Radiology Pathology Conference

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PGY-3

1/29/2010

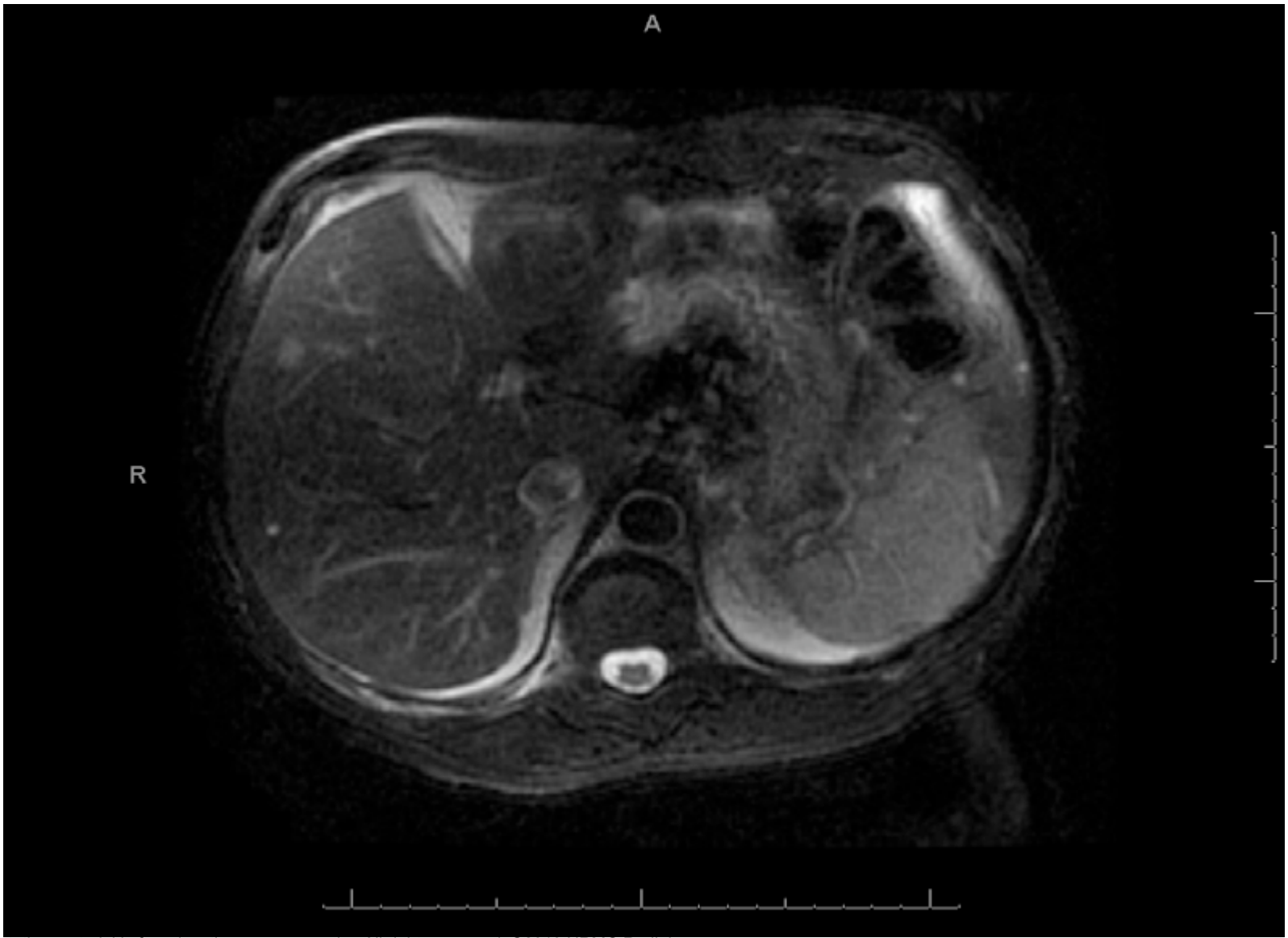
Case 1

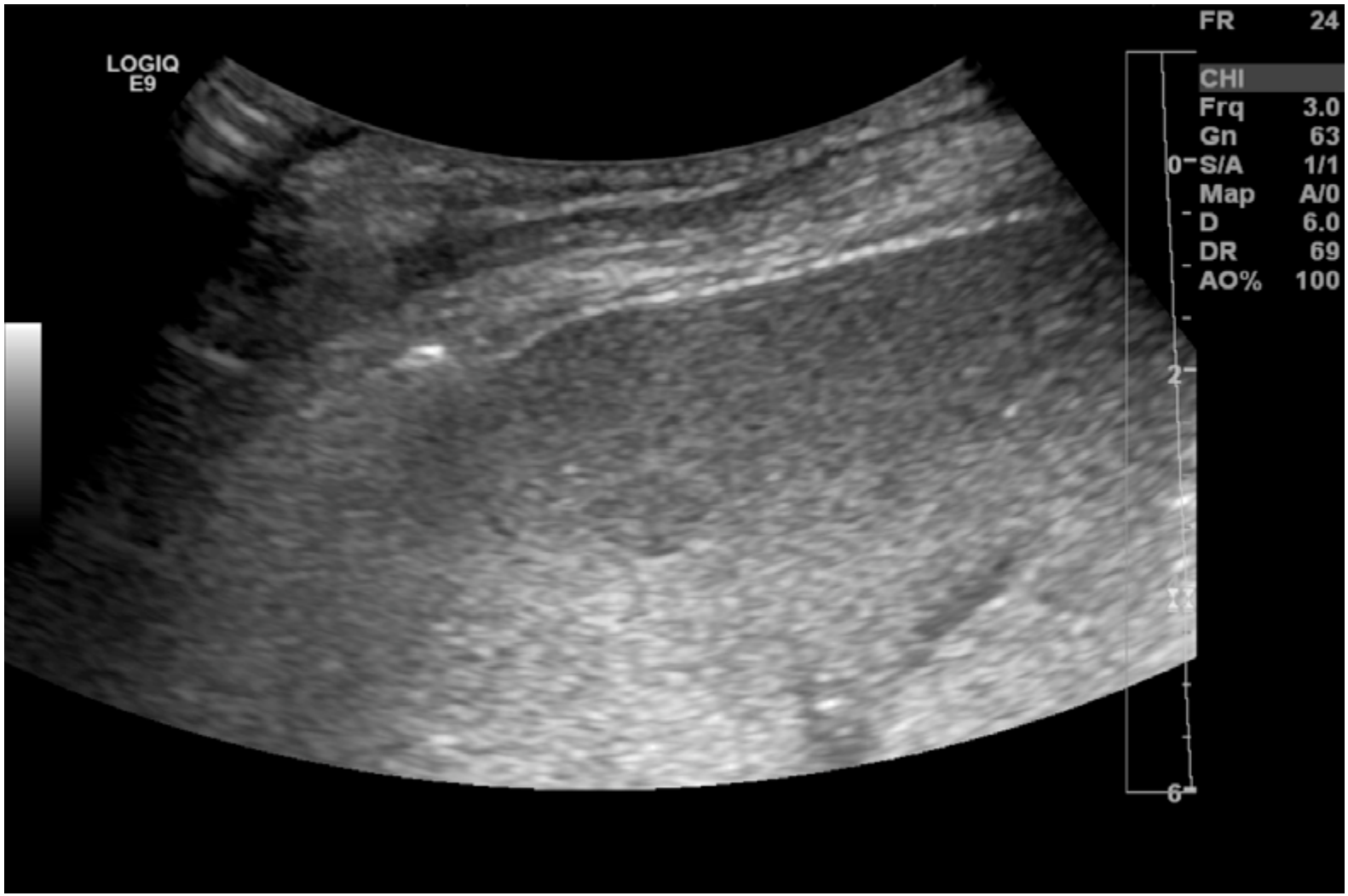
- 60 year- old man presents with abdominal pain

60 year old man w/ abdominal pain

Differential: Liver Lesions

- Cyst
- Abscess
- Primary neoplasm
- Metastasis
- Hemangioma
- Focal fat





Liver Metastases

- 2nd most commonly involved organ by metastatic disease, after lymph nodes
- Metastatic disease more common than primary
- Colon, stomach, breast, lung, and pancreas most common neoplasms to metastasize to the liver in adults
  - Calcified metastases occur with mucinous tumors of the breast, colon, and ovary
- Neuroblastoma, Wilm's tumor and leukemia are the most common in children
- The majority of metastases are multiple; only 10% are solitary

