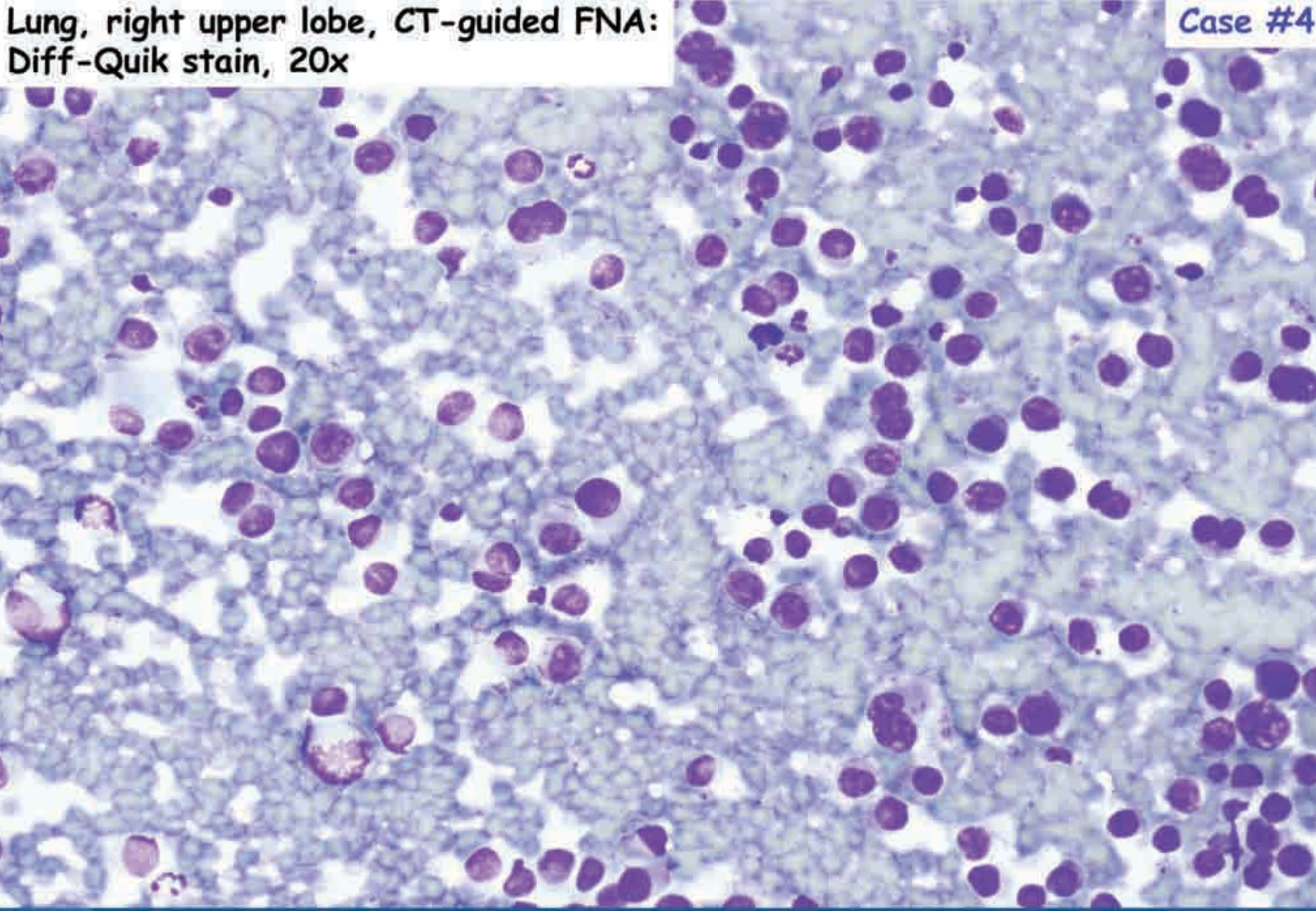


Differential diagnoses

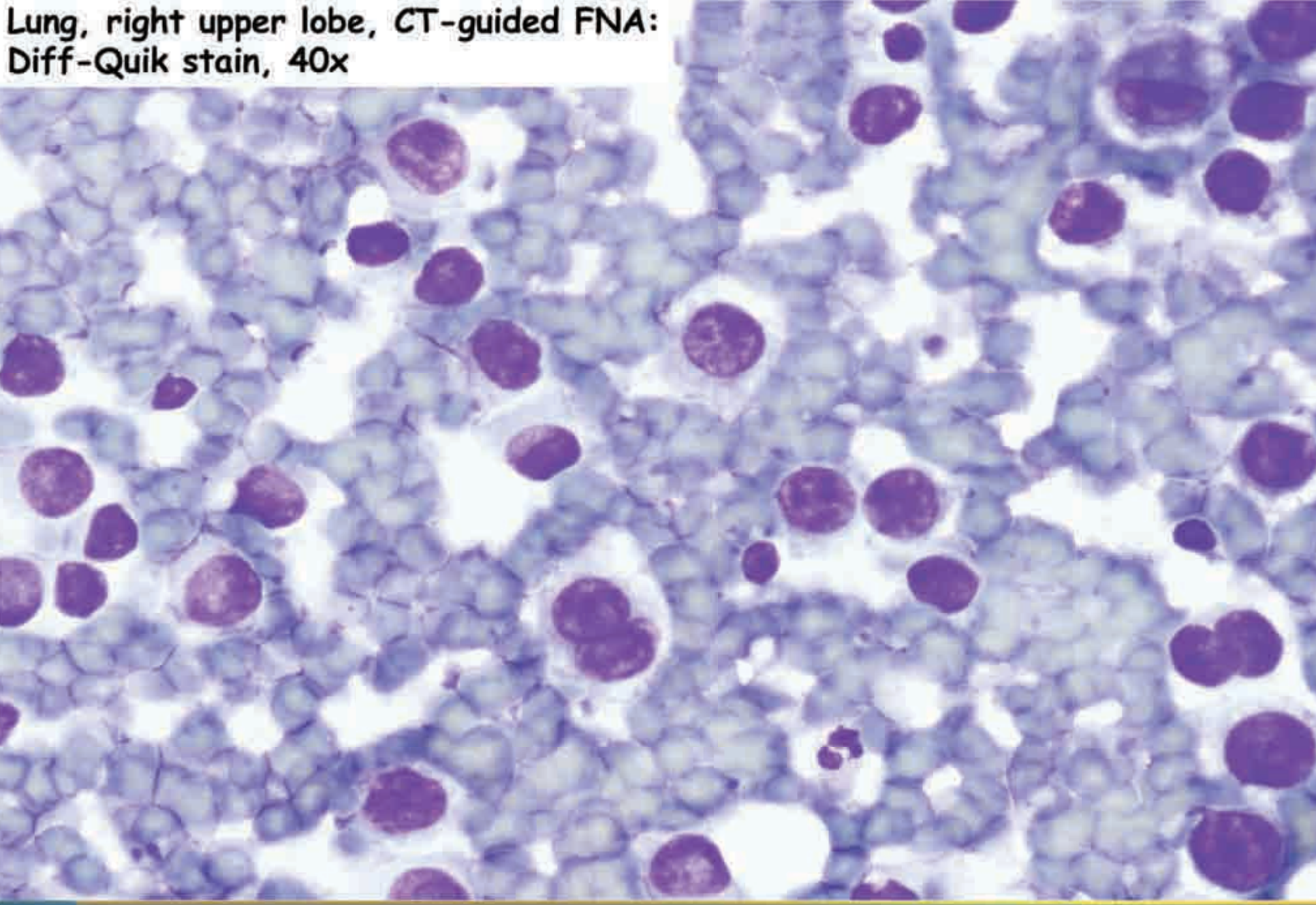
- Primary lung cancer: bronchogenic carcinoma, lymphoma, sarcoma
- Metastasis: kidney, colon, ovary, testicular, melanoma
- Infection: focal pneumonia, abscess, TB, sarcoid, histoplasmosis, fungus ball
- Round atelectasis
- Inflammatory: RA, Wegener granulomatosis
- Benign: Hamartoma, fibroma, LN, leiomyoma



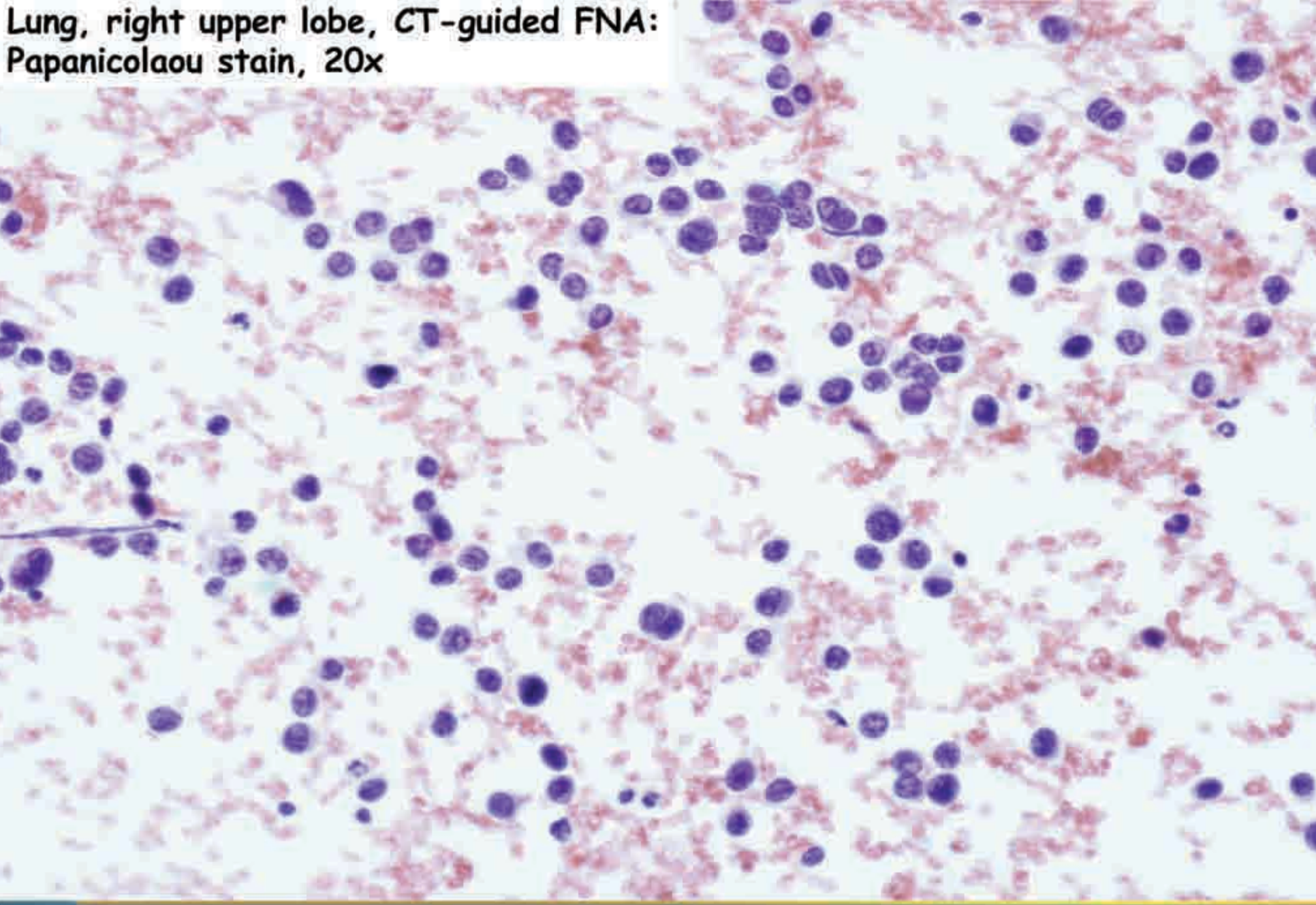
Lung, right upper lobe, CT-guided FNA:
Diff-Quik stain, 20x