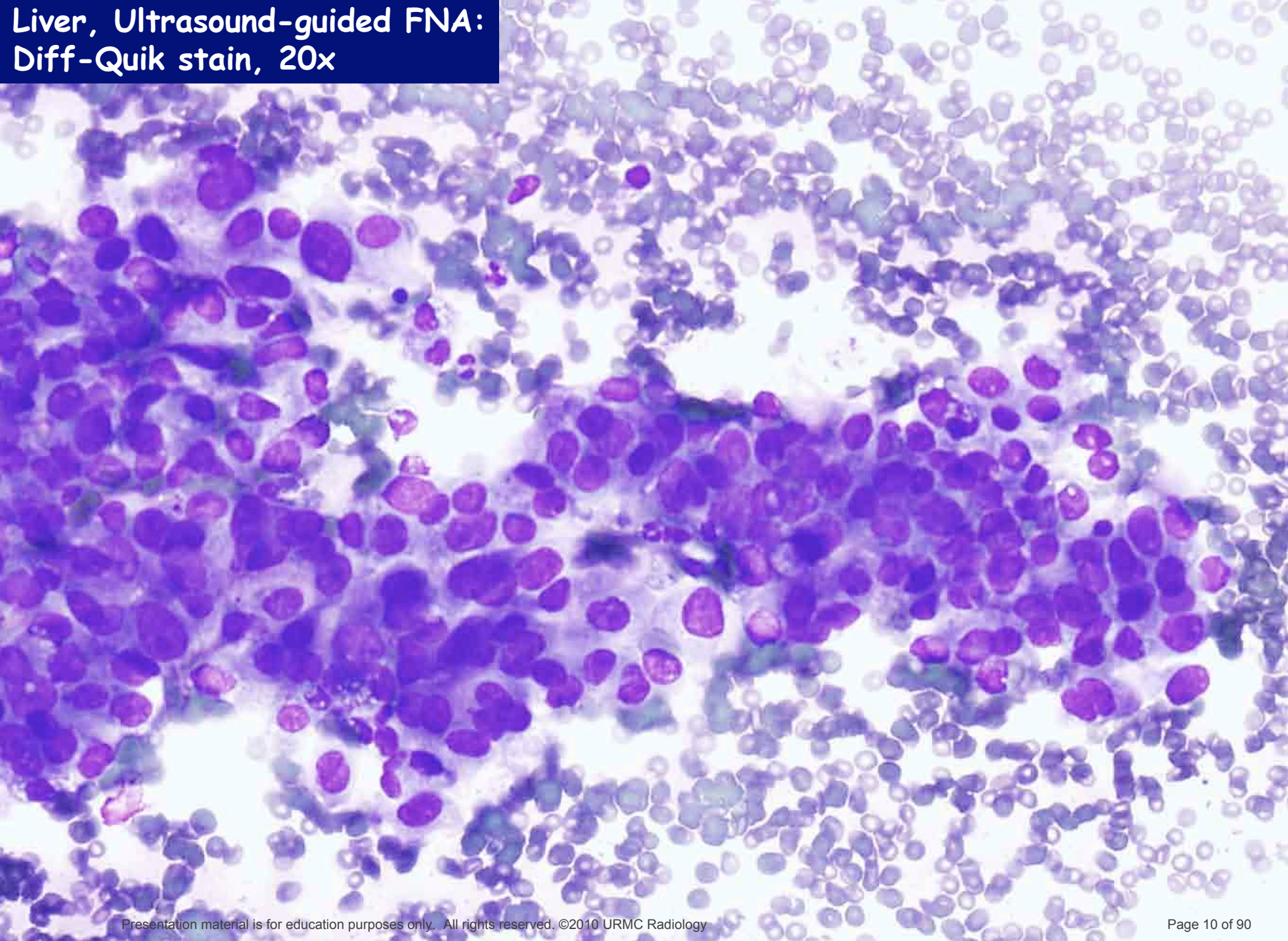
Radiology / Pathology Conference

January 2010

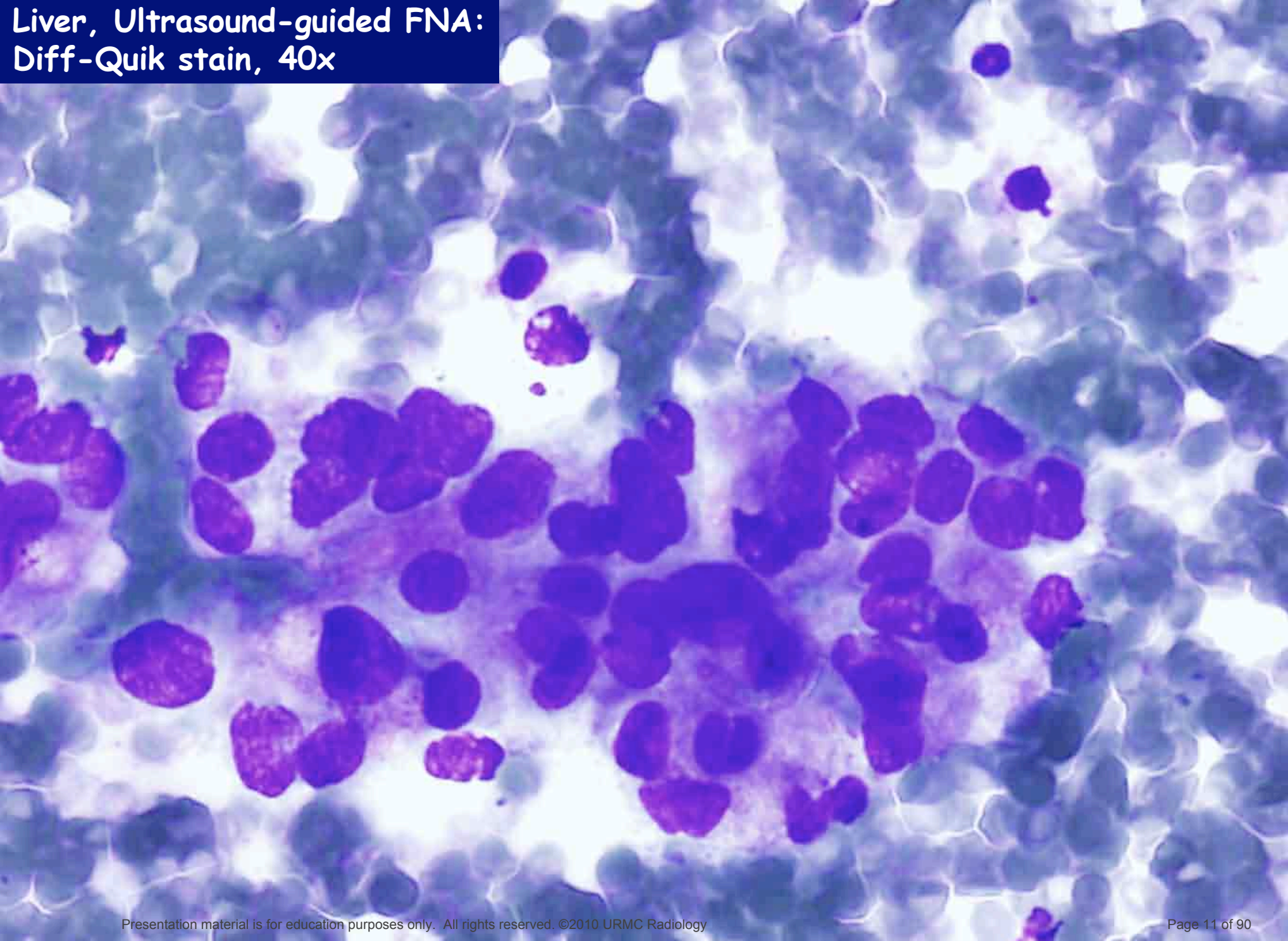
Michael S. Facik

Donna K. Russell

Liver, Ultrasound-guided FNA: Diff-Quik stain, 20x



Liver, Ultrasound-guided FNA: Diff-Quik stain, 40x



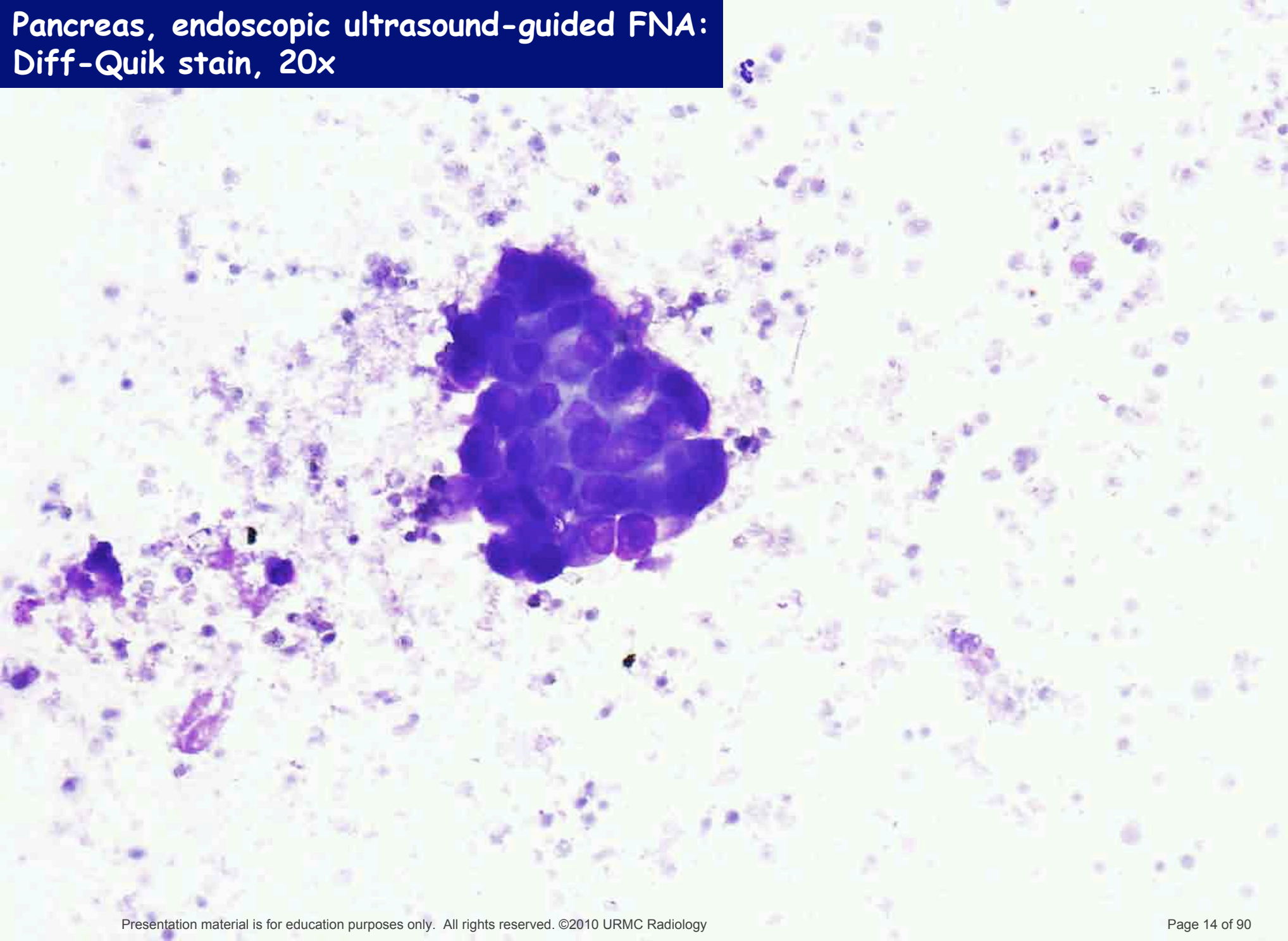
Liver Ultrasound-guided FNA: Papanicolaou stain, 40x

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

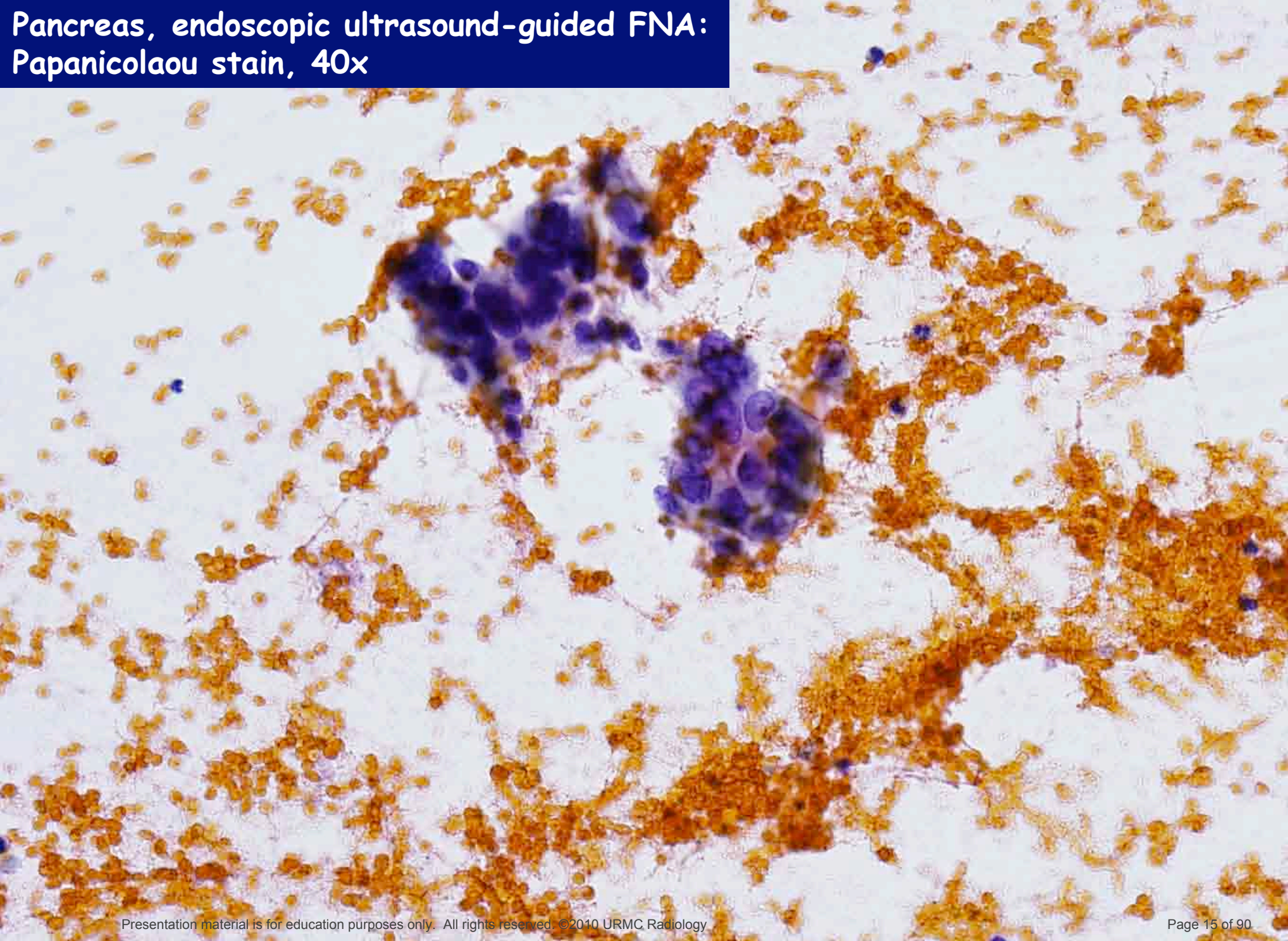
Malignant tumor cells present derived from adenocarcinoma.

Pancreatic endoscopic ultrasound-guided FNA 18 days prior was positive for malignancy, adenocarcinoma.

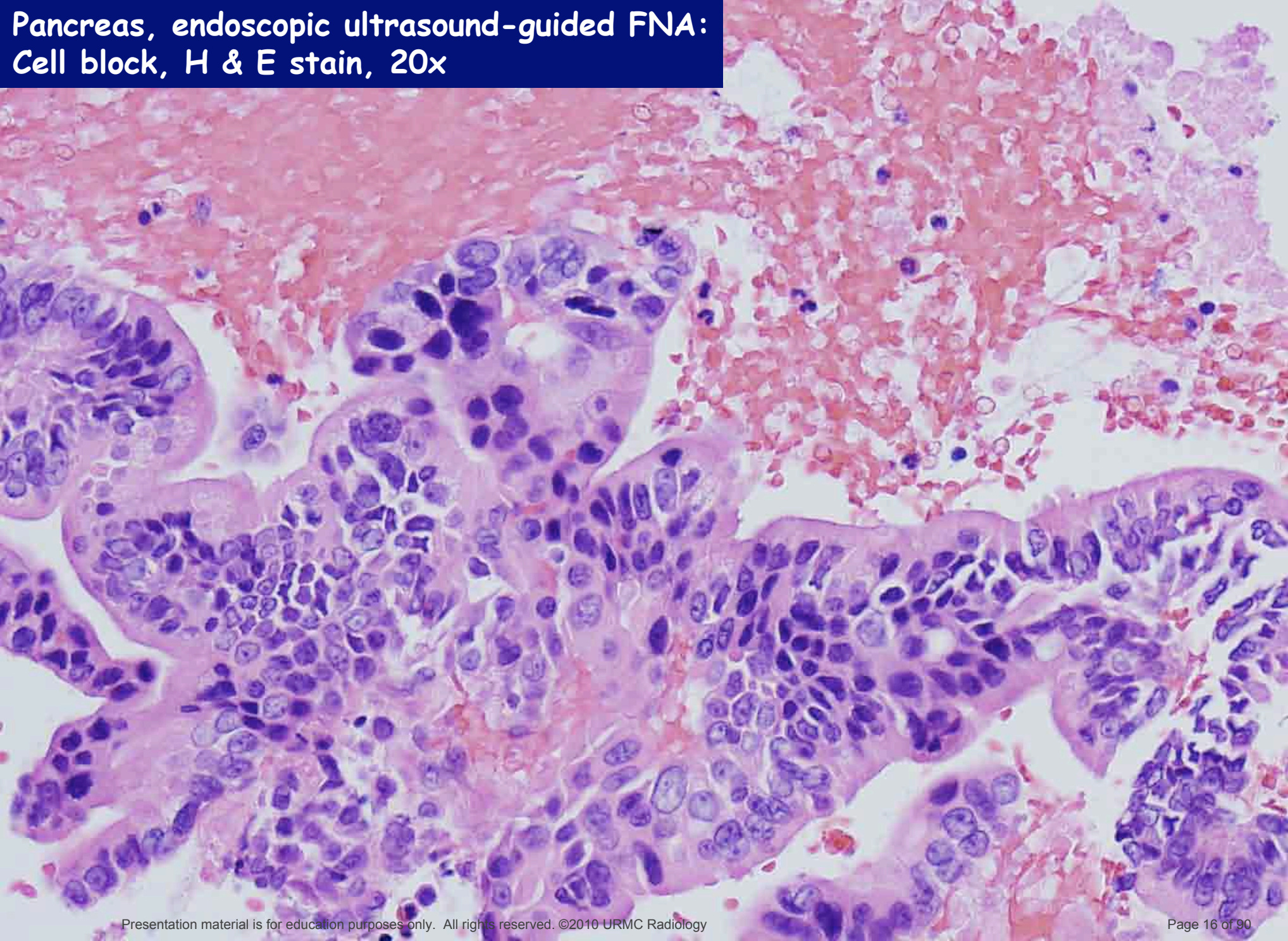
Pancreas, endoscopic ultrasound-guided FNA: Diff-Quik stain, 20x



Pancreas, endoscopic ultrasound-guided FNA: Papanicolaou stain, 40x



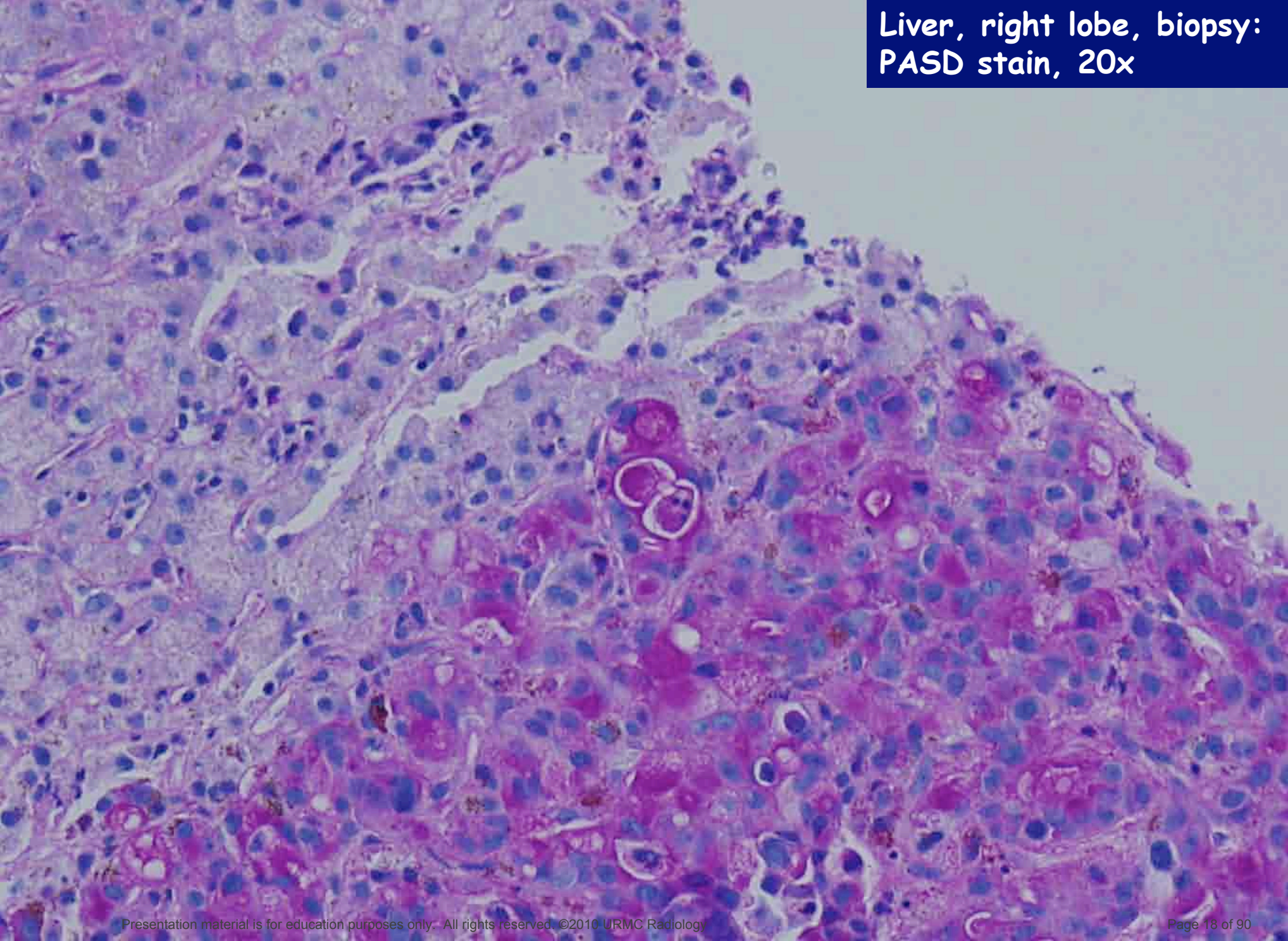
Pancreas, endoscopic ultrasound-guided FNA: Cell block, H & E stain, 20x



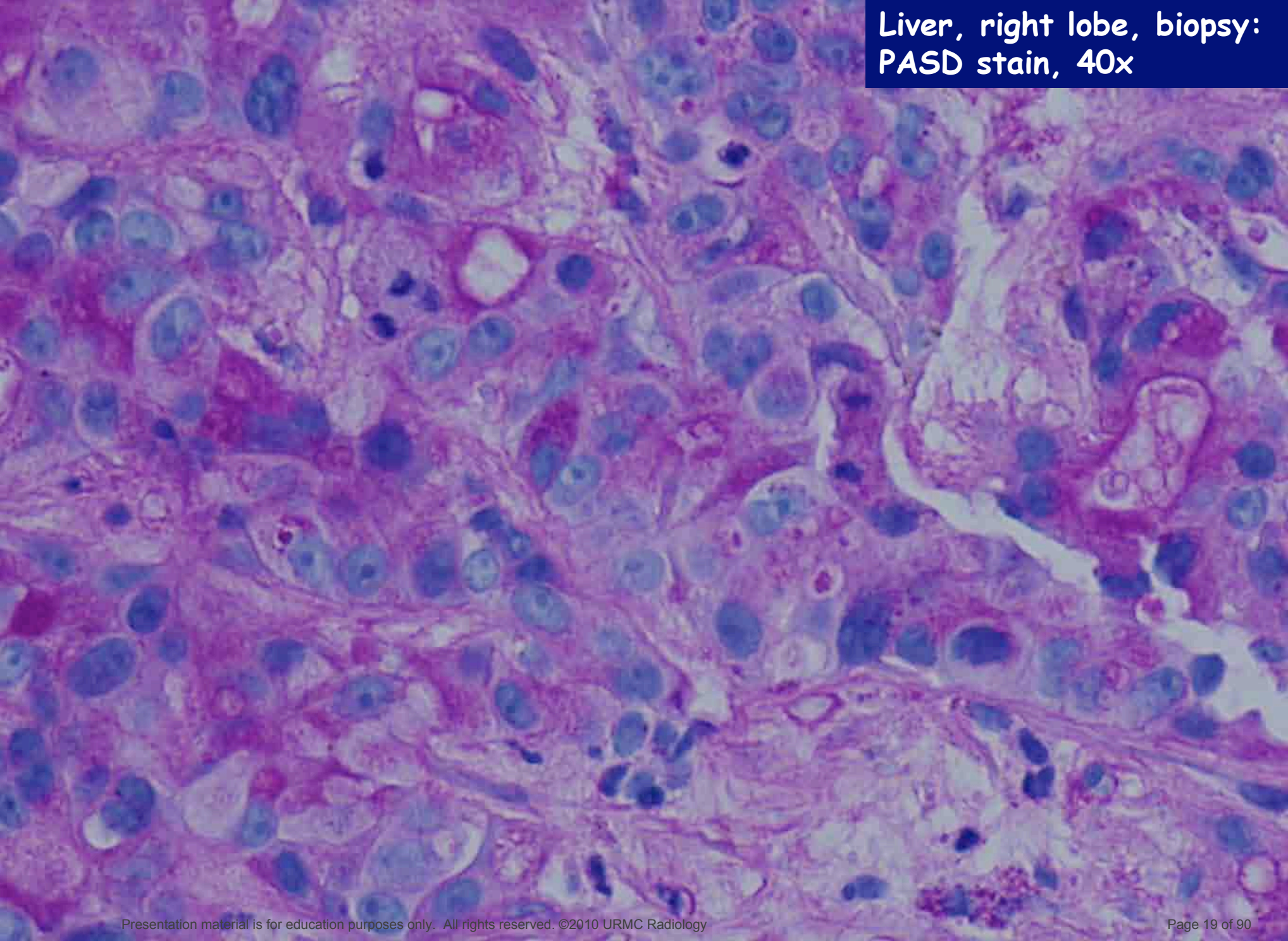
Liver, right lobe, core needle biopsy:

Moderately differentiated adenocarcinoma consistent with pancreatic primary.

Liver, right lobe, biopsy:
PASD stain, 20x



Liver, right lobe, biopsy:
PASD stain, 40x



Pancreatic Adenocarcinoma

- EUS guided FNAs gaining recognition –obtain a pathologic diagnosis patients with pancreatic lesions (Advantage of this method detection of smaller lesions due to proximity of the probe)
- Pancreatic carcinoma ranks 4th in frequency of cancer deaths in North America #s ↑
- Adenocarcinomas comprise 80-90% of malignant neoplasms of pancreas

Pancreatic Adenocarcinoma Metastatic to Liver

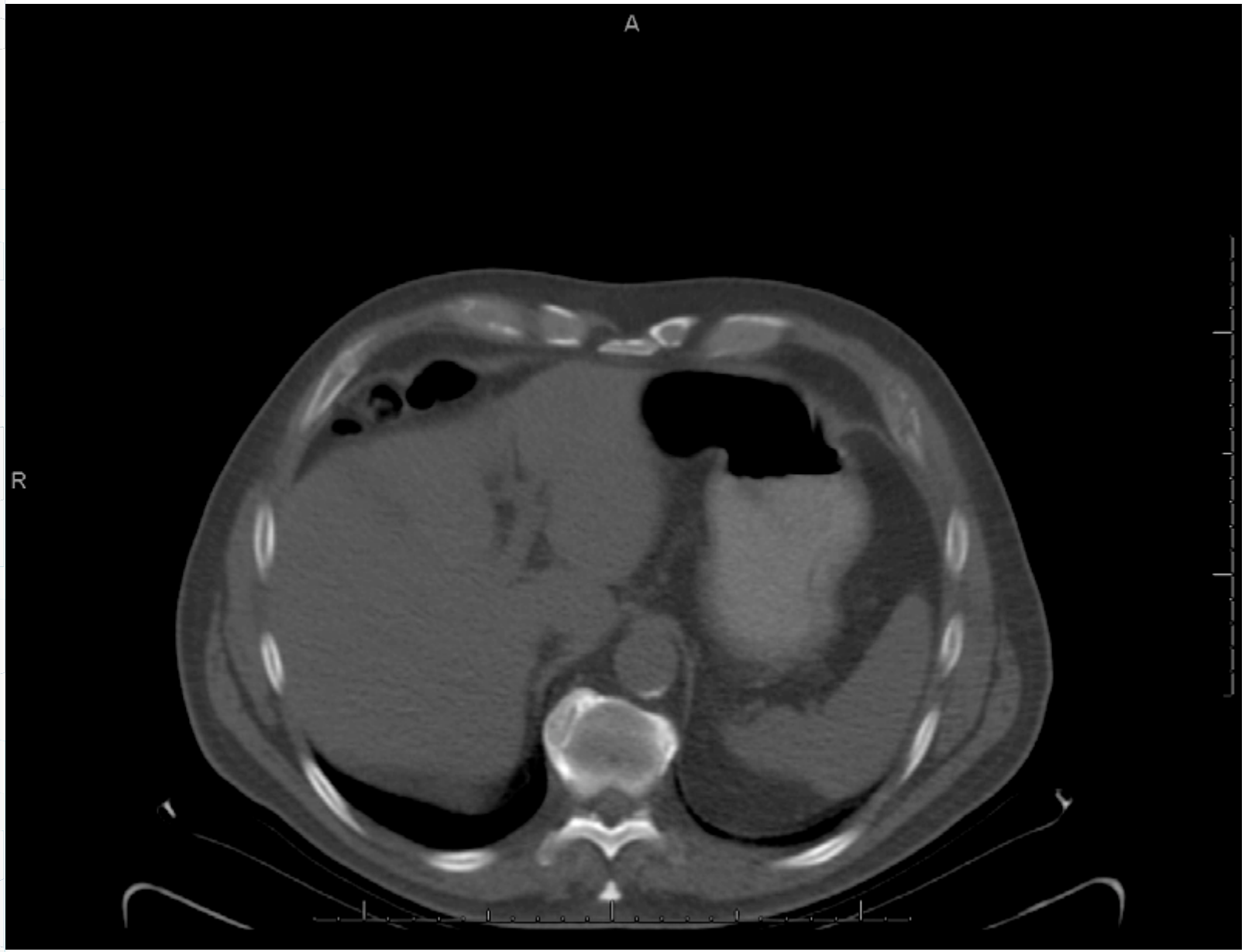
- Cancer cells reach the liver through portal vein, hepatic artery, hilar lymphatics or by direct extension

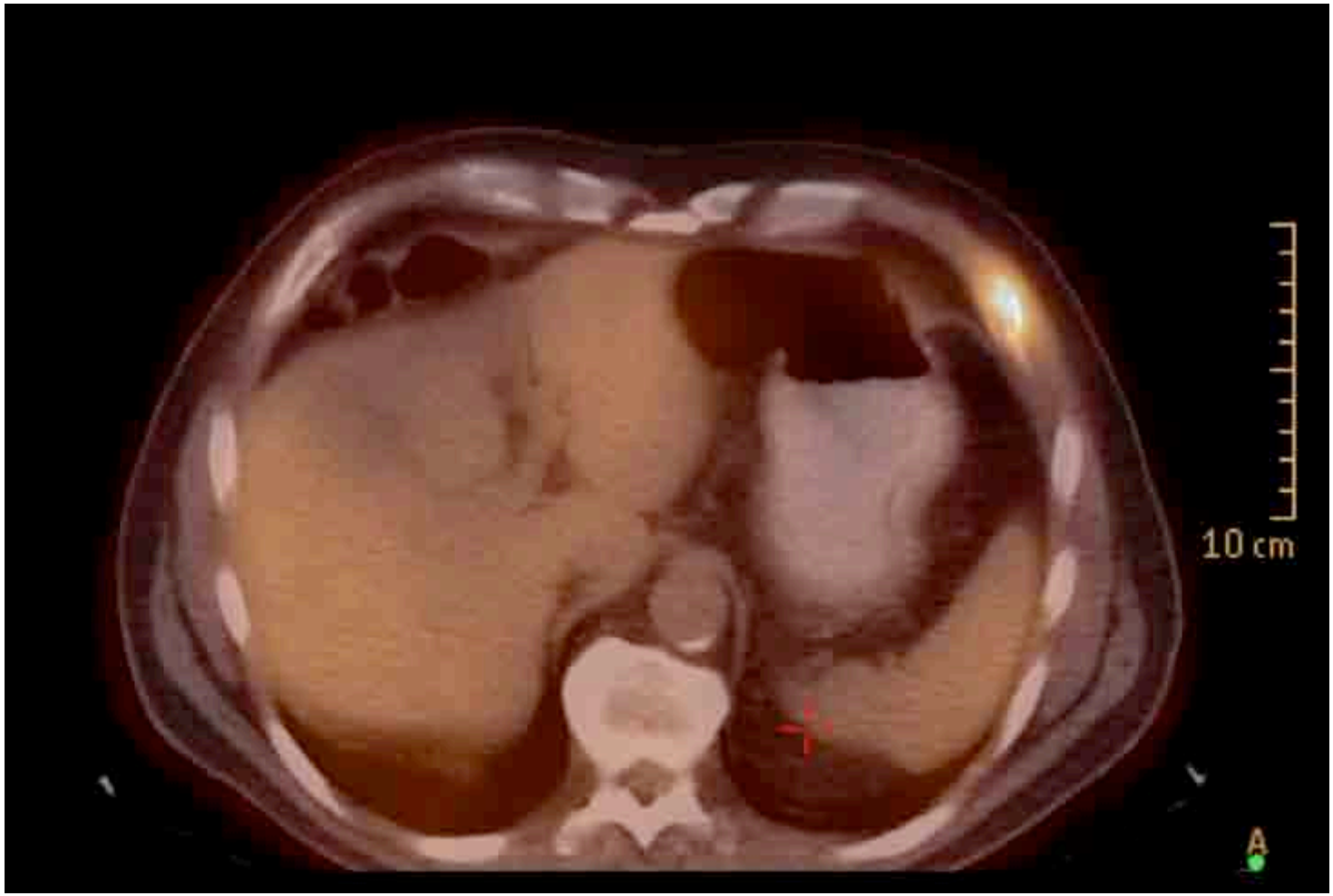
- Primary tumors of the gallbladder, extrahepatic bile ducts, pancreas and stomach frequently involve the liver by direct extension