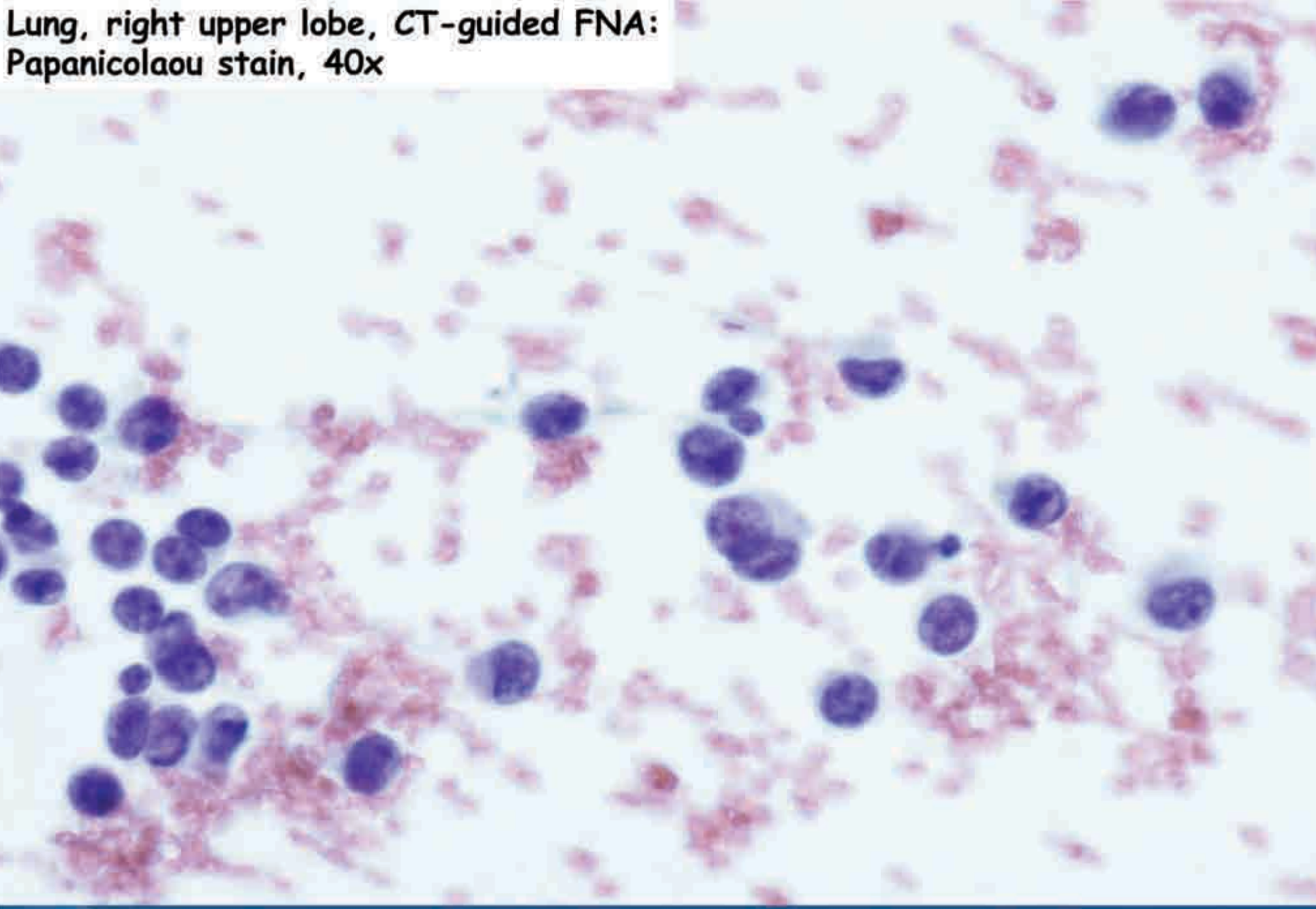
Lung, right upper lobe, CT-guided FNA:
Diff-Quik stain, 40x

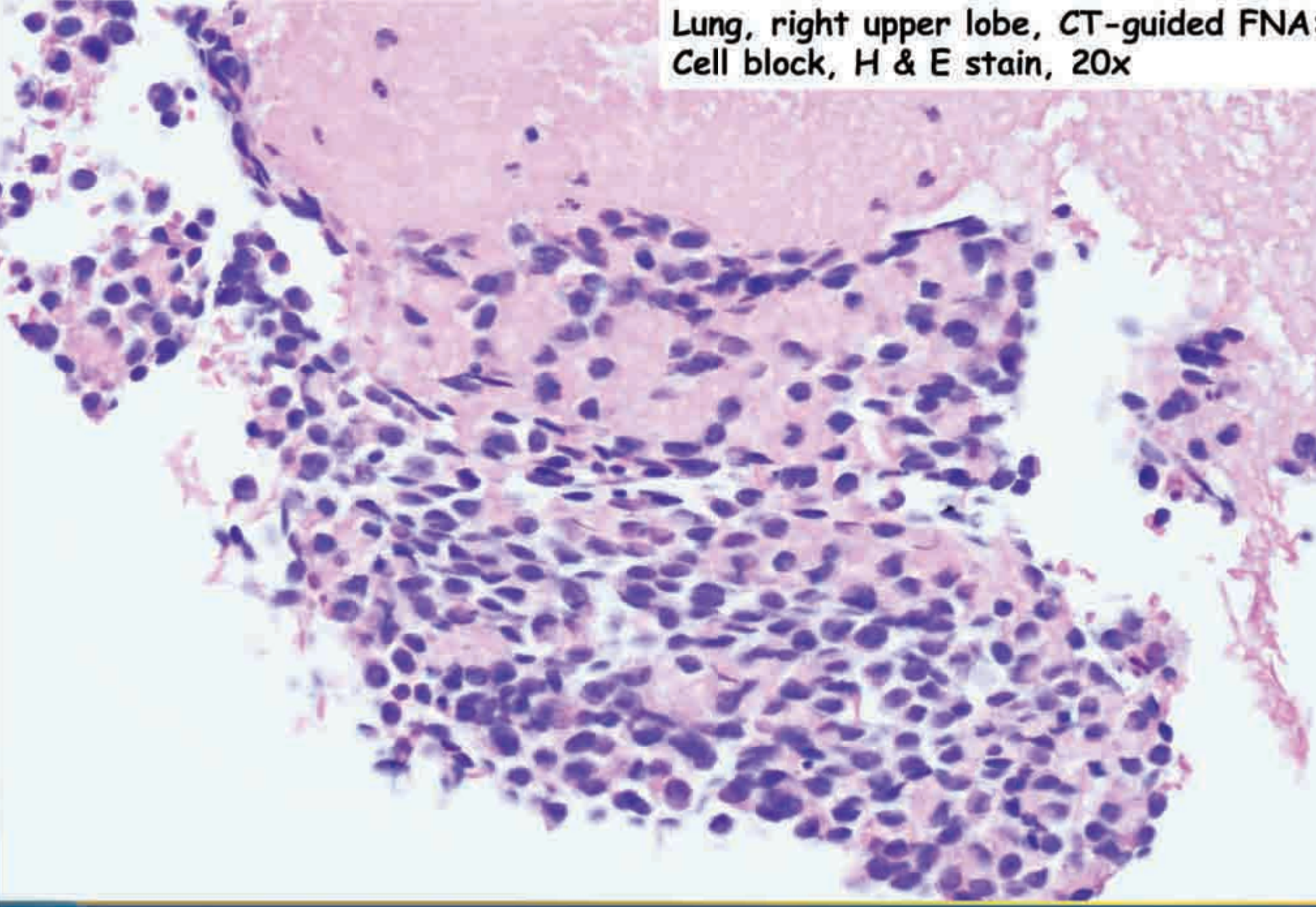


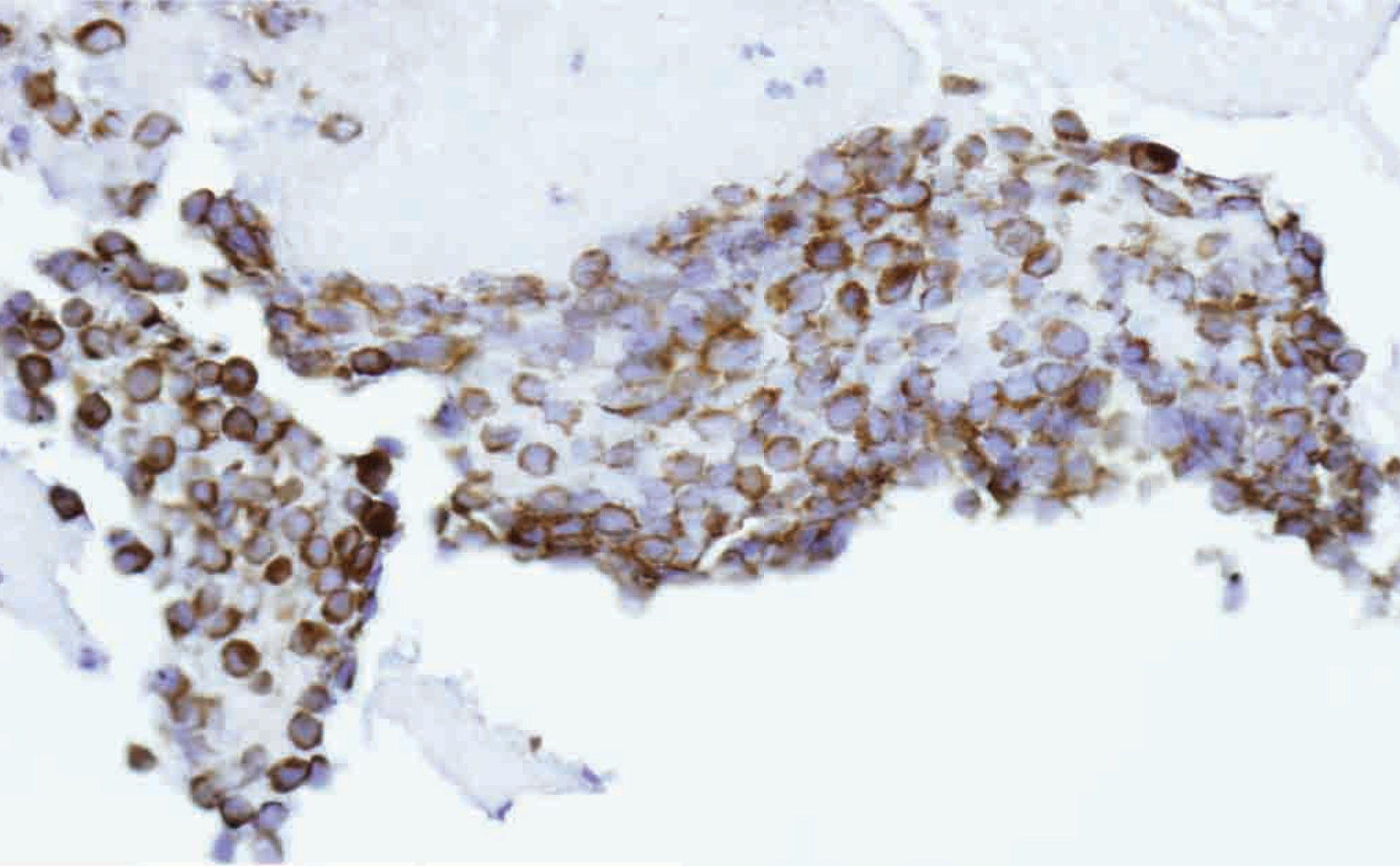
Lung, right upper lobe, CT-guided FNA:
Papanicolaou stain, 20x