Case 2

- 69 year-old man with hiccups

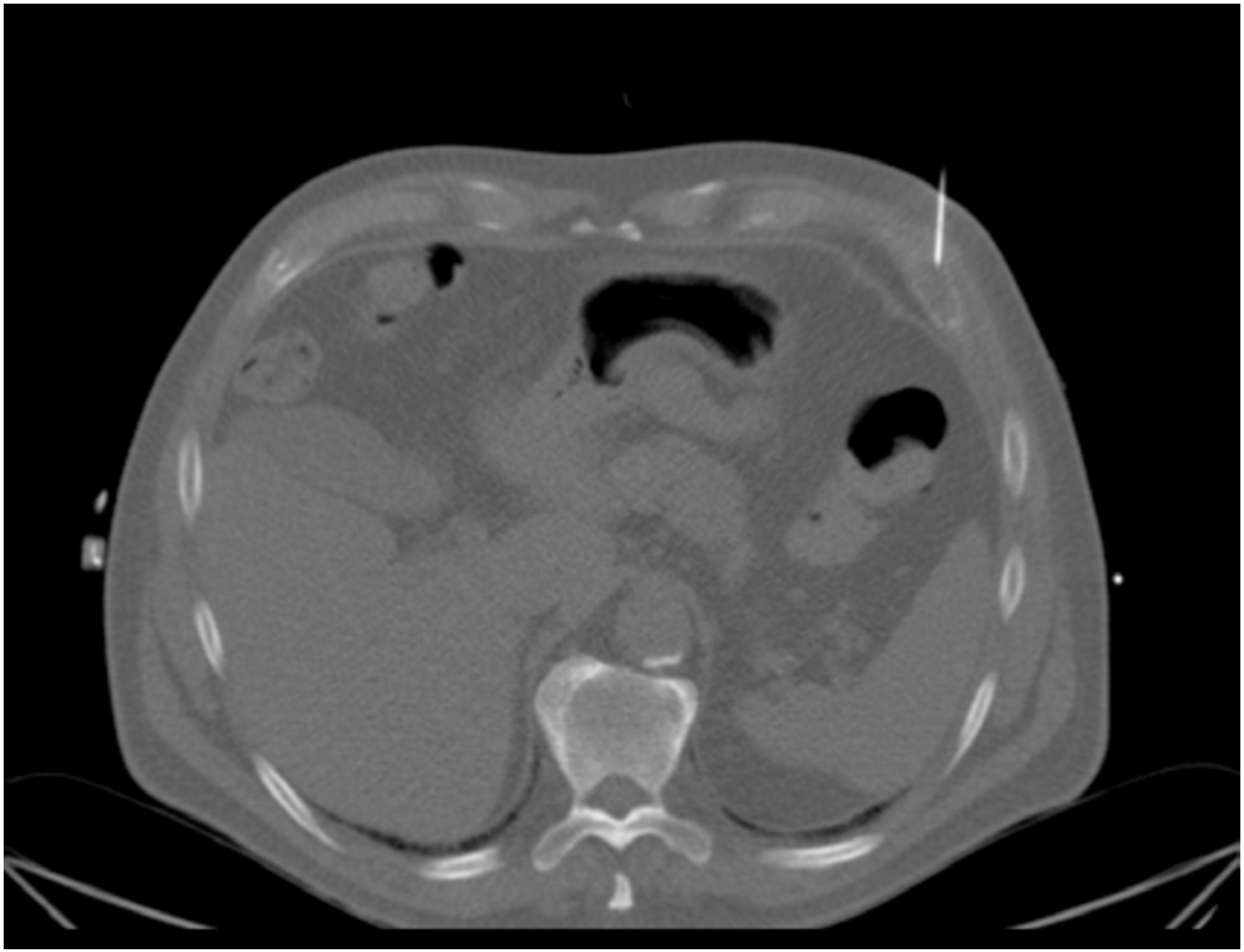
69 year old man with hiccups



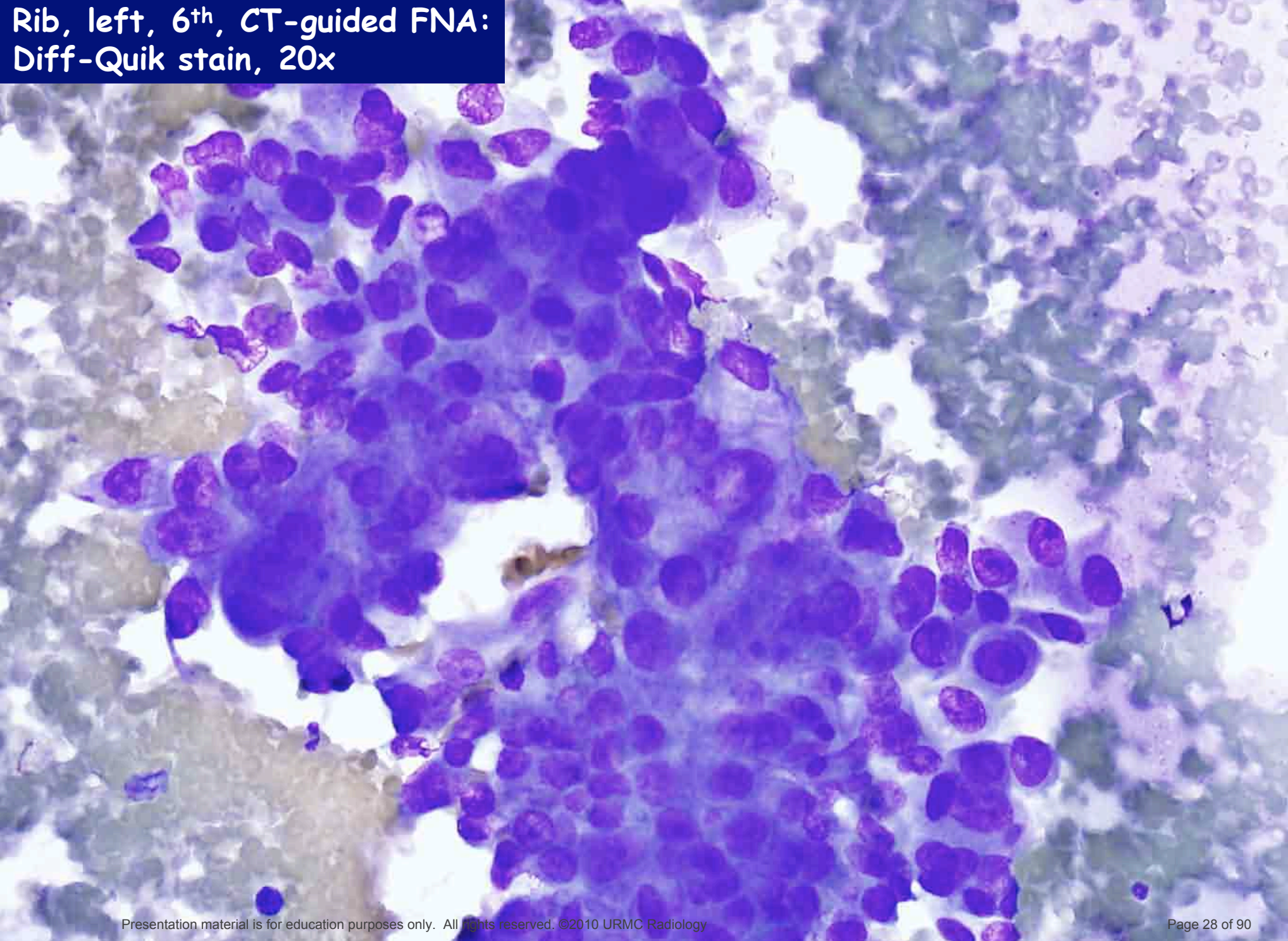


Differential: Hypermetabolic Rib Lesion

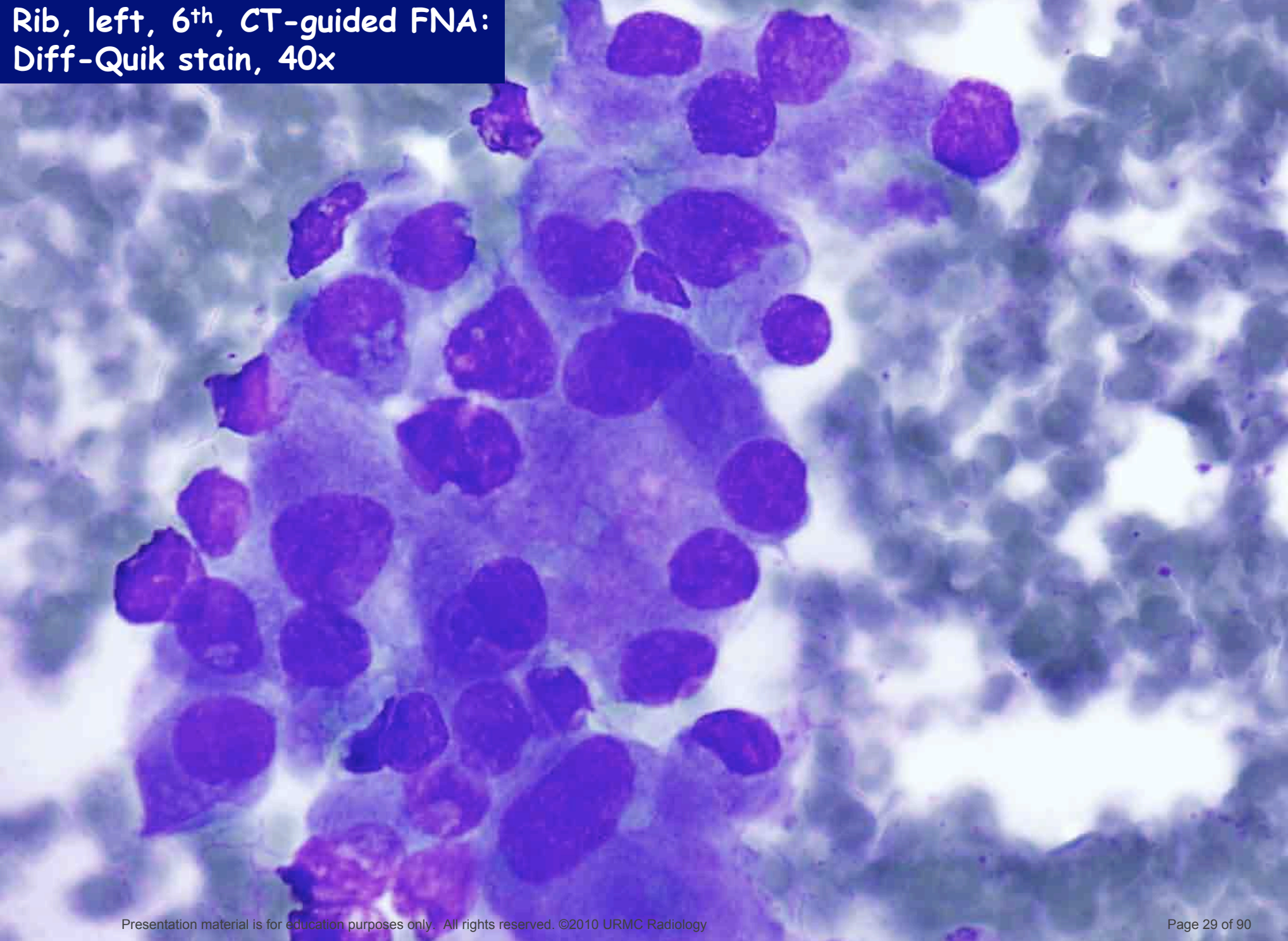
- Metastases
- Multiple myeloma
- Infection
  - TB
- Primary neoplasm
  - Benign: osteochondroma
  - Malignant: chondrosarcoma



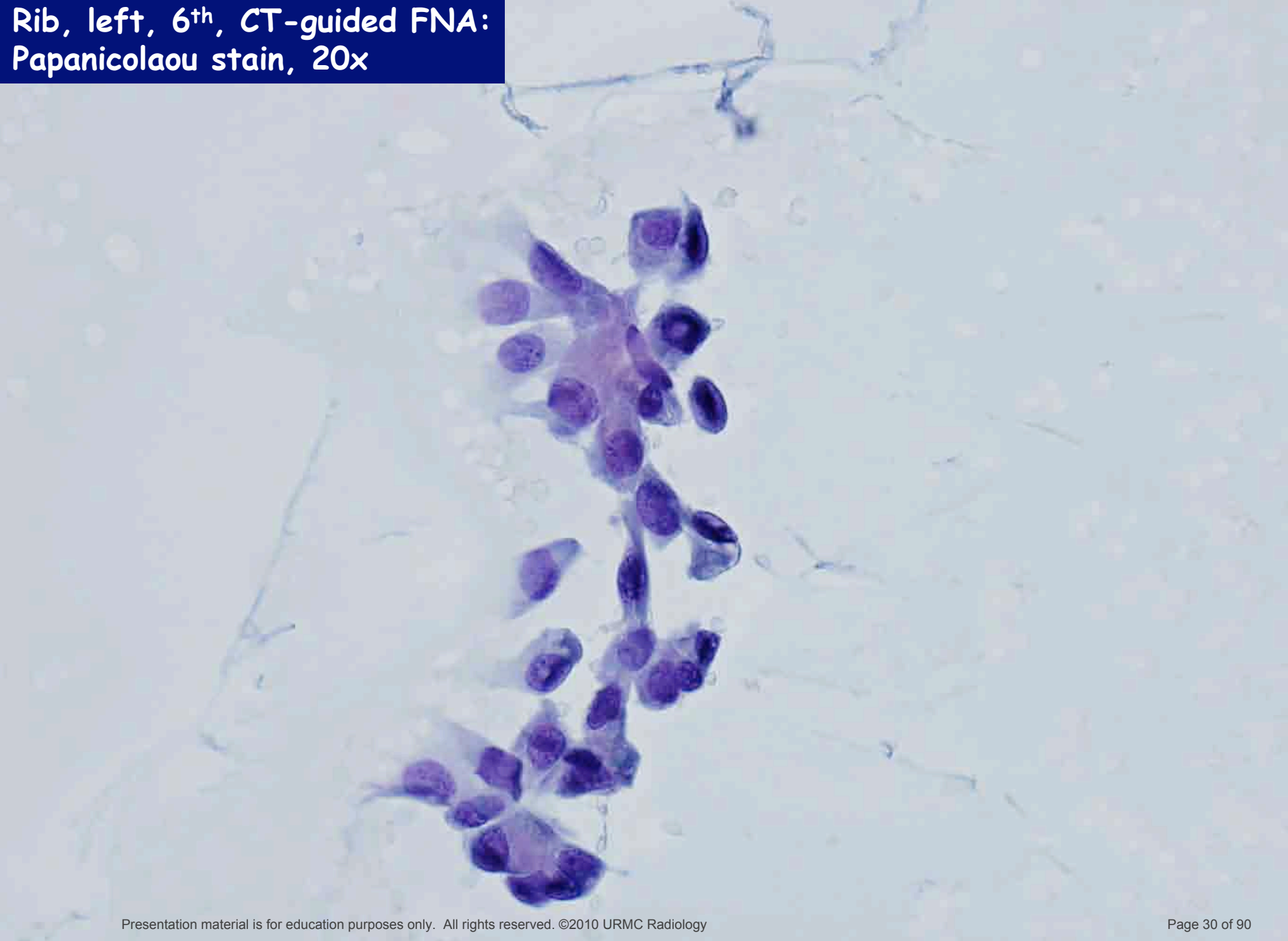
Rib, left, 6th, CT-guided FNA: Diff-Quik stain, 20x



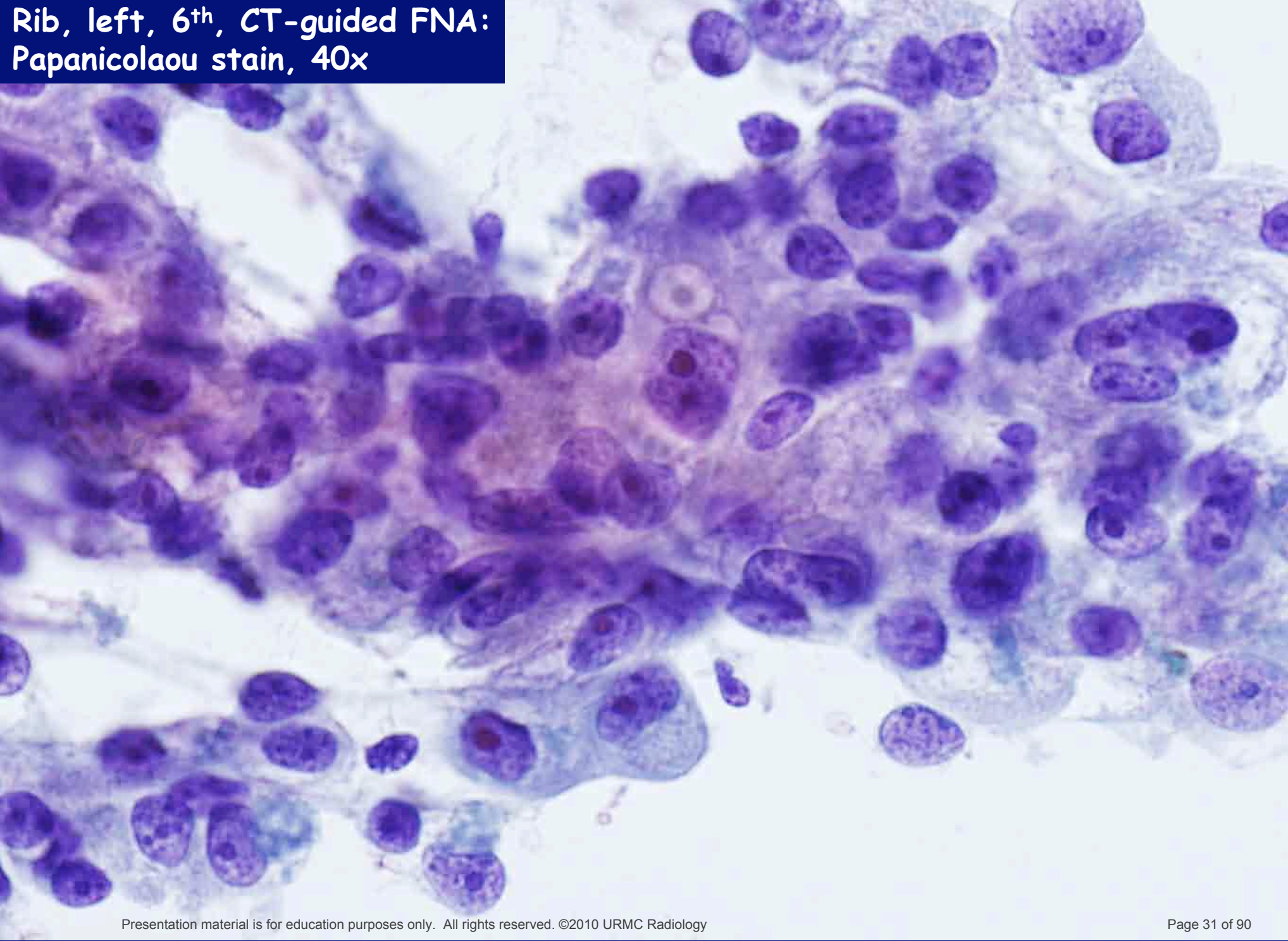
Rib, left, 6th, CT-guided FNA: Diff-Quik stain, 40x



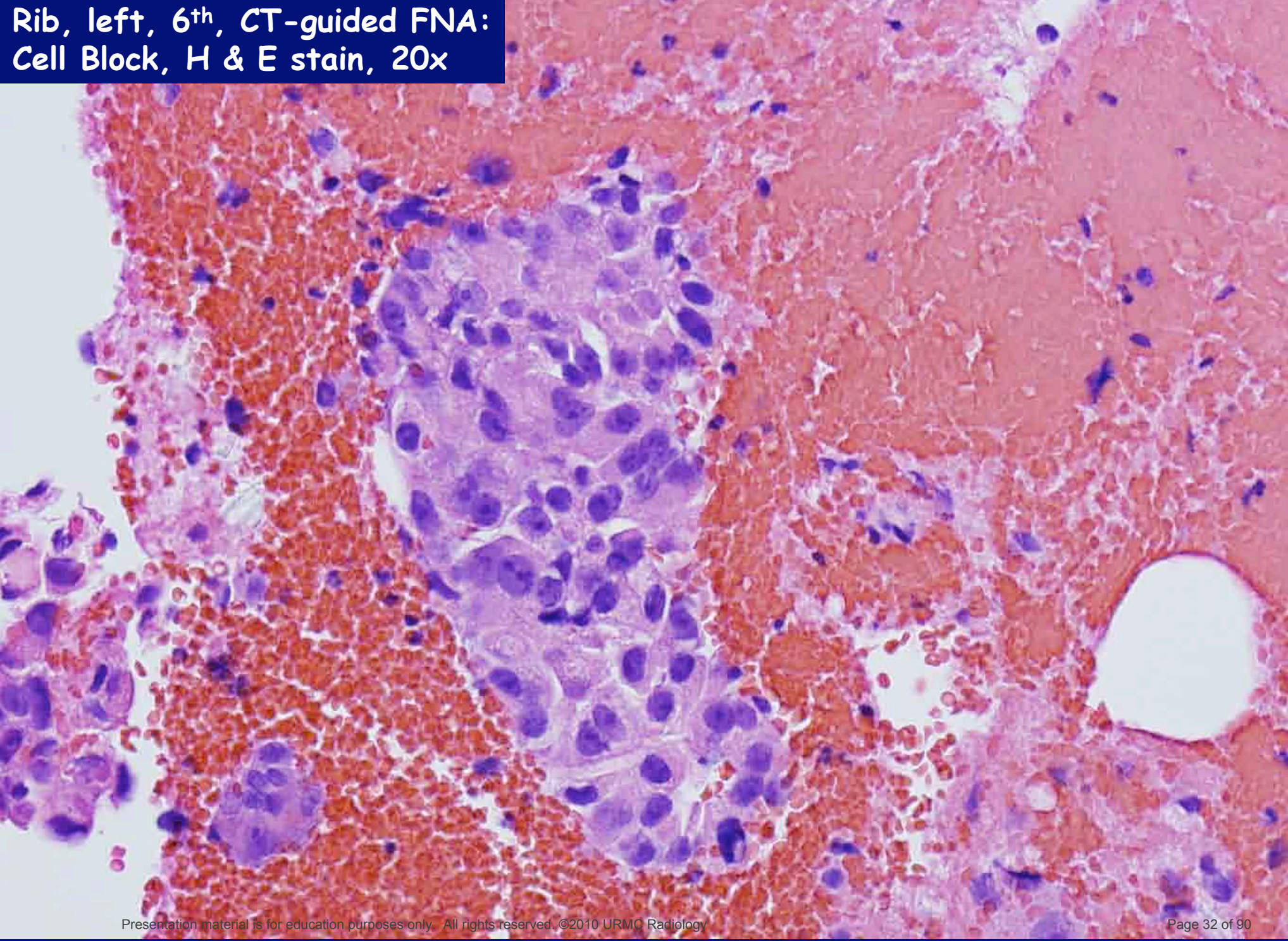
Rib, left, 6th, CT-guided FNA: Papanicolaou stain, 20x



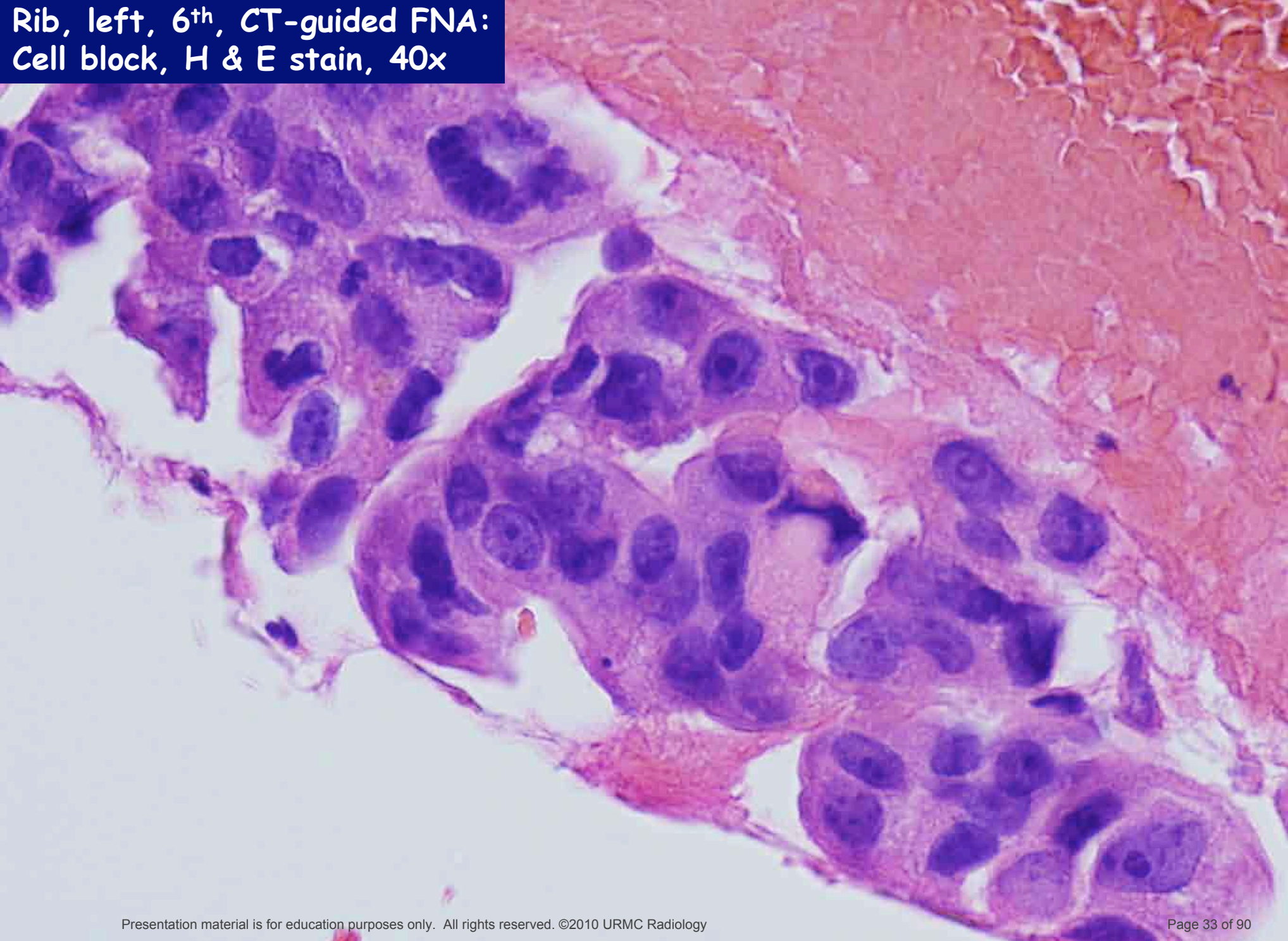
Rib, left, 6th, CT-guided FNA: Papanicolaou stain, 40x



Rib, left, 6th, CT-guided FNA: Cell Block, H & E stain, 20x



Rib, left, 6th, CT-guided FNA: Cell block, H & E stain, 40x



Rib, left, 6th, CT-guided fine needle aspiration:

Malignant tumor cells present derived from adenocarcinoma.

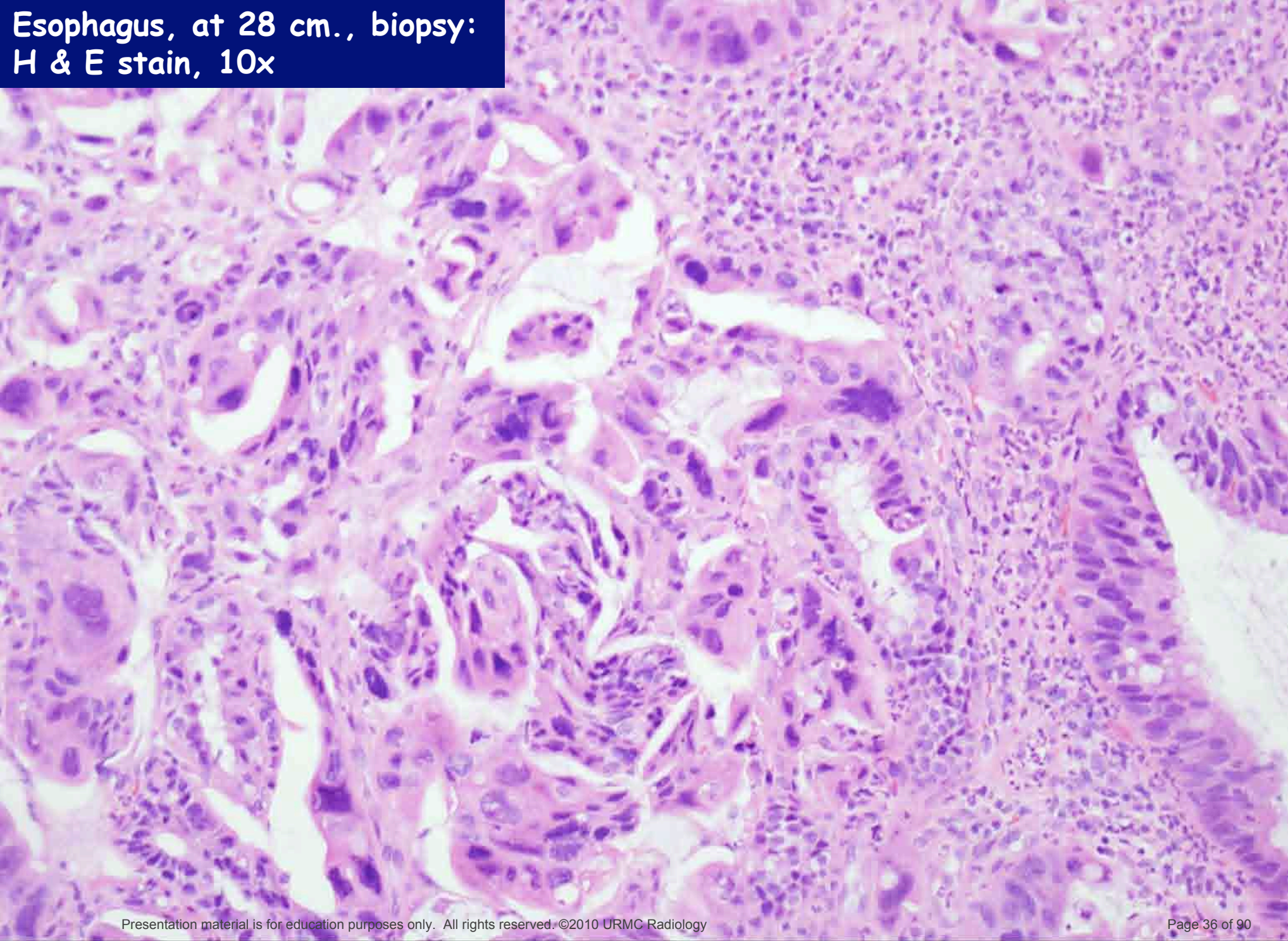
Cell block and cytologic preparations examined.

Esophagus, at 28 cm., biopsy:

Invasive adenocarcinoma, superficial biopsy.

Comment: Depth of invasion cannot be assessed with this small biopsy.

Esophagus, at 28 cm., biopsy: H & E stain, 10x



Metastatic Adenocarcinoma

- Metastatic carcinoma – prior clinical history is extremely important
- Compare surgical pathology with cytopathology specimen

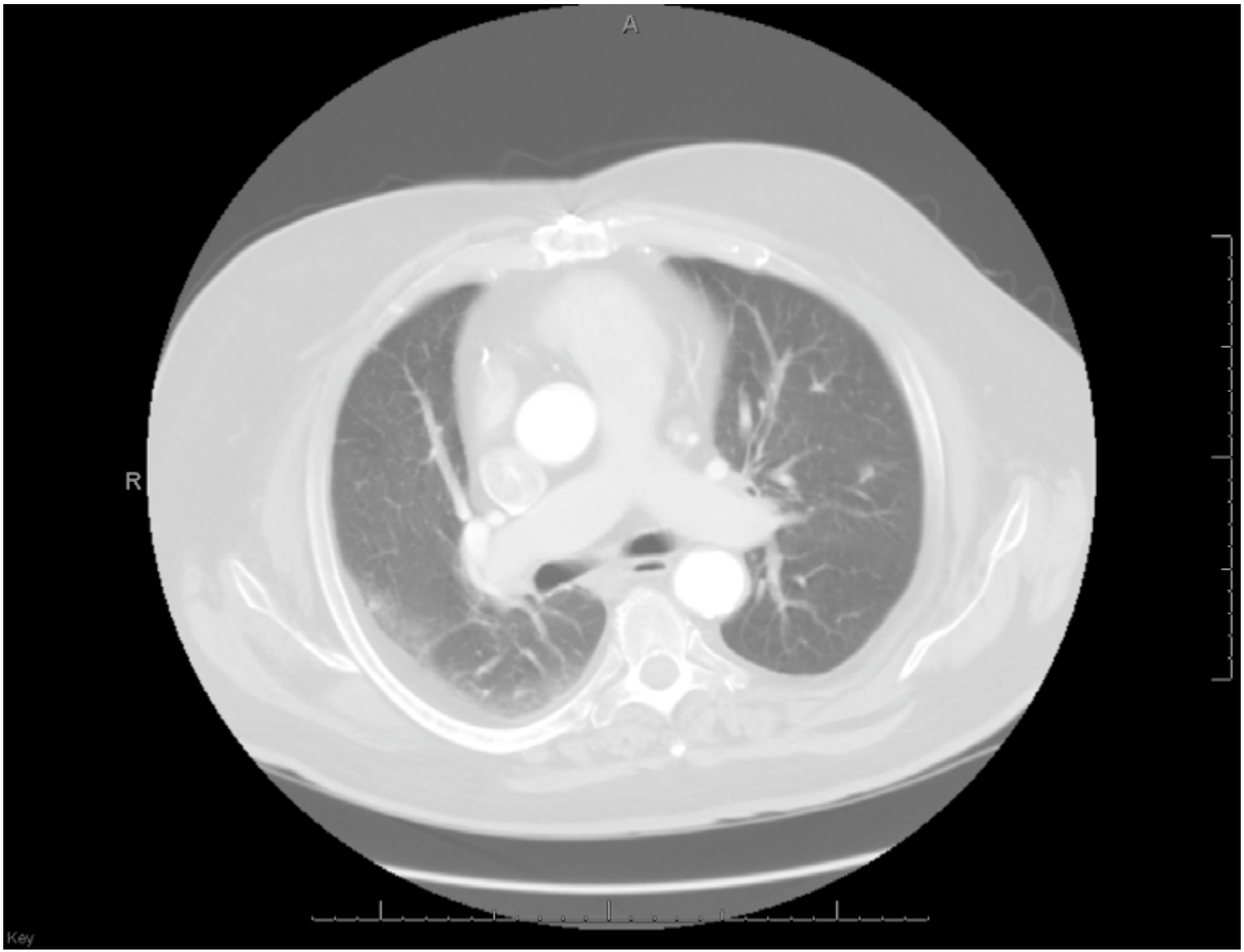
Metastatic Esophageal Adenocarcinoma

- Patient's with Barrett's esophagus – relative risk of adenocarcinoma 30-120 fold in comparison with patient's without
- Smoking factor – risk related to quantity and duration
- Abdominal obesity – risk factor, especially in men
- Time of diagnosis ~50% of patient's have distant metastatic disease

Case 3

- 70 year-old smoker with shortness of breath. History of rheumatoid arthritis.

70 year old smoker w/ SOB. Hx RA



Differential: Solitary Pulmonary Nodule

- Neoplasm
  - Bronchogenic carcinoma
  - Hamartoma
  - Bronchial adenoma
- Infection
  - Septic embolus
  - Round pneumonia
  - Abscess
  - granuloma
- CVD
  - Rheumatoid lung
- Congenital
  - Sequestration
  - Bronchogenic cyst
- Miscellaneous
  - Rounded atelectasis

Fleischner Society Recommendations

Recommendations for Follow-up and Management of Nodules Smaller than 8 mm Detected Incidentally at Nonscreening CT

Nodule Size (mm)*	Low-Risk Patient†	High-Risk Patient‡
≤4	No follow-up needed§	Follow-up CT at 12 mo; if unchanged, no further follow-up‖
>4–6	Follow-up CT at 12 mo; if unchanged, no further follow-up‖	Initial follow-up CT at 6–12 mo then at 18–24 mo if no change‖
>6–8	Initial follow-up CT at 6–12 mo then at 18–24 mo if no change	Initial follow-up CT at 3–6 mo then at 9–12 and 24 mo if no change
>8	Follow-up CT at around 3, 9, and 24 mo, dynamic contrast-enhanced CT, PET, and/or biopsy	Same as for low-risk patient

Note.—Newly detected indeterminate nodule in persons 35 years of age or older.