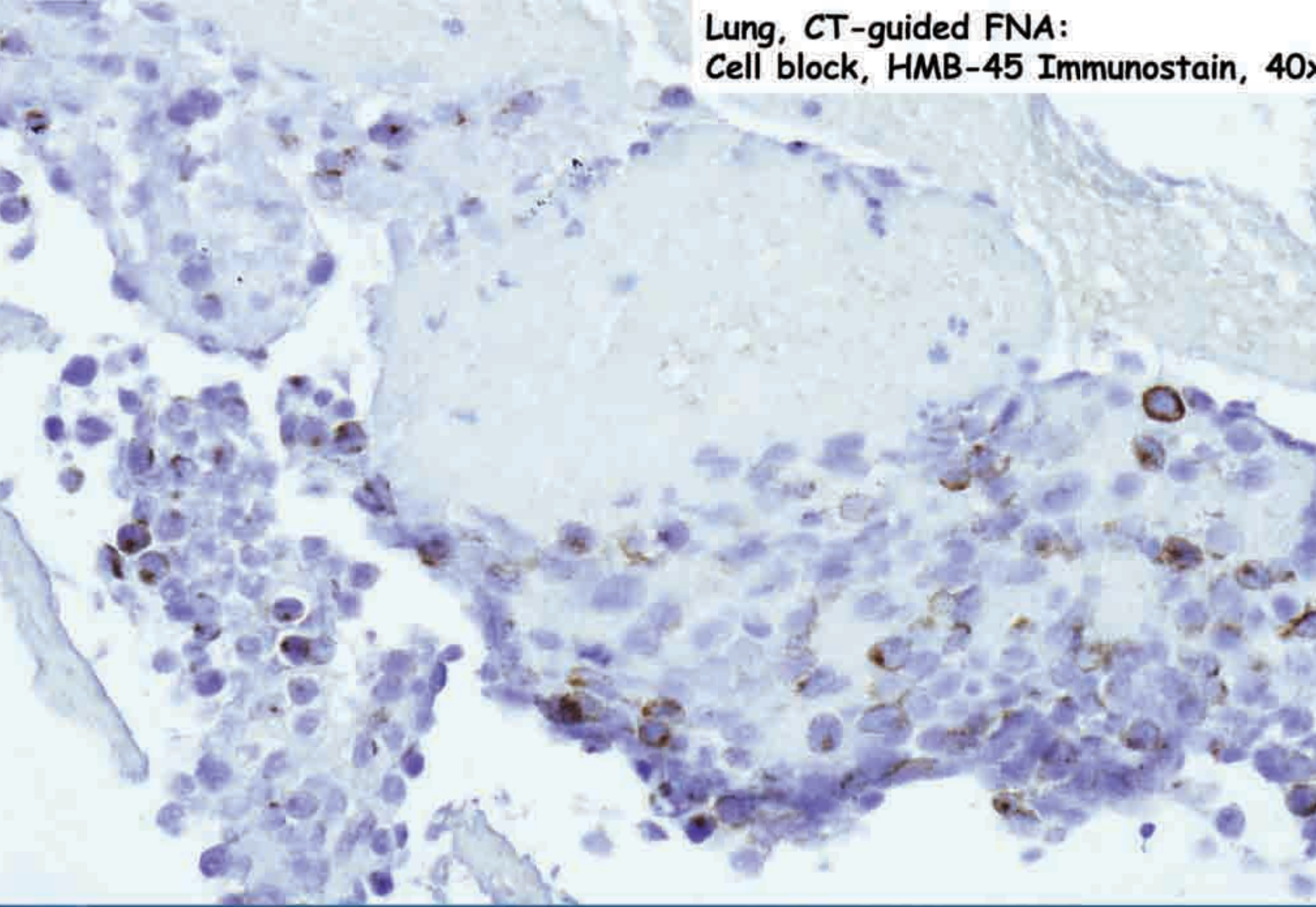
Lung, right upper lobe, CT-guided FNA:
Papanicolaou stain, 40x