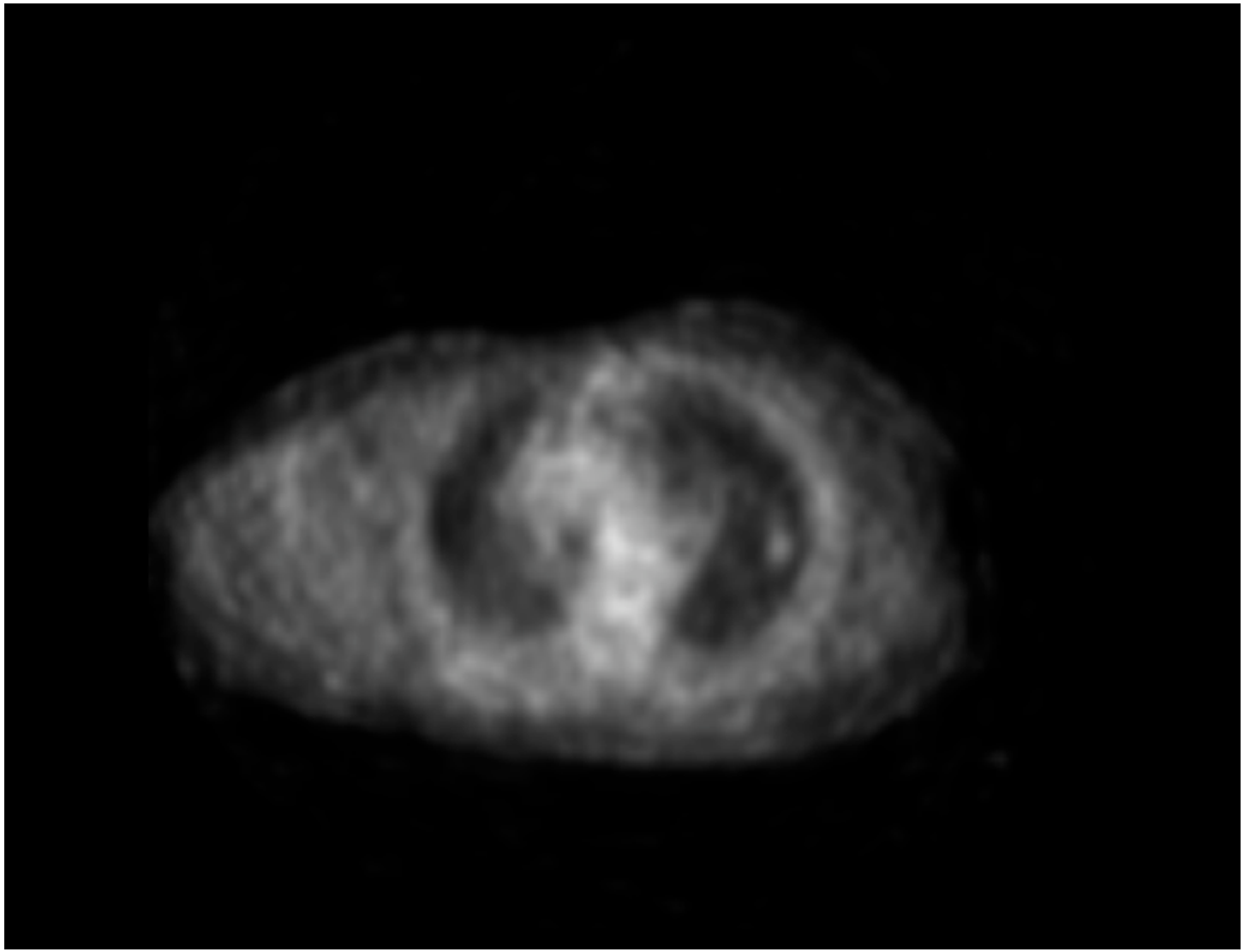
* Average of length and width.

† Minimal or absent history of smoking and of other known risk factors.

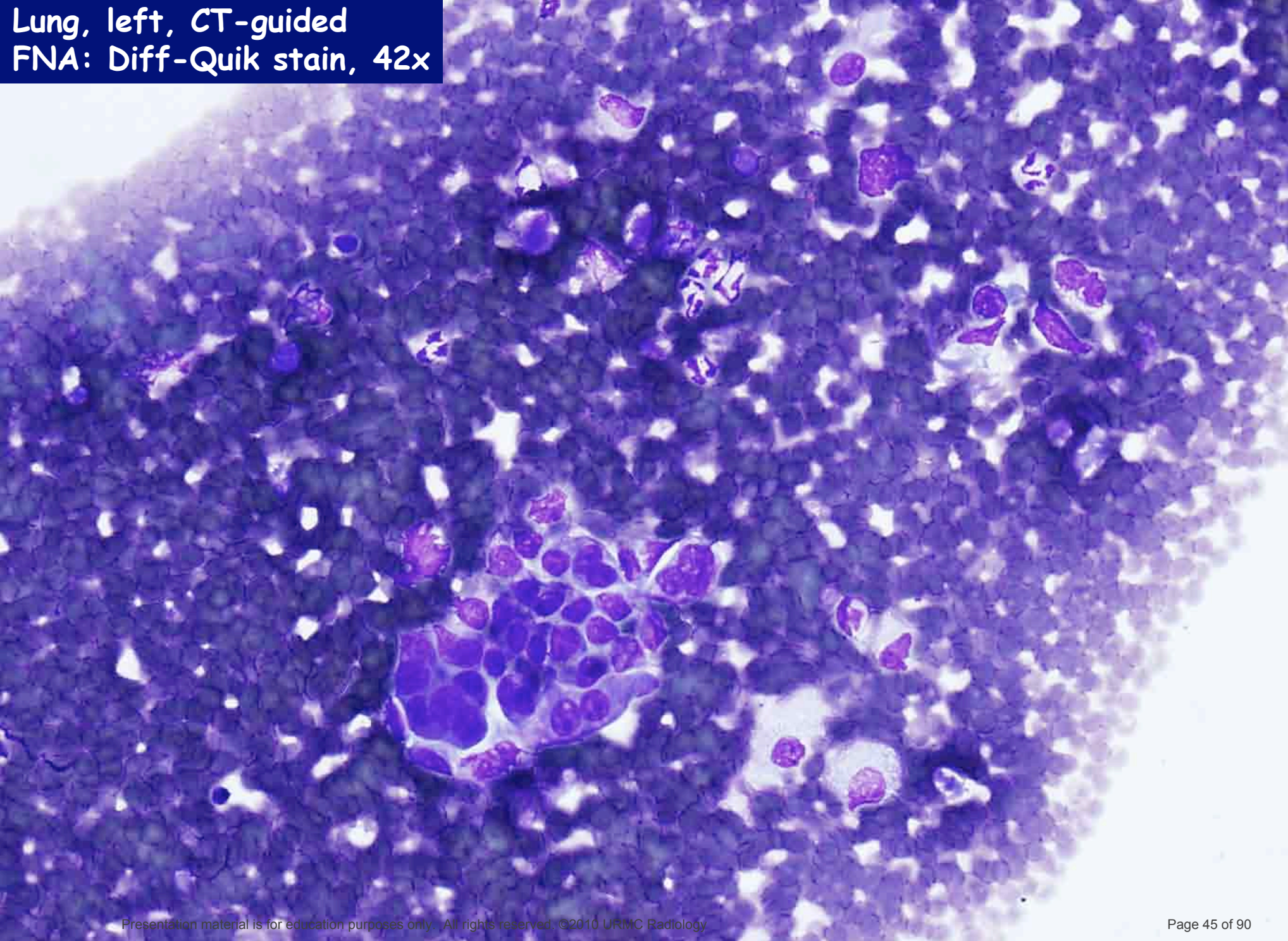
‡ History of smoking or of other known risk factors.

§ The risk of malignancy in this category (<1%) is substantially less than that in a baseline CT scan of an asymptomatic smoker.

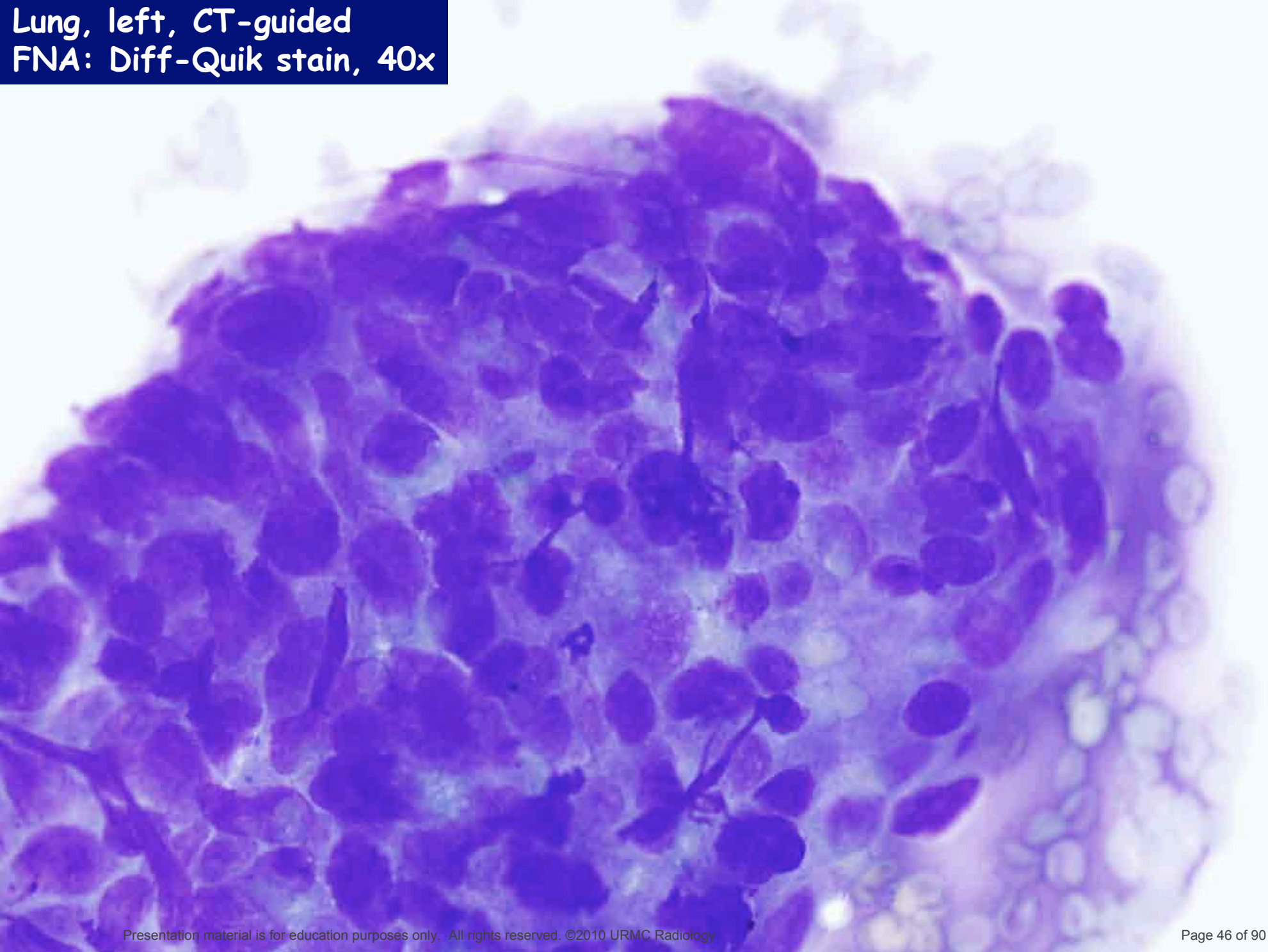
‖ Nonsolid (ground-glass) or partly solid nodules may require longer follow-up to exclude indolent adenocarcinoma.

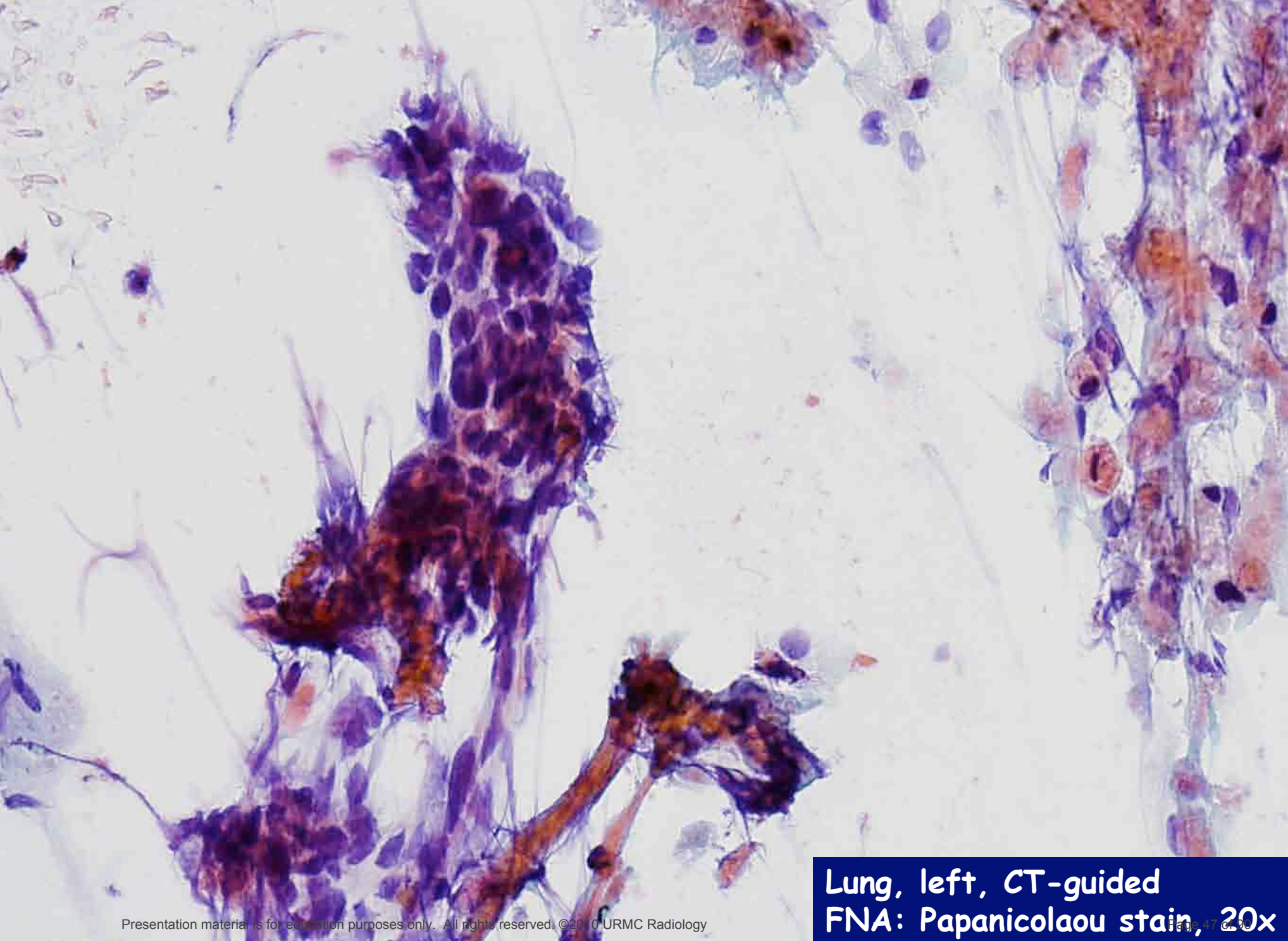


Lung, left, CT-guided
FNA: Diff-Quik stain, 42x



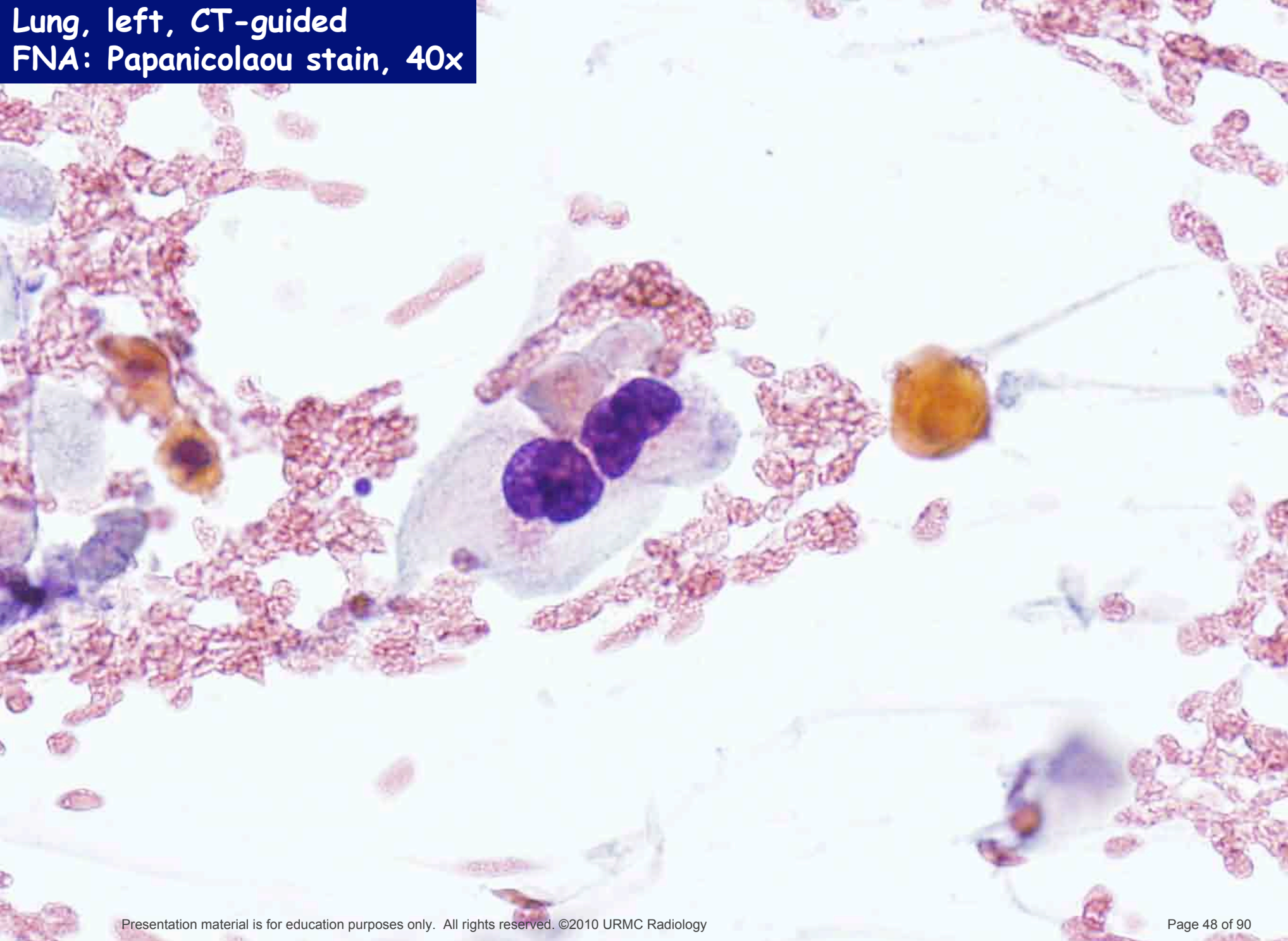
Lung, left, CT-guided
FNA: Diff-Quik stain, 40x