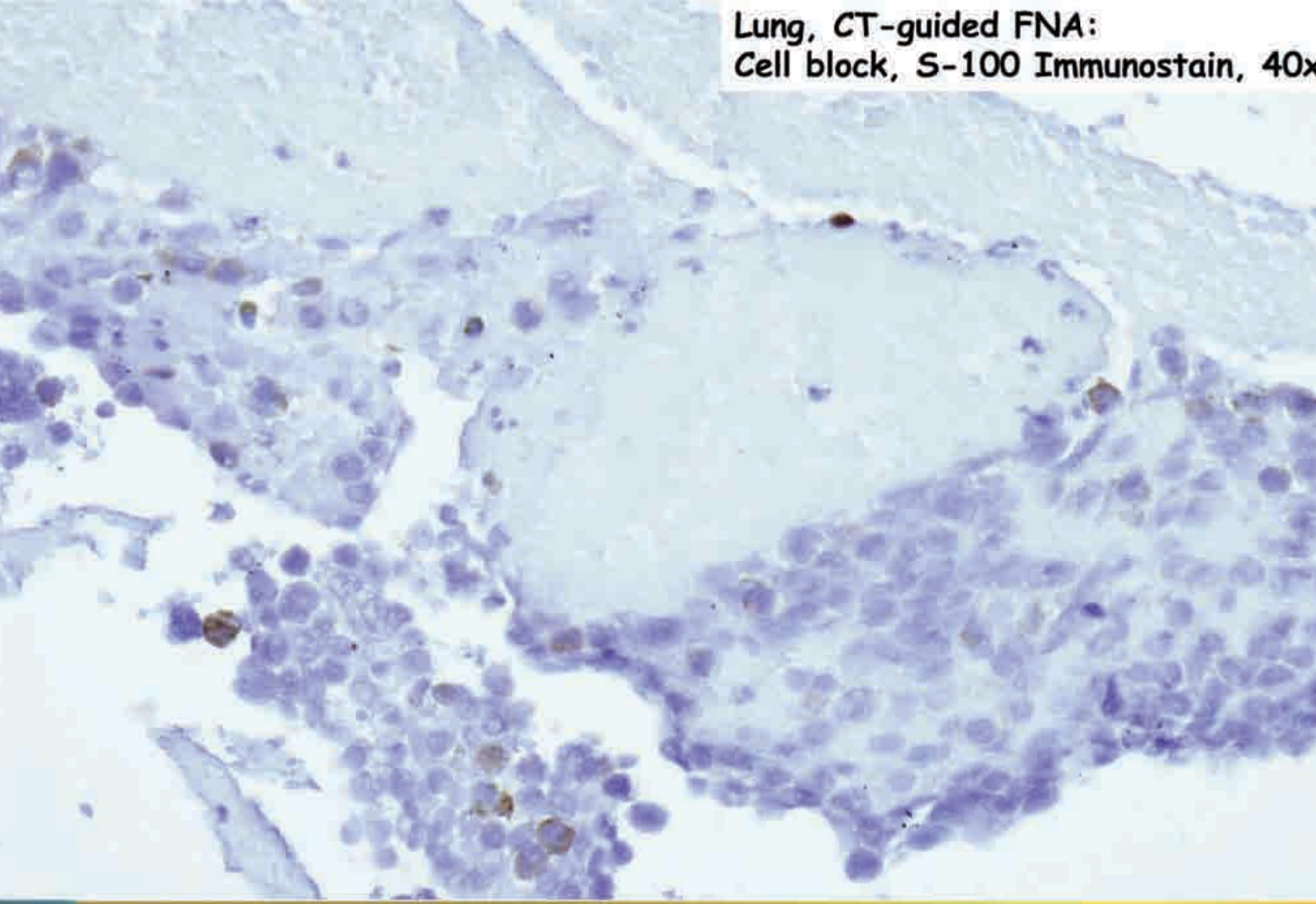






Lung, CT-guided FNA:
Cell block, Melan-A Immunostain, 20x



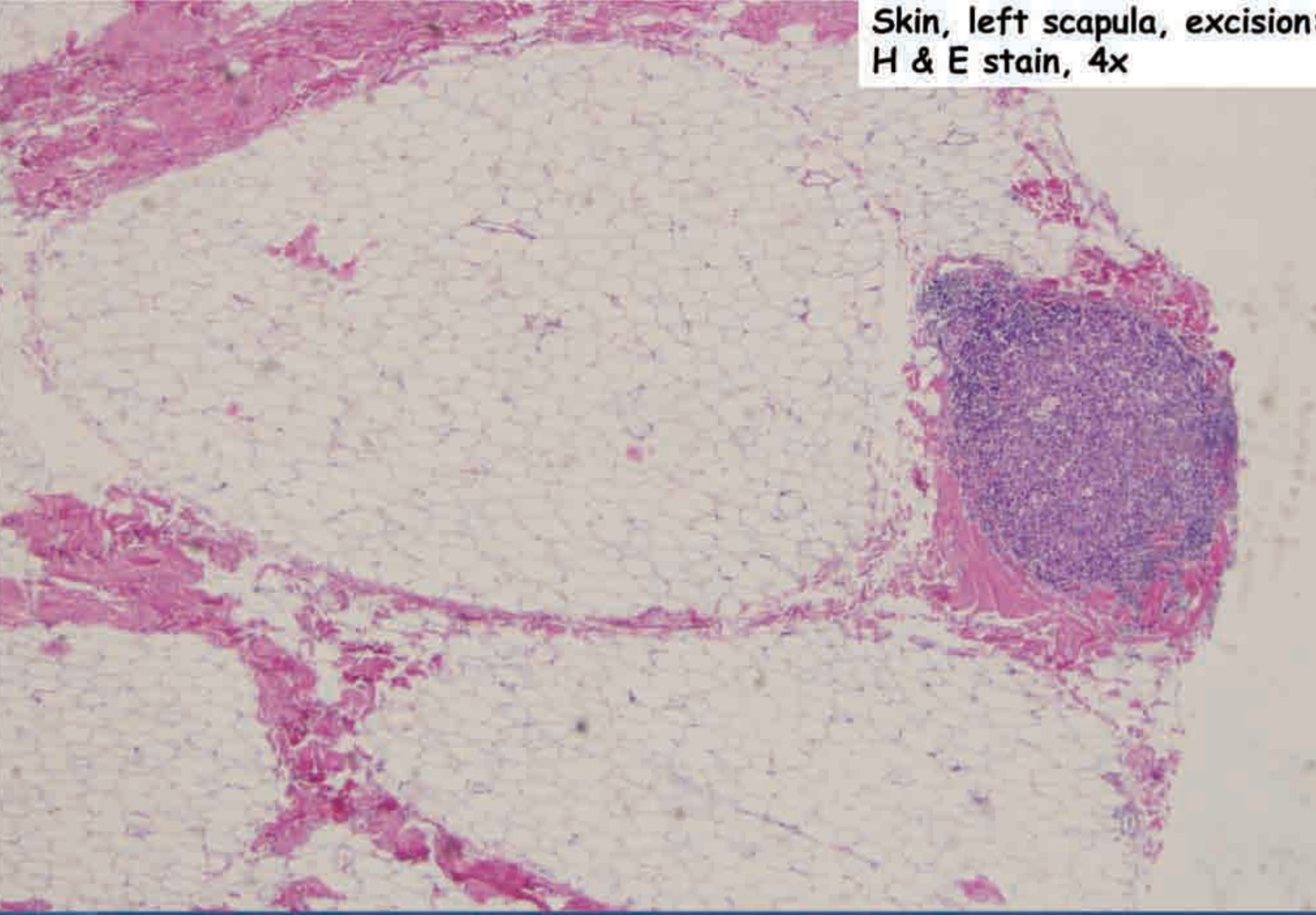


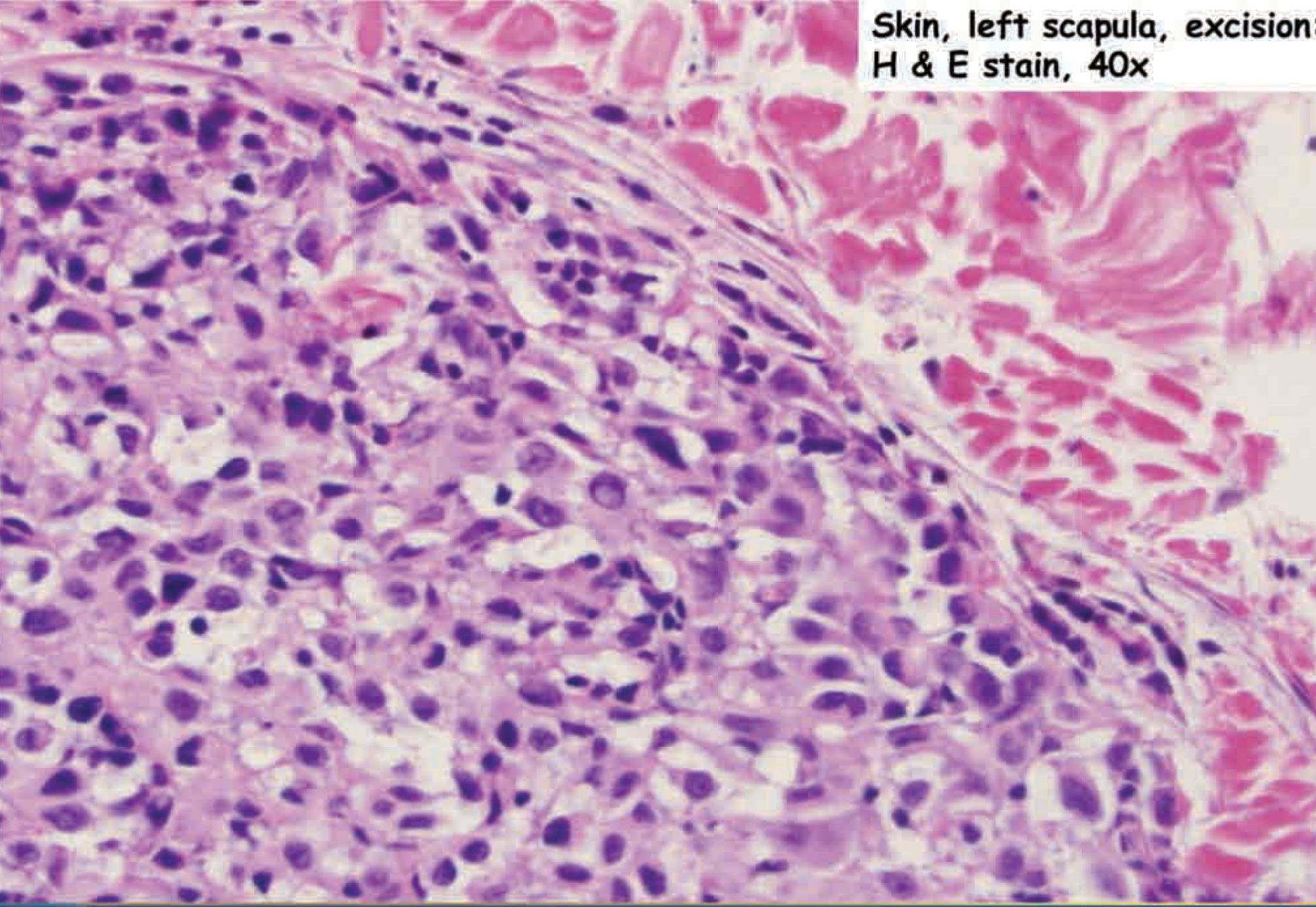
Lung, right upper lobe, CT-guided fine needle aspiration:

Malignant tumor cells present derived from malignant melanoma.

Comment: Immunohistochemical stains show the tumor cells mark strongly with Melan-A, HMB-45 and S-100. These staining results support melanocytic origin.

Cell block and cytologic preparations examined.





DX: Metastatic melanoma

Transthoracic needle biopsy (TNB)

- CT or CT-fluoroscopic guidance

Contraindication

- Uncooperative patient
- Irreversible bleeding diathesis
- Severe bullous emphysema
- Prior pneumonectomy

Type of needle

- Aspiration needles (Chiba) range from 23–25 gauge diameter
- Core biopsy needles range from 18-20 gauge diameter (to provide histologic samples)

(both methods use Guide needle (coaxial needle one gauge larger))

Lung cancer in general can be diagnosed reliably by microscopic examination of cytologic specimens, and core needle biopsy typically is not necessary

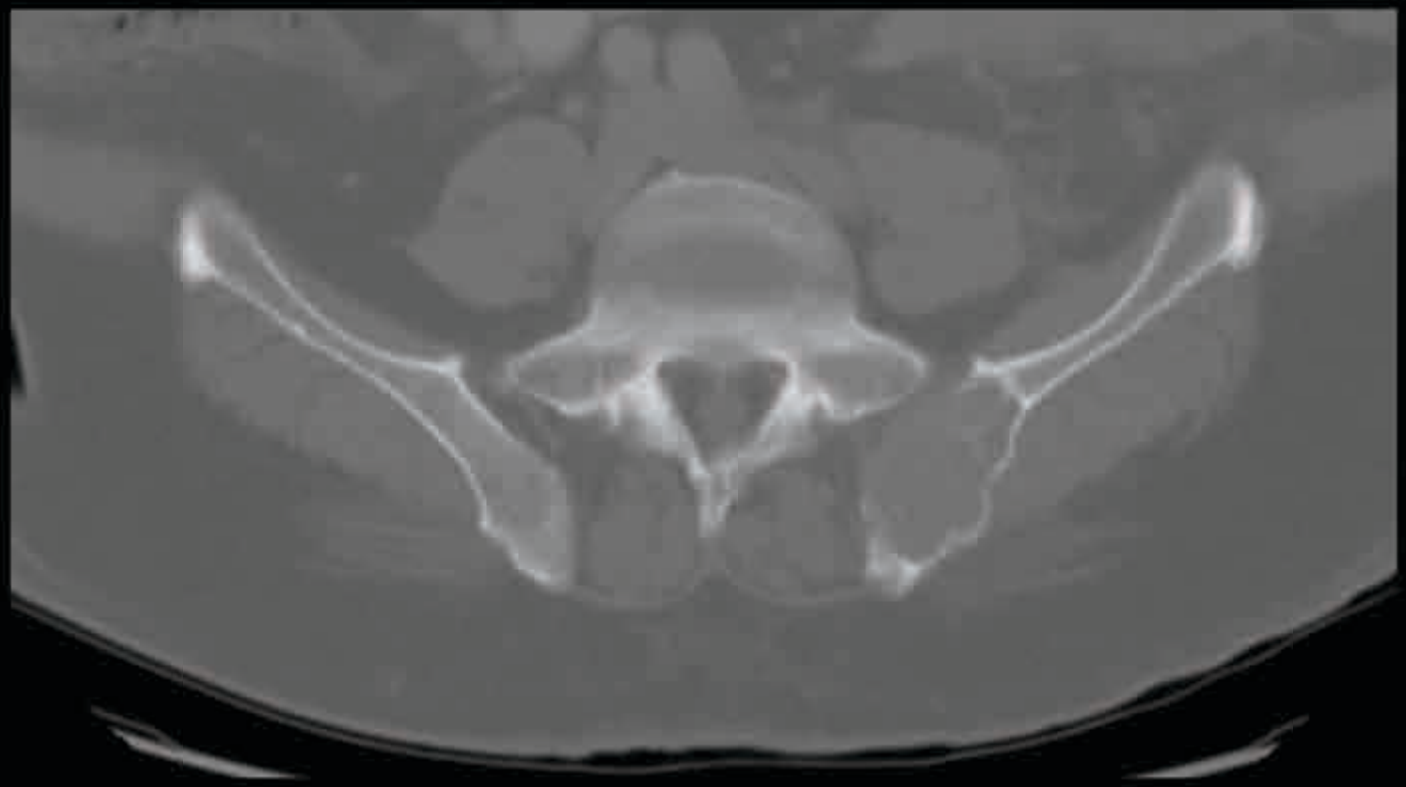
- Sensitivity of TNB for the diagnosis of malignant SPNs > 5 mm are above 90%
- TNB has lower sensitivity and specificity for benign lung lesions: the nonspecific pathologic appearance of many common benign lesions
- Core biopsy specimens in patients who have potentially benign lesions is of great use in providing material for specific benign histologic diagnoses

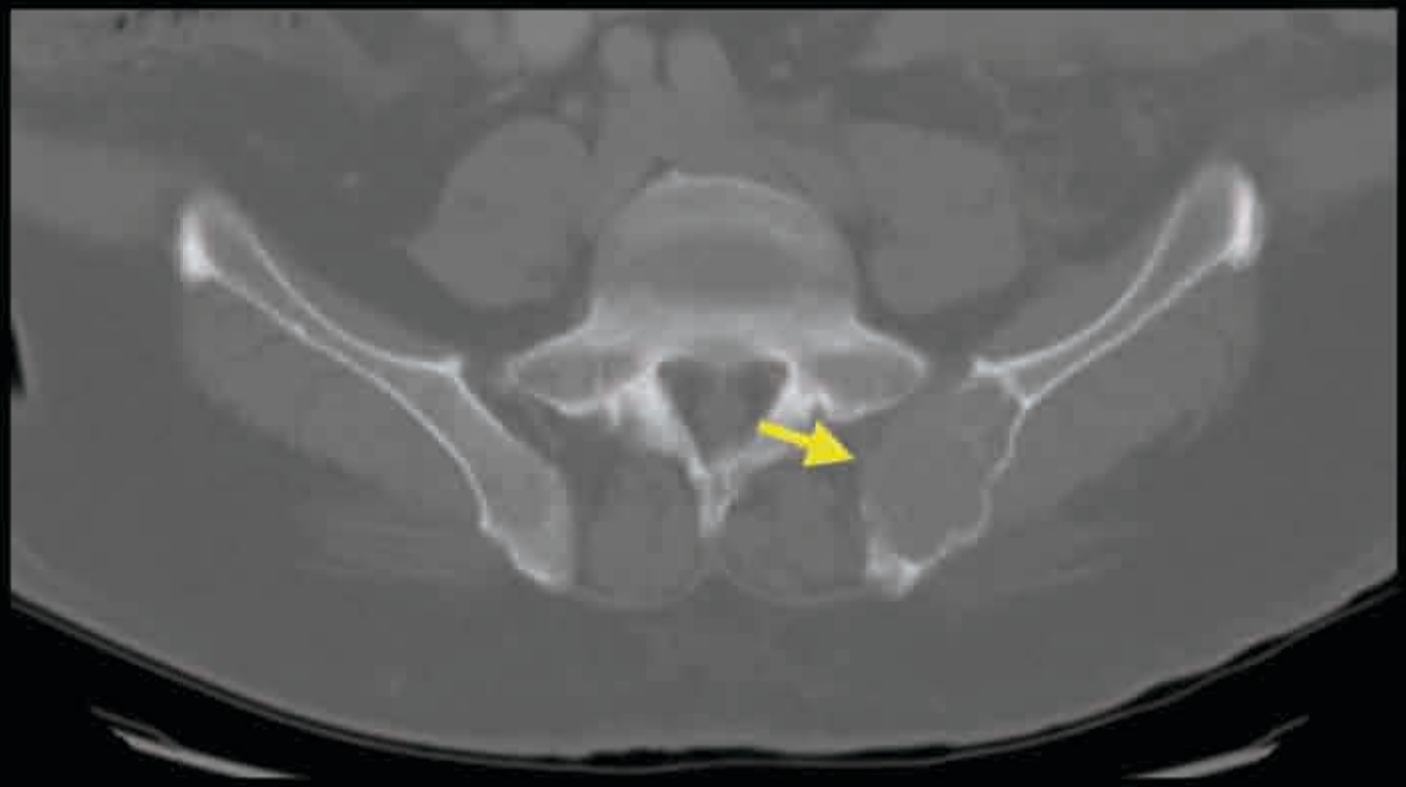
Complications

- Pneumothorax: occurs only 20-30%
- Hemorrhage
- Needle track seeding
- Air embolism: occur when a fistula is created between a pulmonary vein and an airway

Case 5

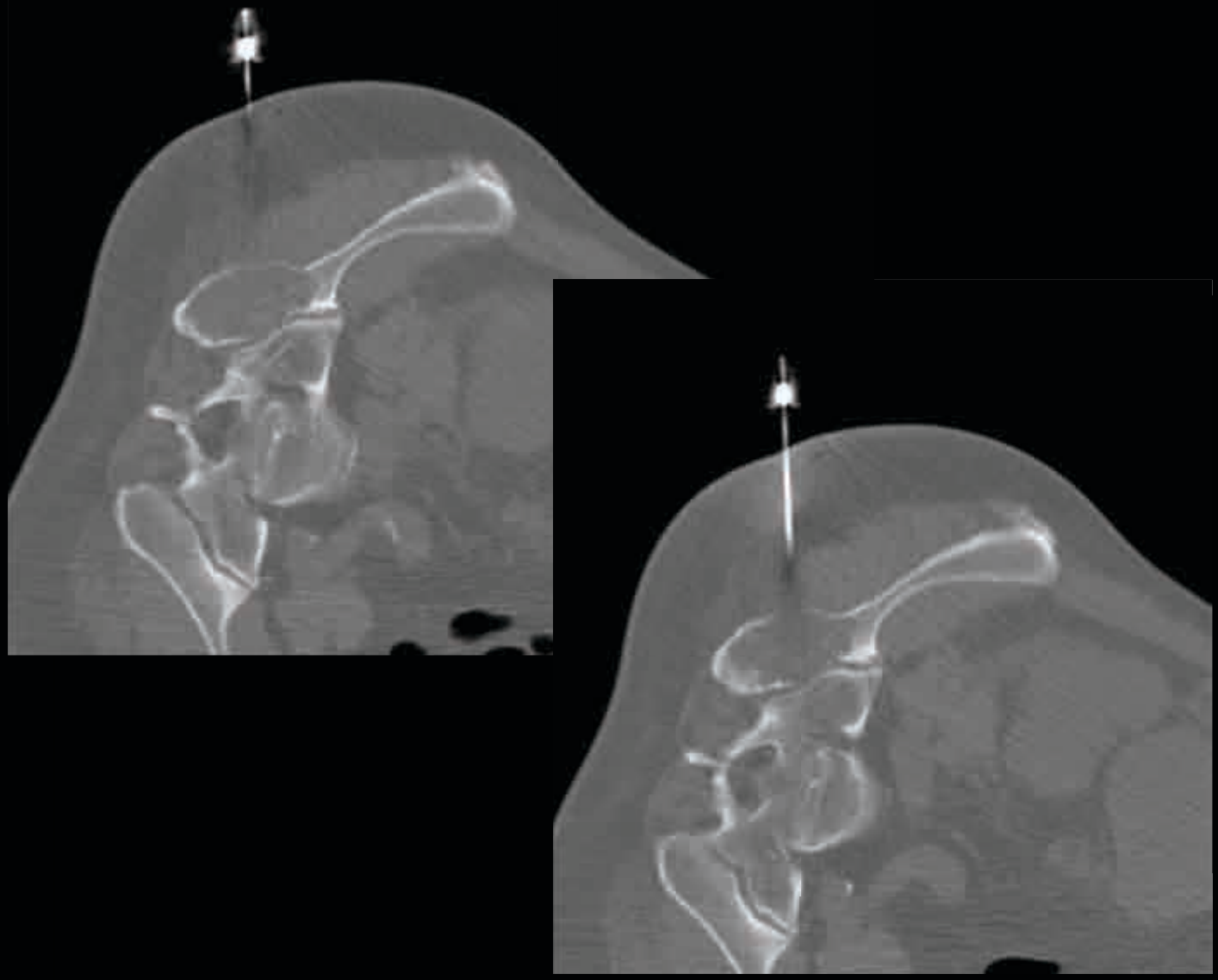
- 69 year-old male with low back pain

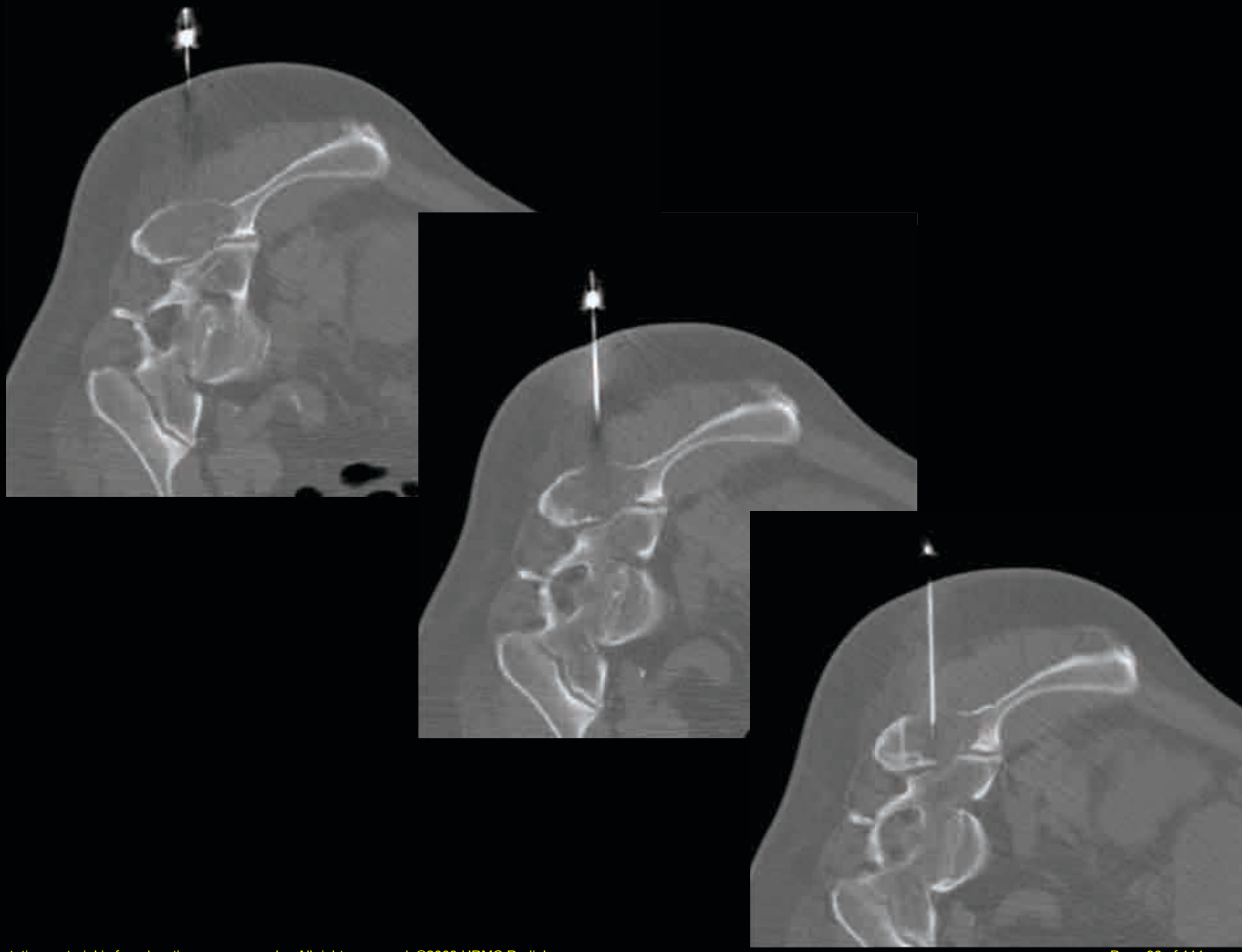




Differential diagnoses lytic bone lesion

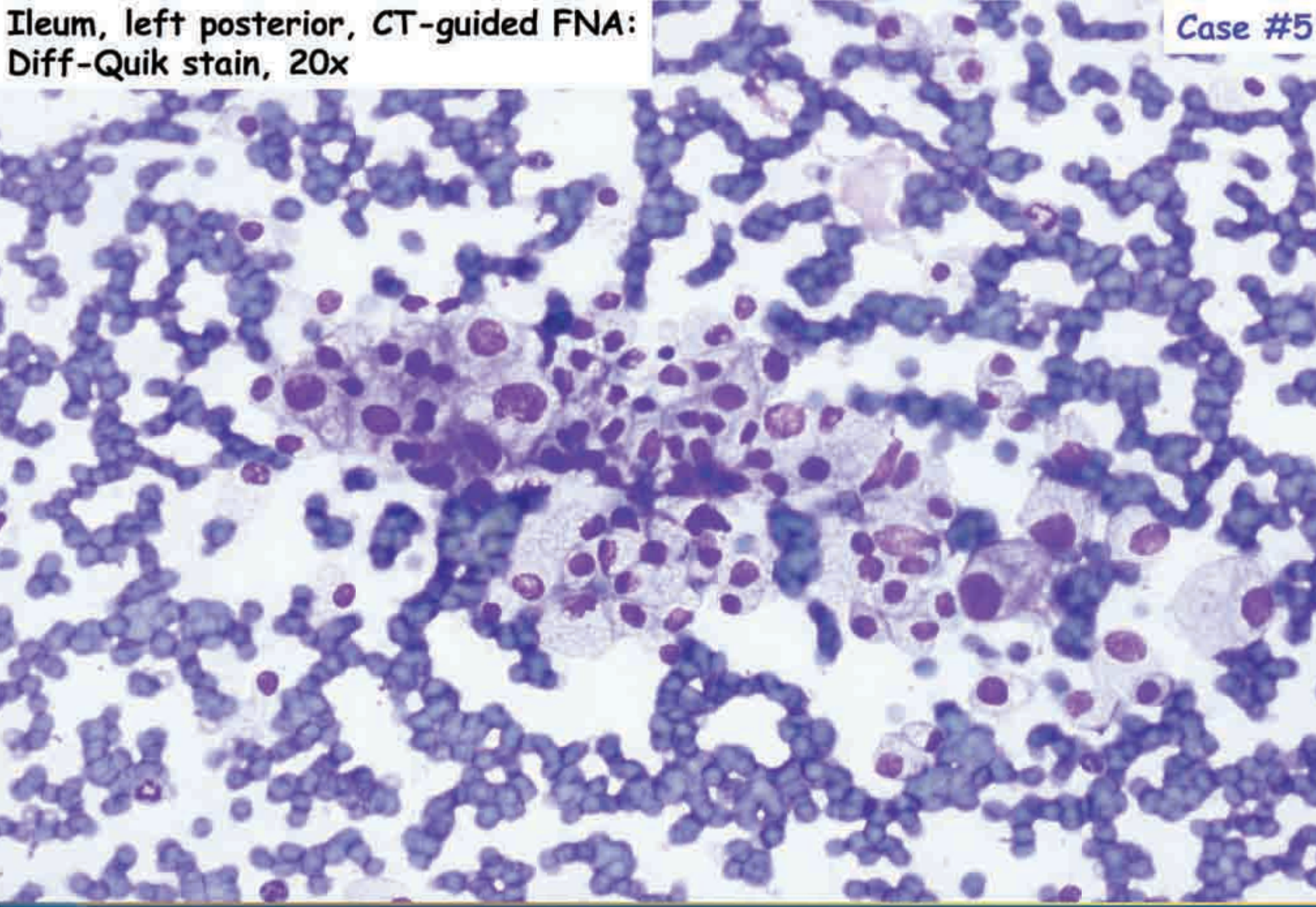
- Metastasis: Renal, Thyroid, melanoma, breast
- Multiple myeloma and plasmacytoma
- Lymphoma
- Osteomyelitis
- Primary neoplasm of the bone: Sarcoma





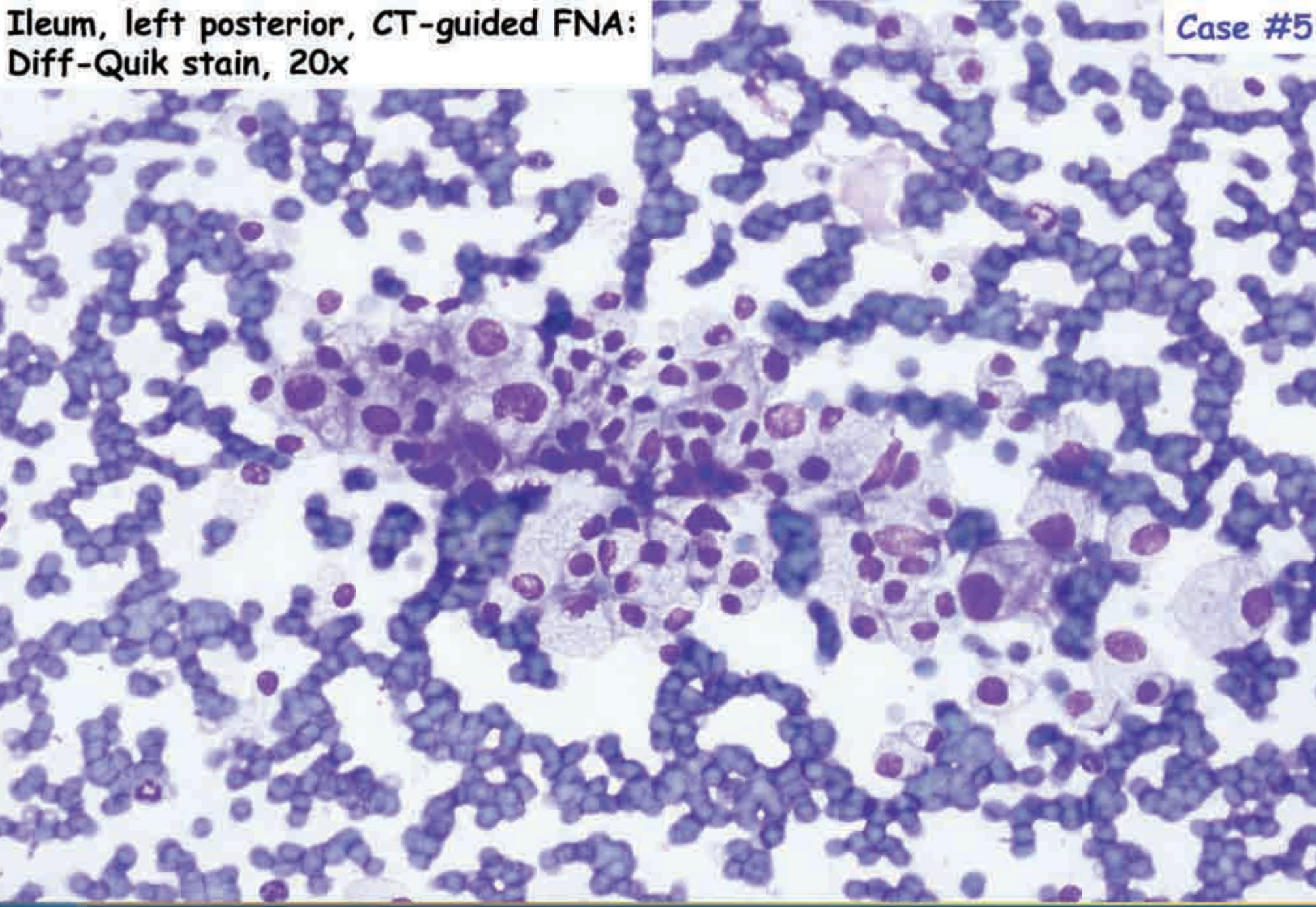
Ileum, left posterior, CT-guided FNA:
Diff-Quik stain, 20x