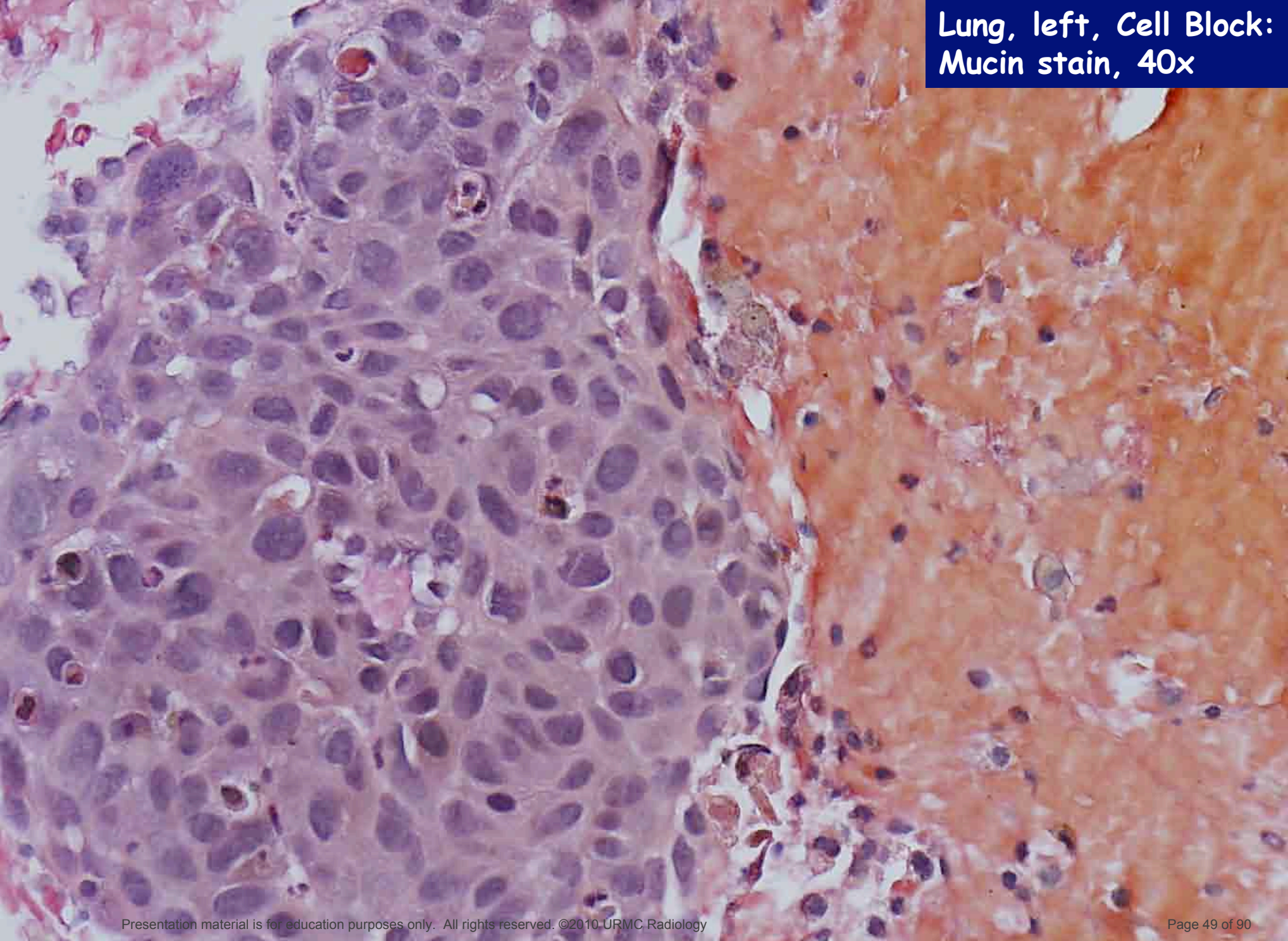


Lung, left, CT-guided
FNA: Papanicolaou stain, 20x

Lung, left, CT-guided
FNA: Papanicolaou stain, 40x



Lung, left, Cell Block: Mucin stain, 40x



Lung, left, CT-guided fine needle aspiration:

Malignant tumor cells present derived from squamous cell carcinoma.

Cell block and cytologic preparations examined.

Comment: Immunohistochemical stains are positive for CK 5/6 and p63, negative for TTF-1 and napsin A. Mucin histochemical stain is negative. The results support the diagnosis of squamous cell carcinoma.

Squamous Cell Carcinoma of Lung

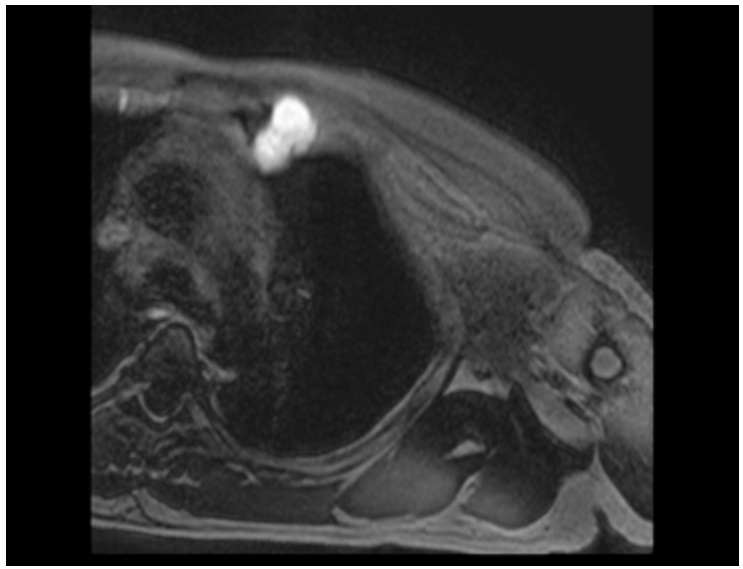
- Lung cancer leading cause cancer deaths in men and women in U.S. and world
- Squamous cell carcinoma 2nd most common type of lung Ca (30%)
- Risk factors include tobacco use, asbestos, TB, COPD, radon and second hand smoke exposure

Almost there…

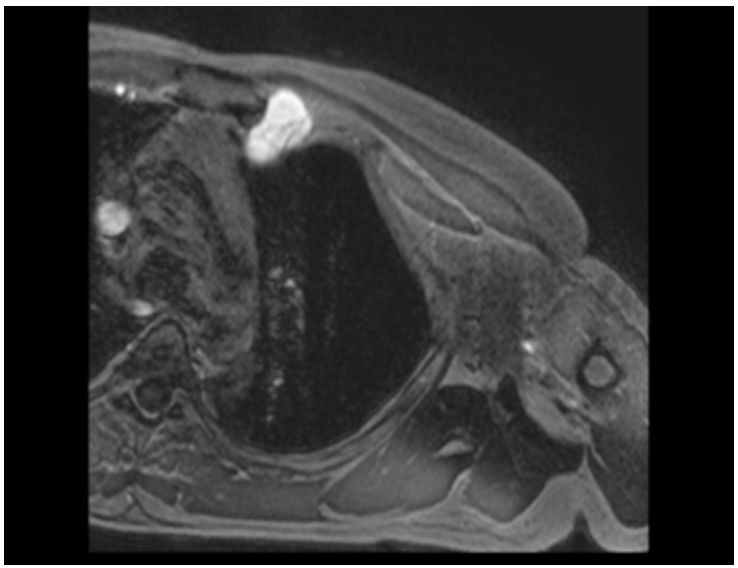
Case 4

- 45 year-old man with chest discomfort. History of rib resection in 2006 secondary to chondrosarcoma.

45 year old w/ chest discomfort. Hx of chondrosarcoma



T1 fat sat



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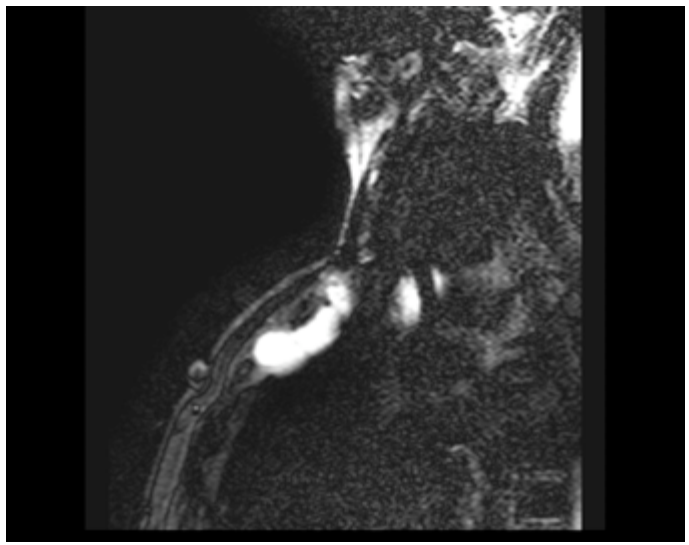

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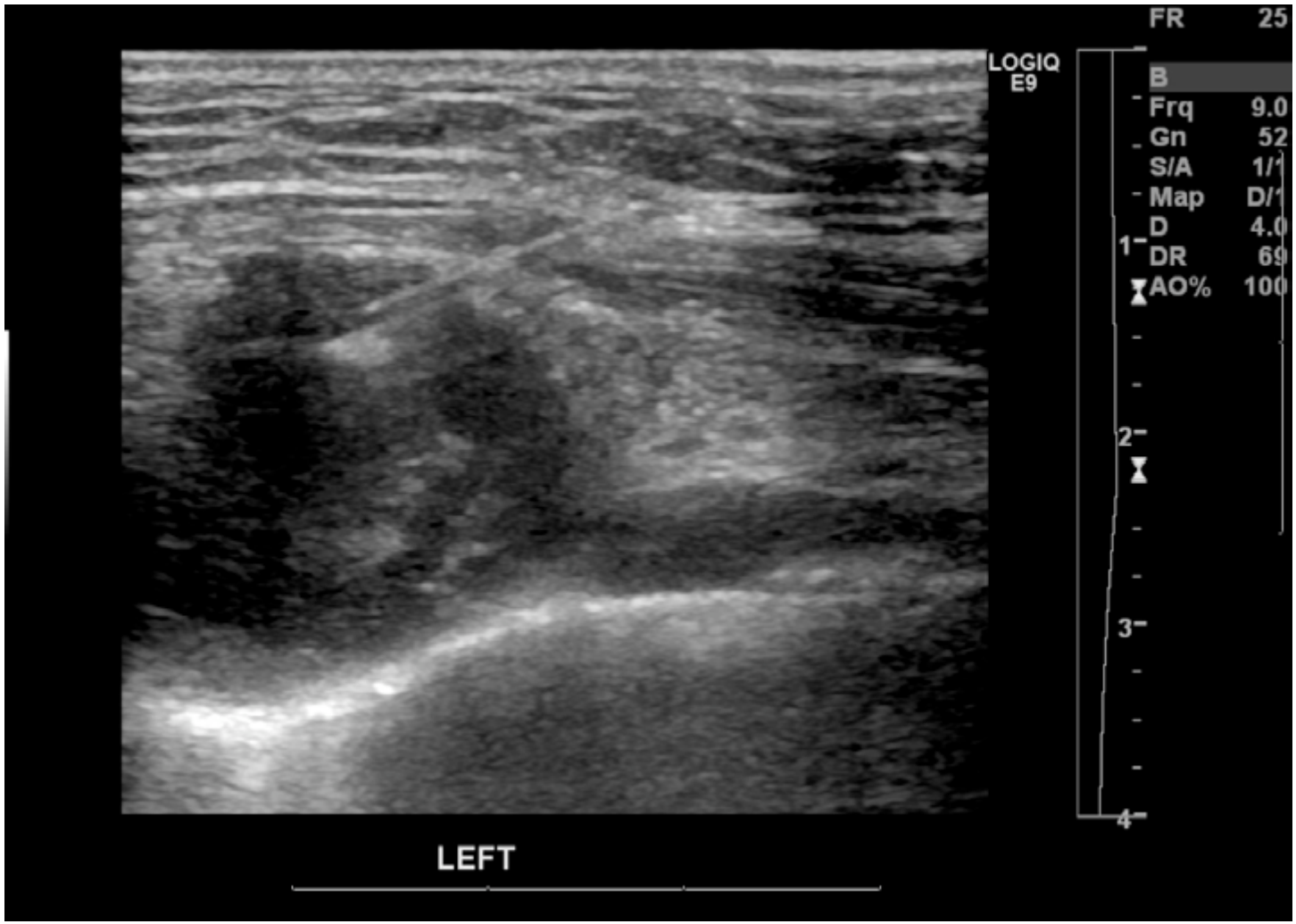
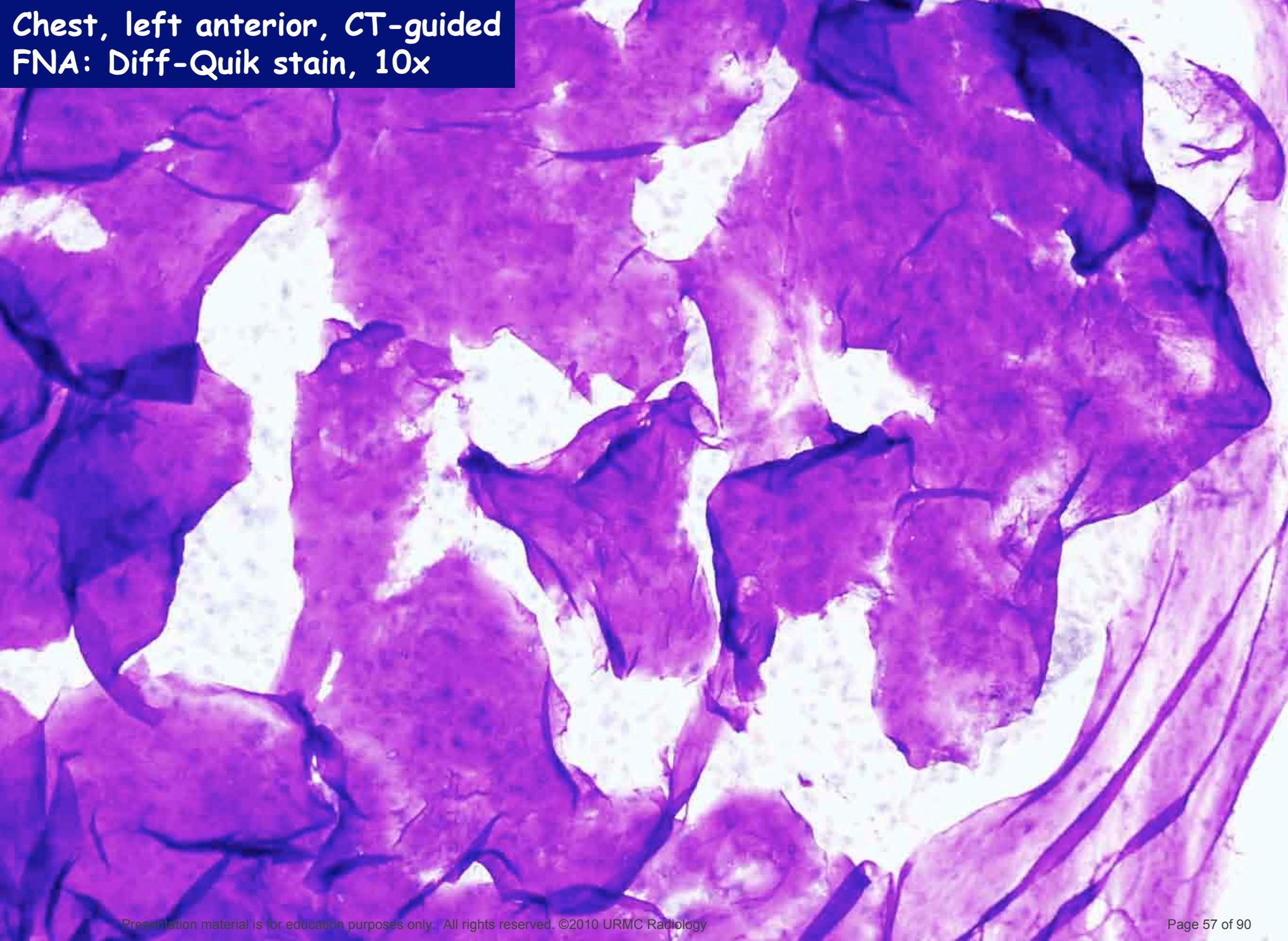
Differential: Cystic Chest Wall Lesion