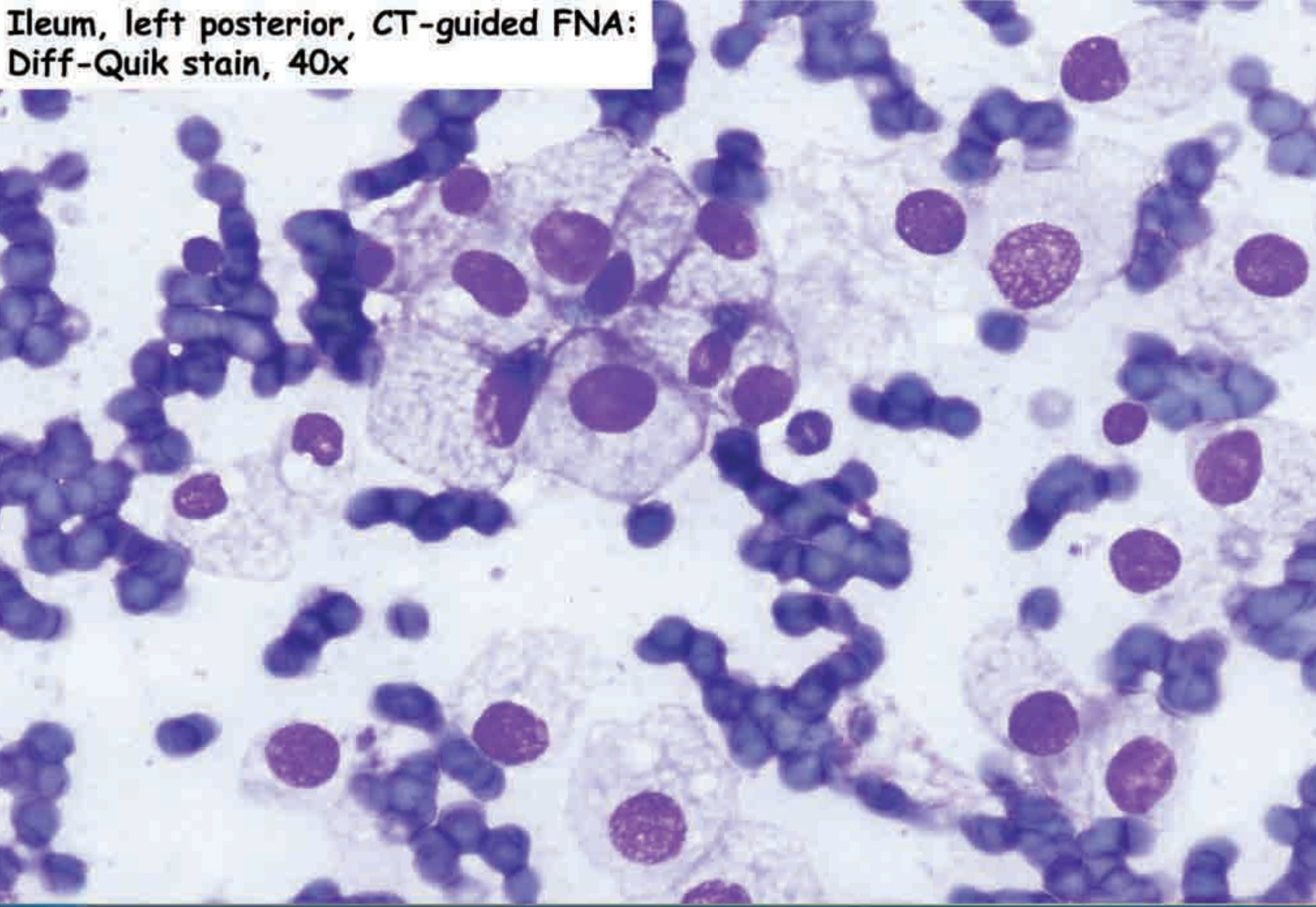
Case #5

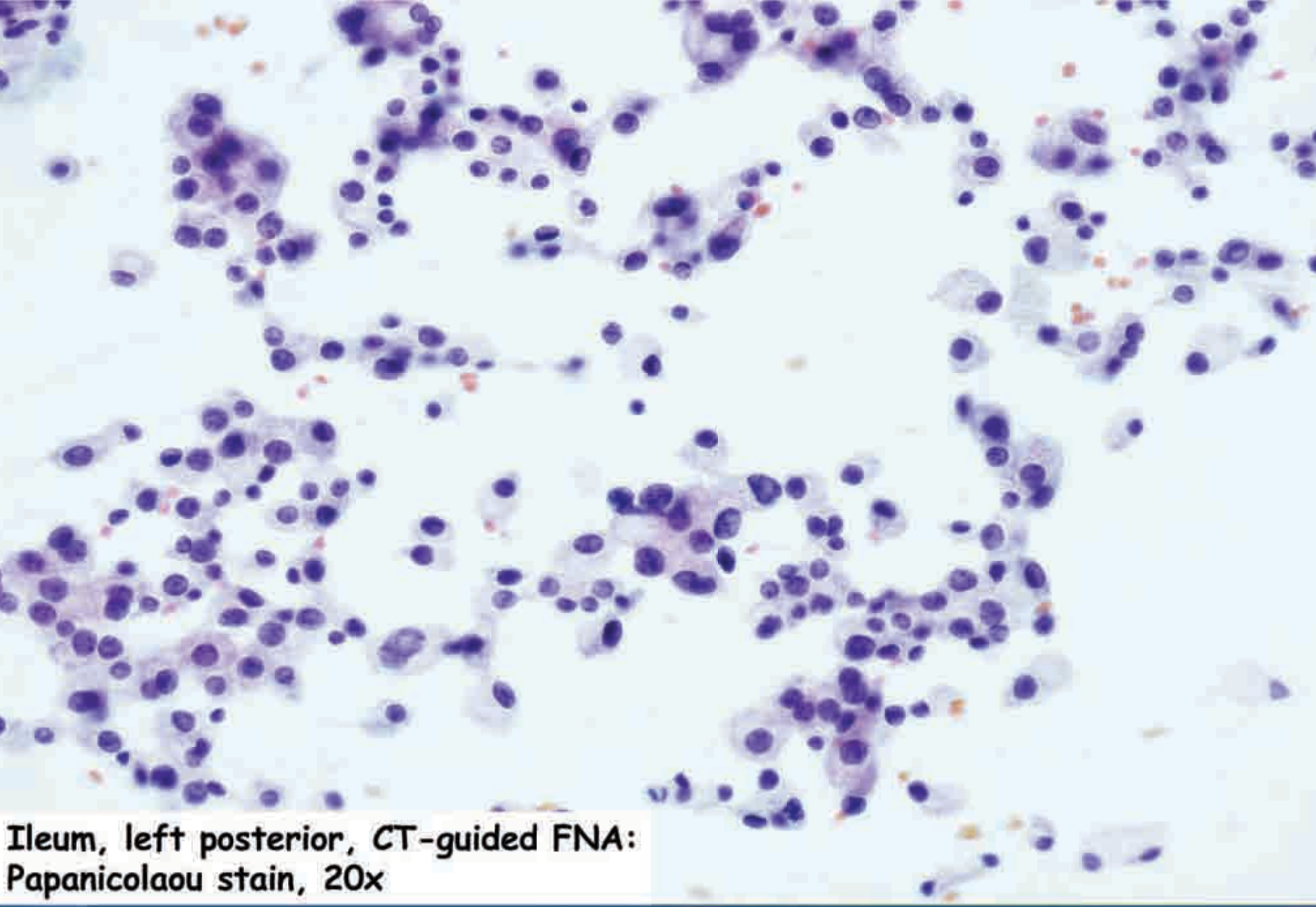


Ileum, left posterior, CT-guided FNA:
Diff-Quik stain, 20x

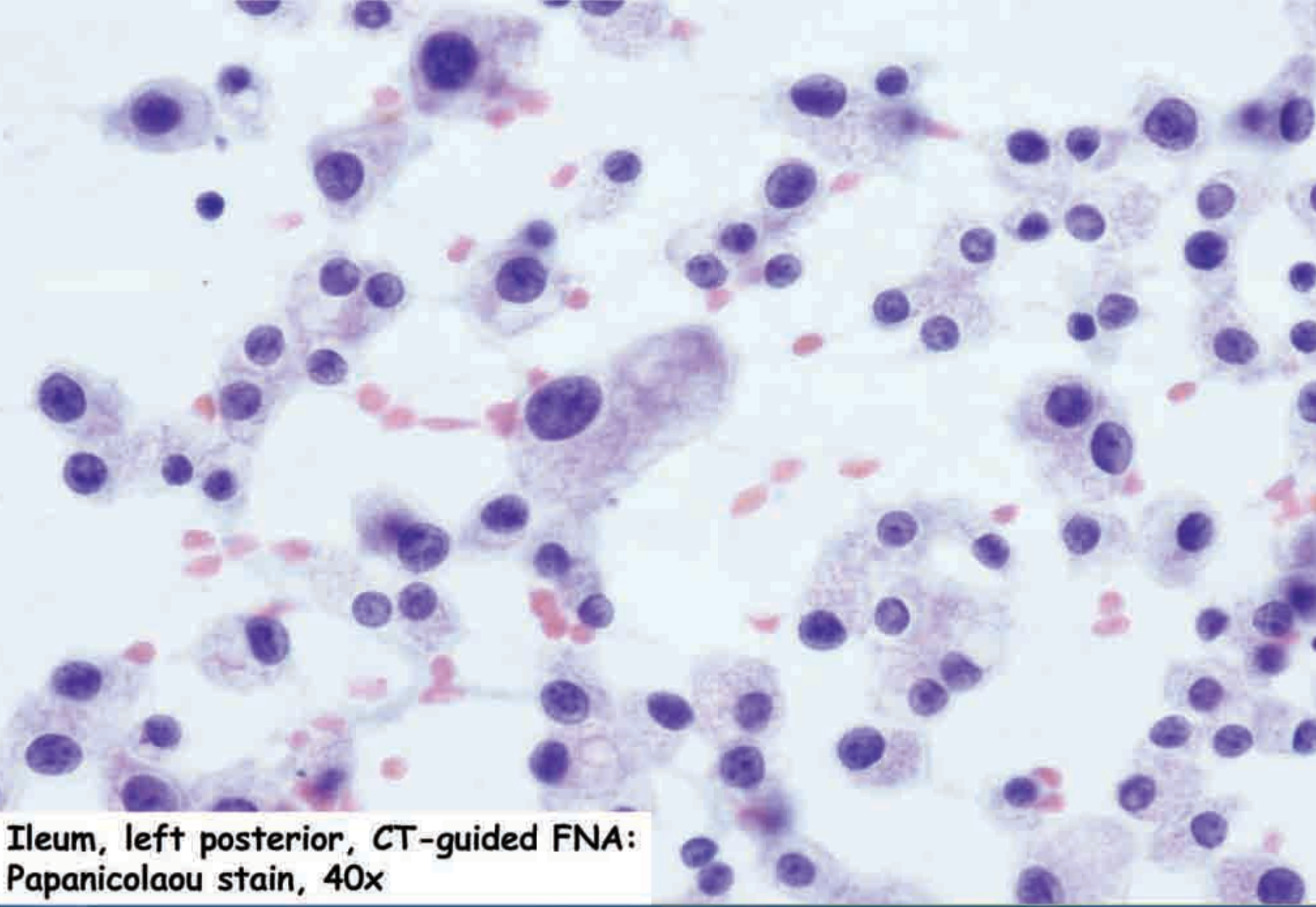
Case #5







Ileum, left posterior, CT-guided FNA:
Papanicolaou stain, 20x



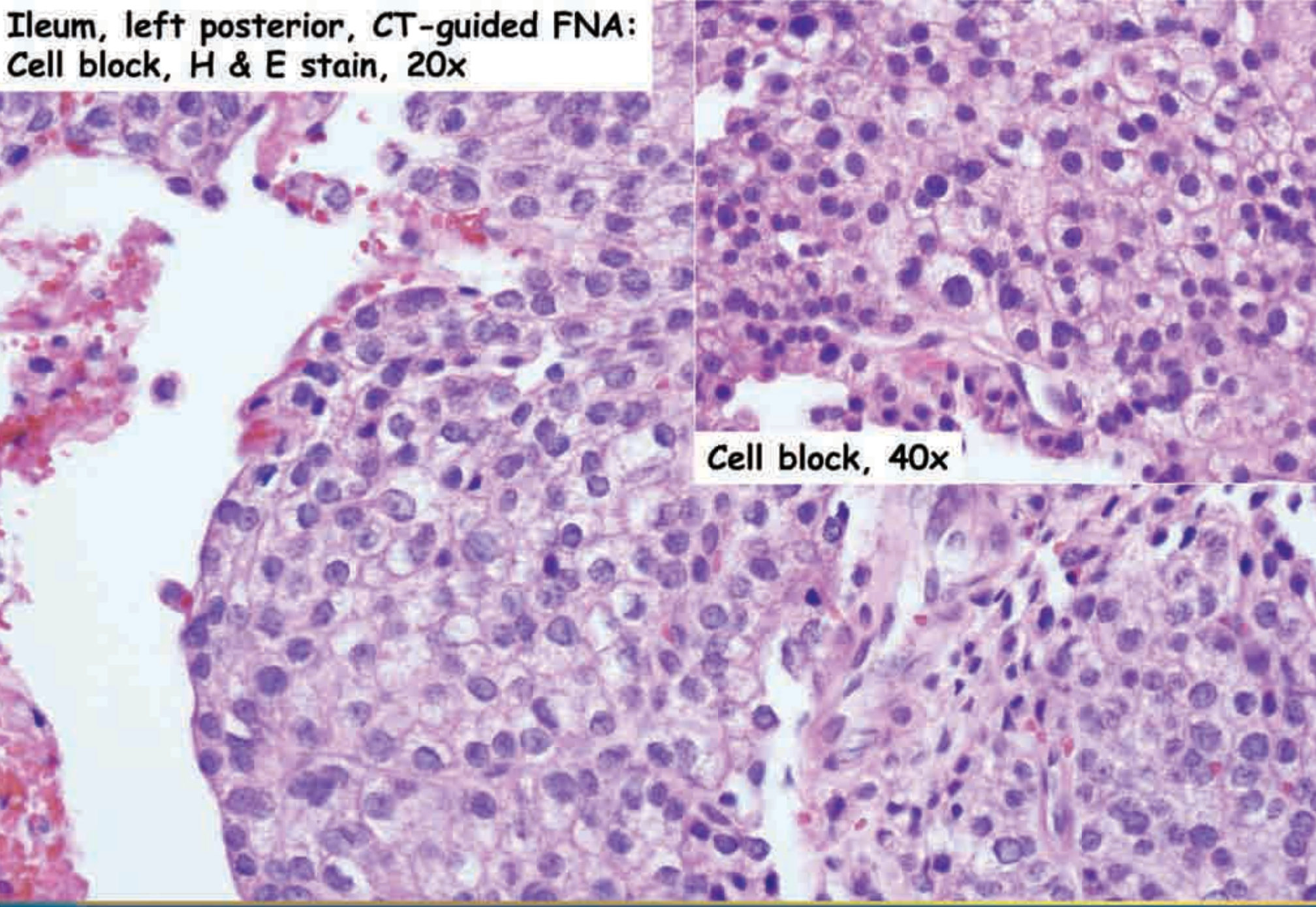
Ileum, left posterior, CT-guided FNA:
Papanicolaou stain, 40x

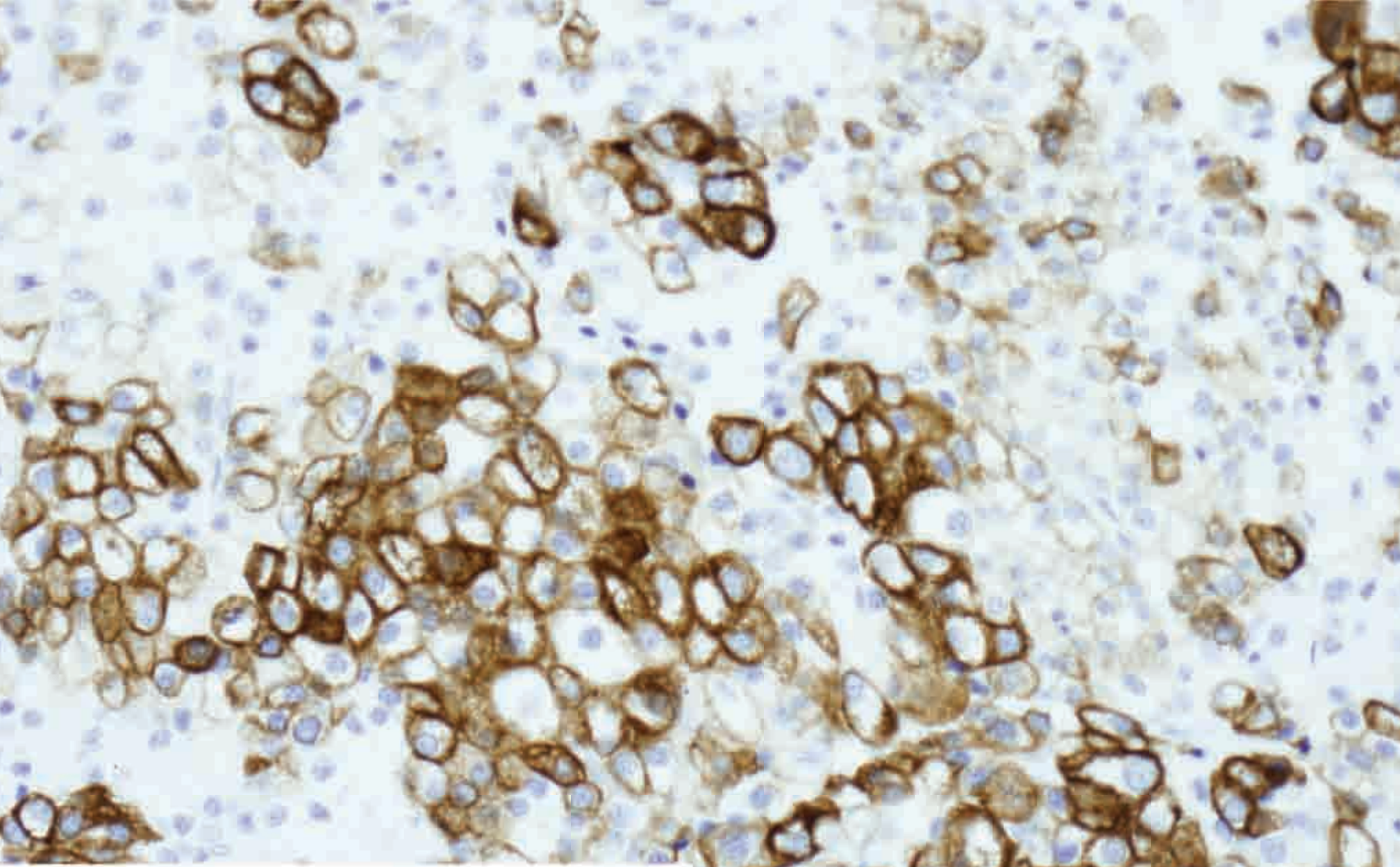
Ileum, left posterior, CT-guided fine needle aspiration:

Malignant tumor cells present consistent with origin from metastatic renal cell carcinoma.

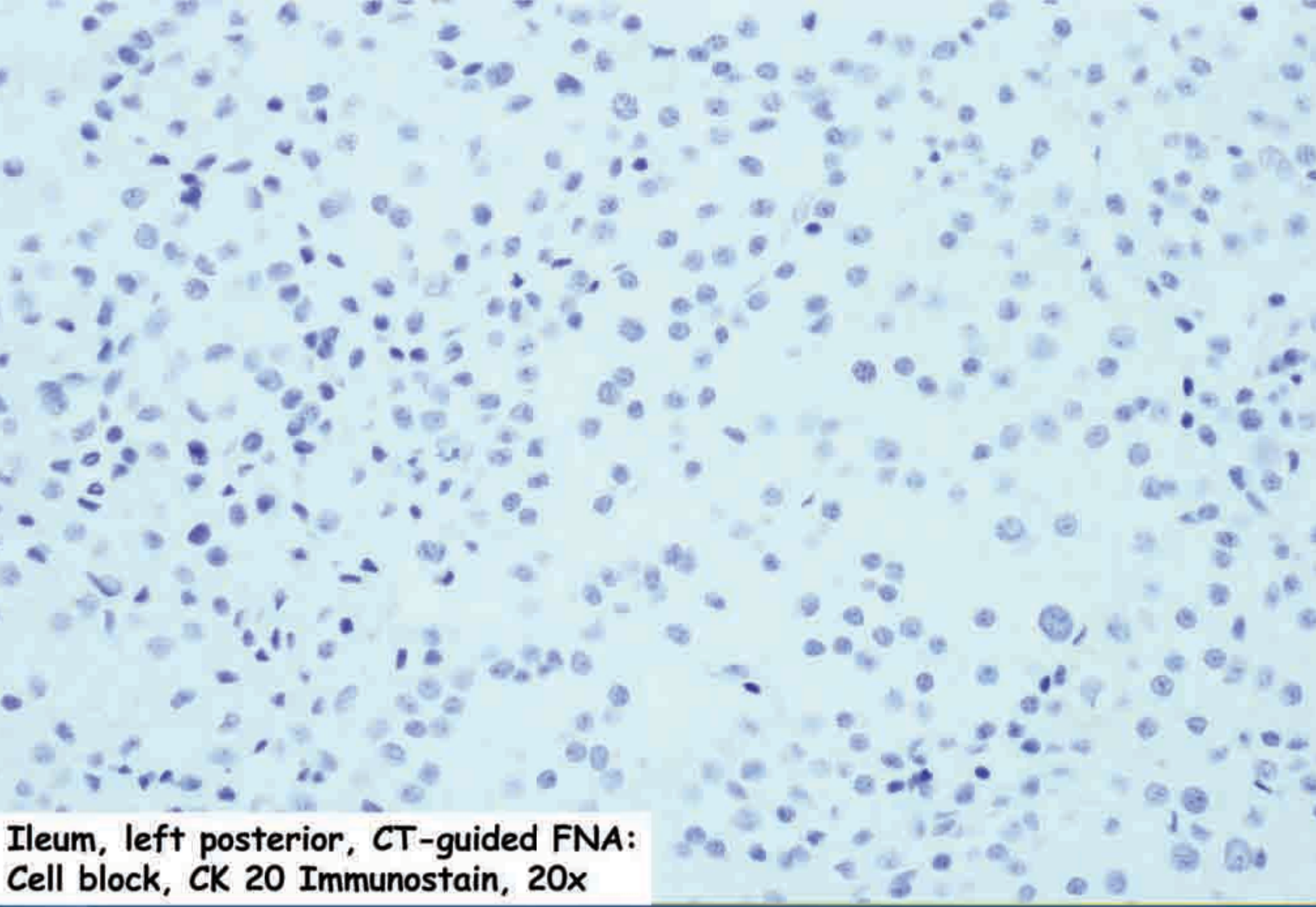
Immunohistochemical stains are positive for CK 7 and negative for CK 20, CD10 and p63.

Cell block and cytologic preparations examined.



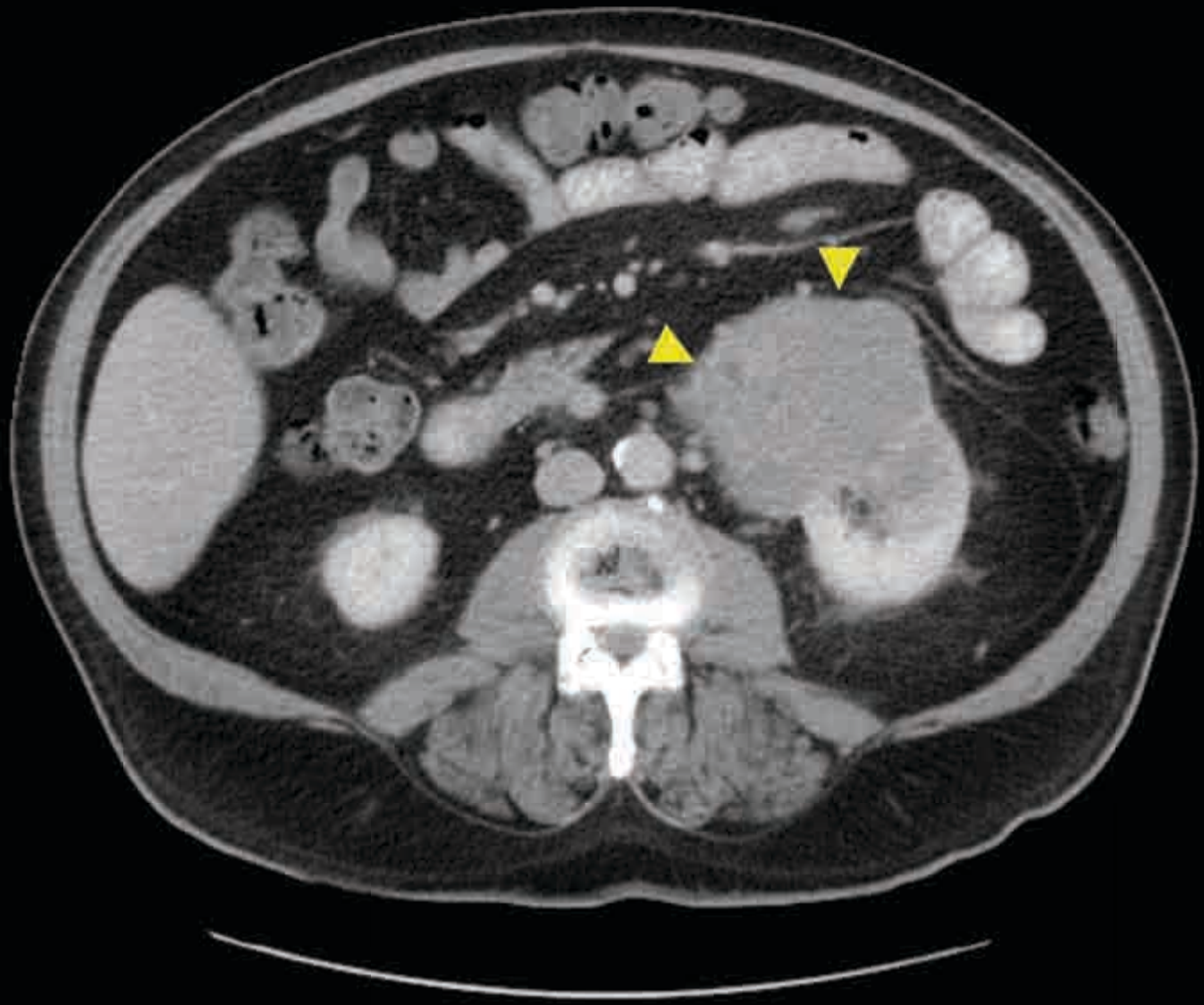


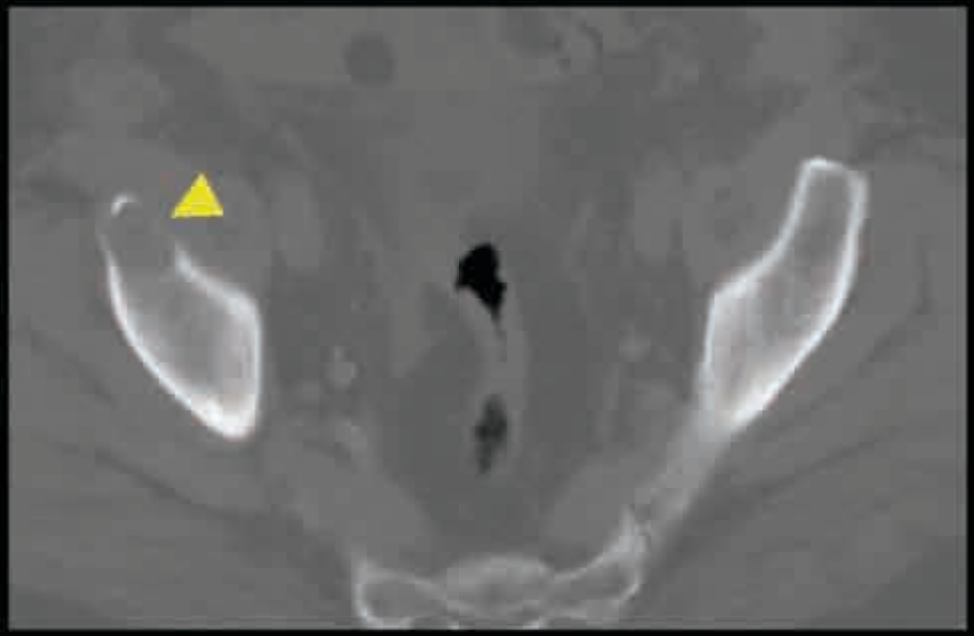
Ileum, left posterior, CT-guided FNA:
Cell block, CK 7 Immunostain, 20x

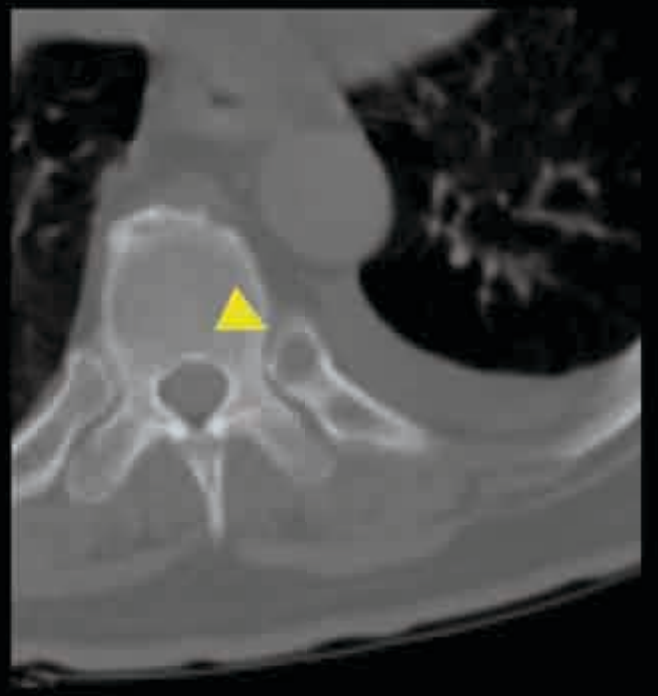


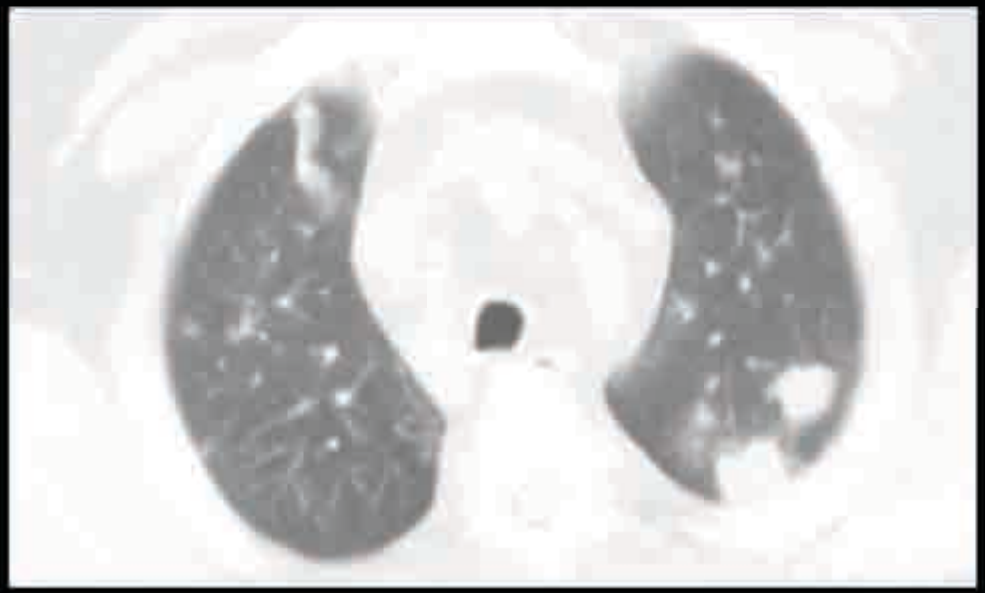
Ileum, left posterior, CT-guided FNA:
Cell block, CK 20 Immunostain, 20x

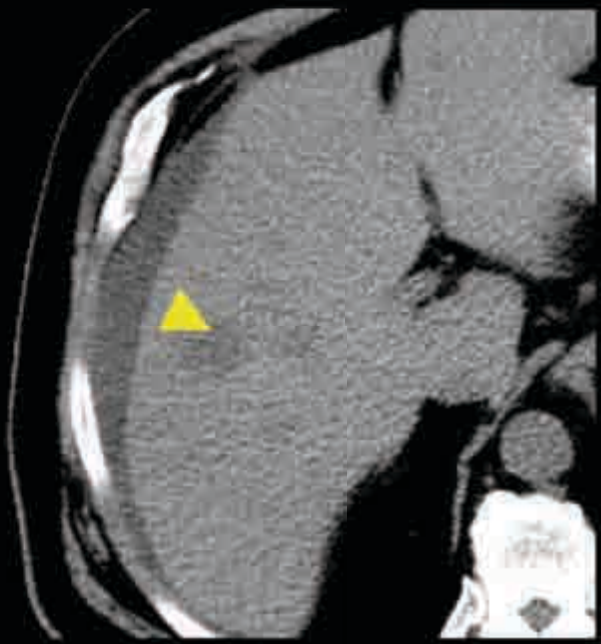
DX: Metastatic renal cell carcinoma











Metastatic renal cell carcinoma

- Spread of the tumor is via lymphatic, hematogenous and direct invasion

Sites of metastasis

- Lungs
- Bone
- Liver
- Pancreas
- Small intestine

Bone metastasis from RCC

- Bone metastases appear to have an intermediate prognosis (poor with liver mets and better with only lung mets)
- Typically osteolytic and are generally very aggressive
- Most commonly affected sites are the pelvis, ribs and spine. Long bones and the skull may also be seen
- CT: Bone destruction with or without the presence of an enhancing soft-tissue mass

- Variable uptake on bone scintigraphy with the sensitivity of 10-60%
- MRI is more sensitive of detecting bone lesions
- FDG PET may offer improved specificity over bone scintigraphy in the detection of bone metastases. However, there is report of 30% false negative on PET scan.