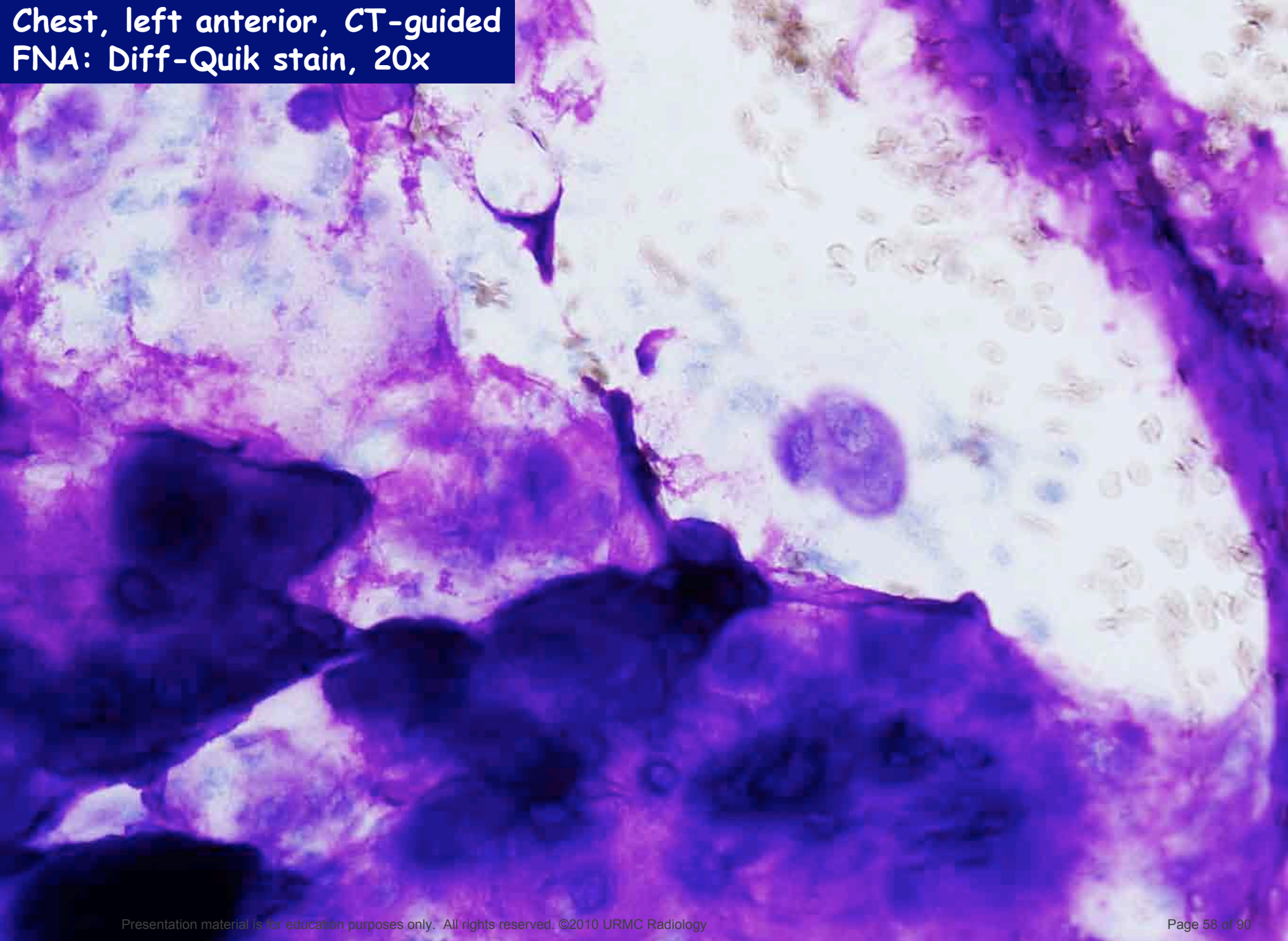
- Recurrent chondrosarcoma
- Abscess
- Seroma
- Hematoma
- Lymphocele



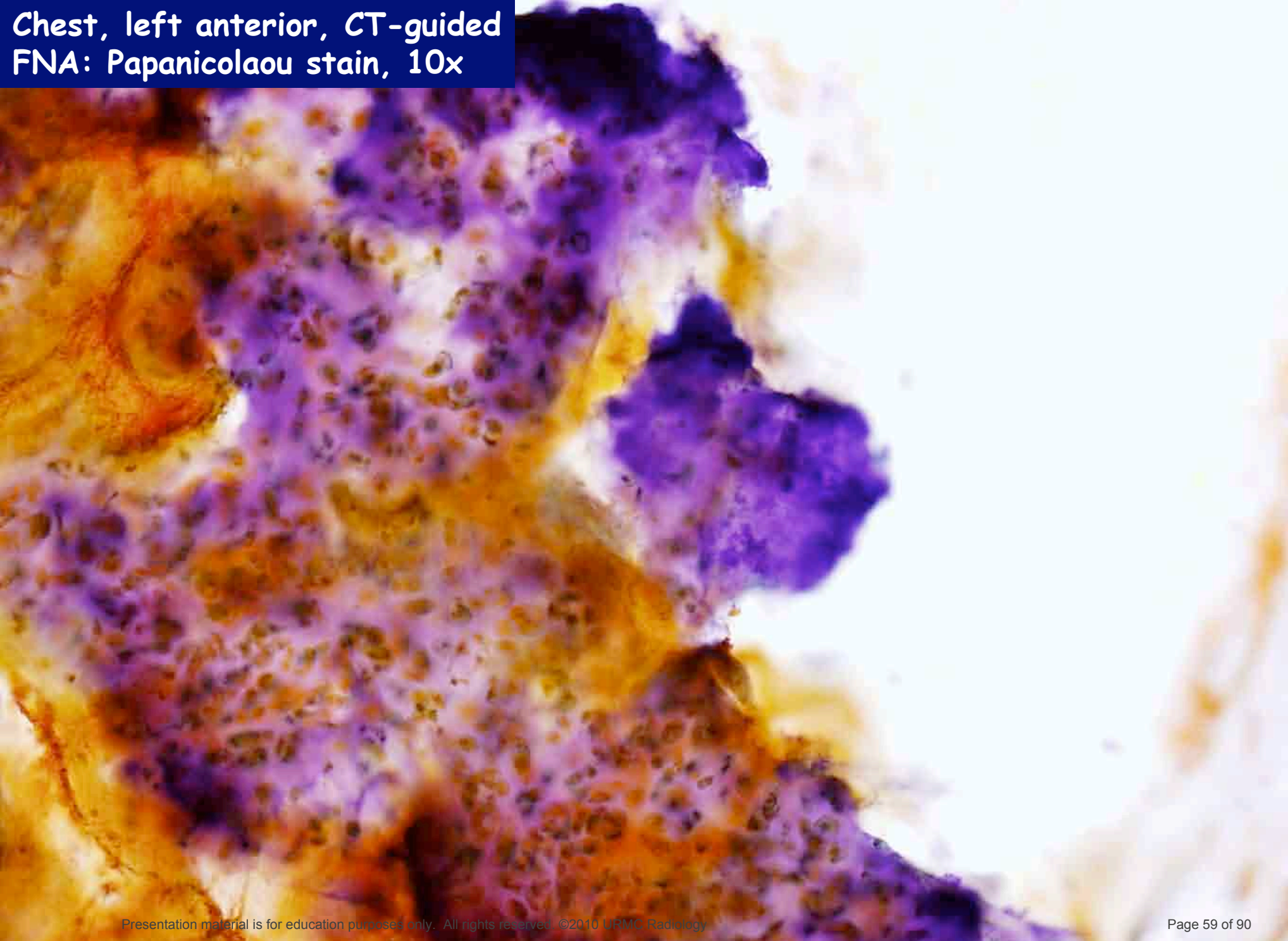
Chest, left anterior, CT-guided FNA: Diff-Quik stain, 10x



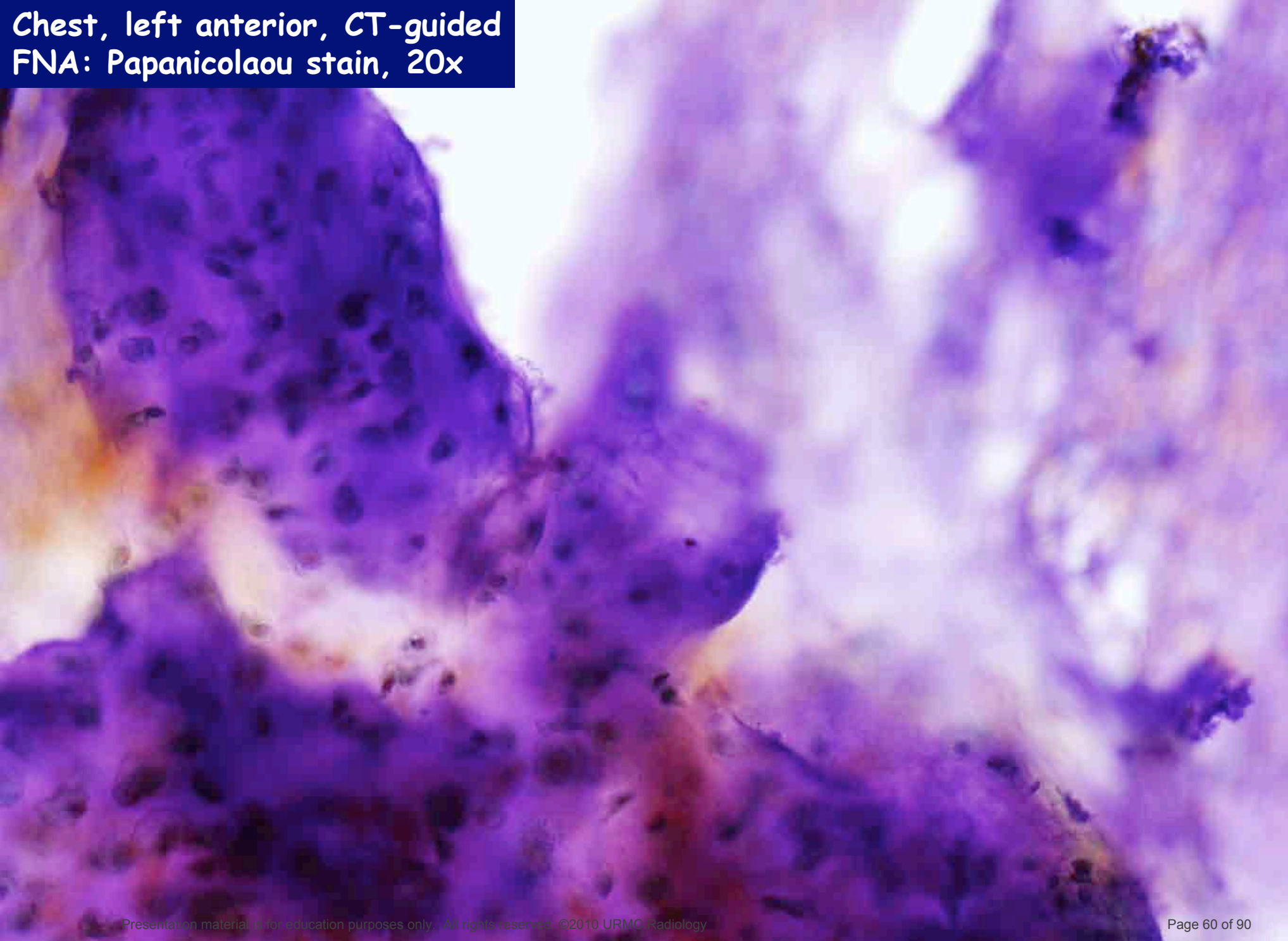
Chest, left anterior, CT-guided FNA: Diff-Quik stain, 20x



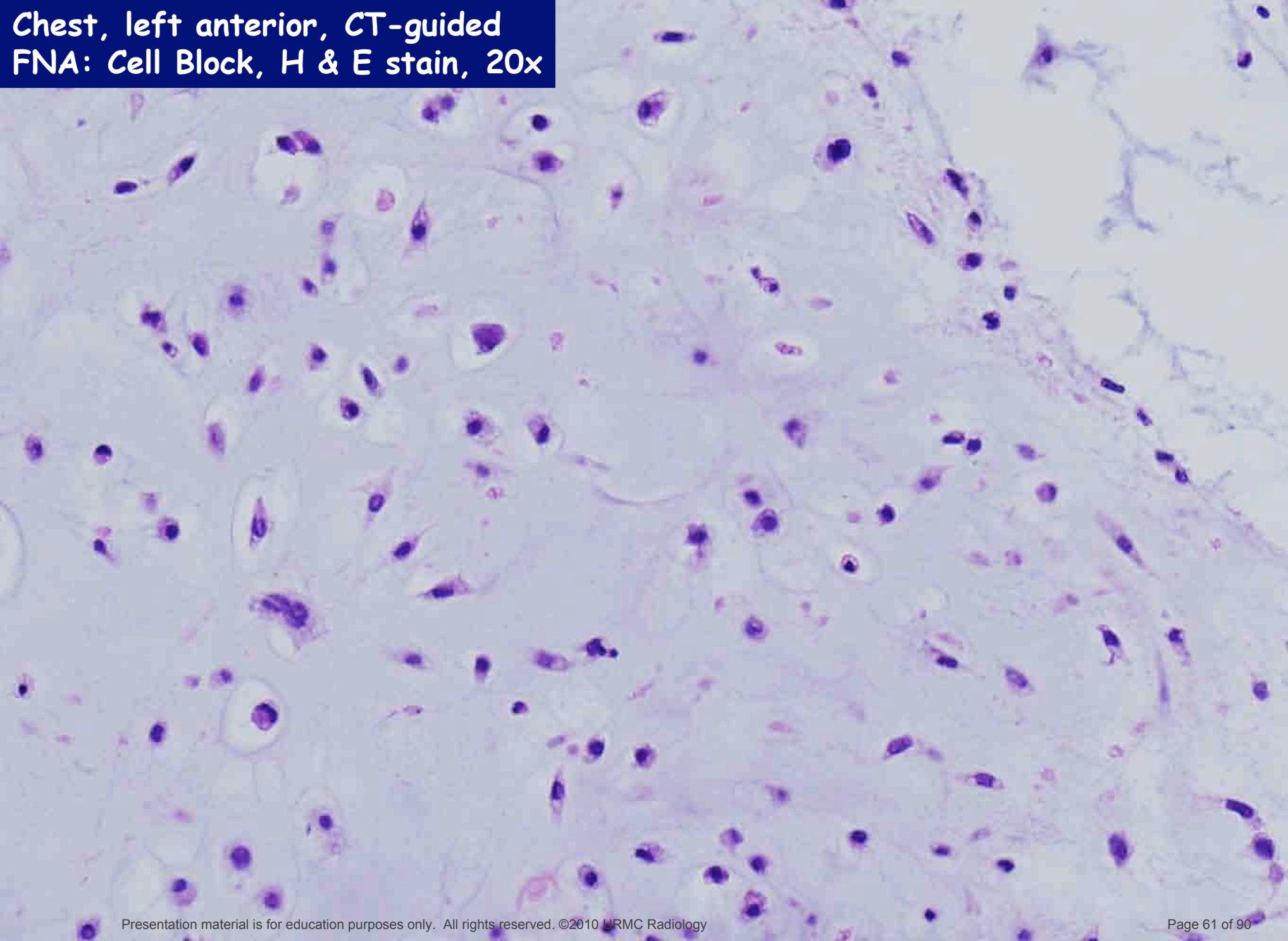
Chest, left anterior, CT-guided FNA: Papanicolaou stain, 10x



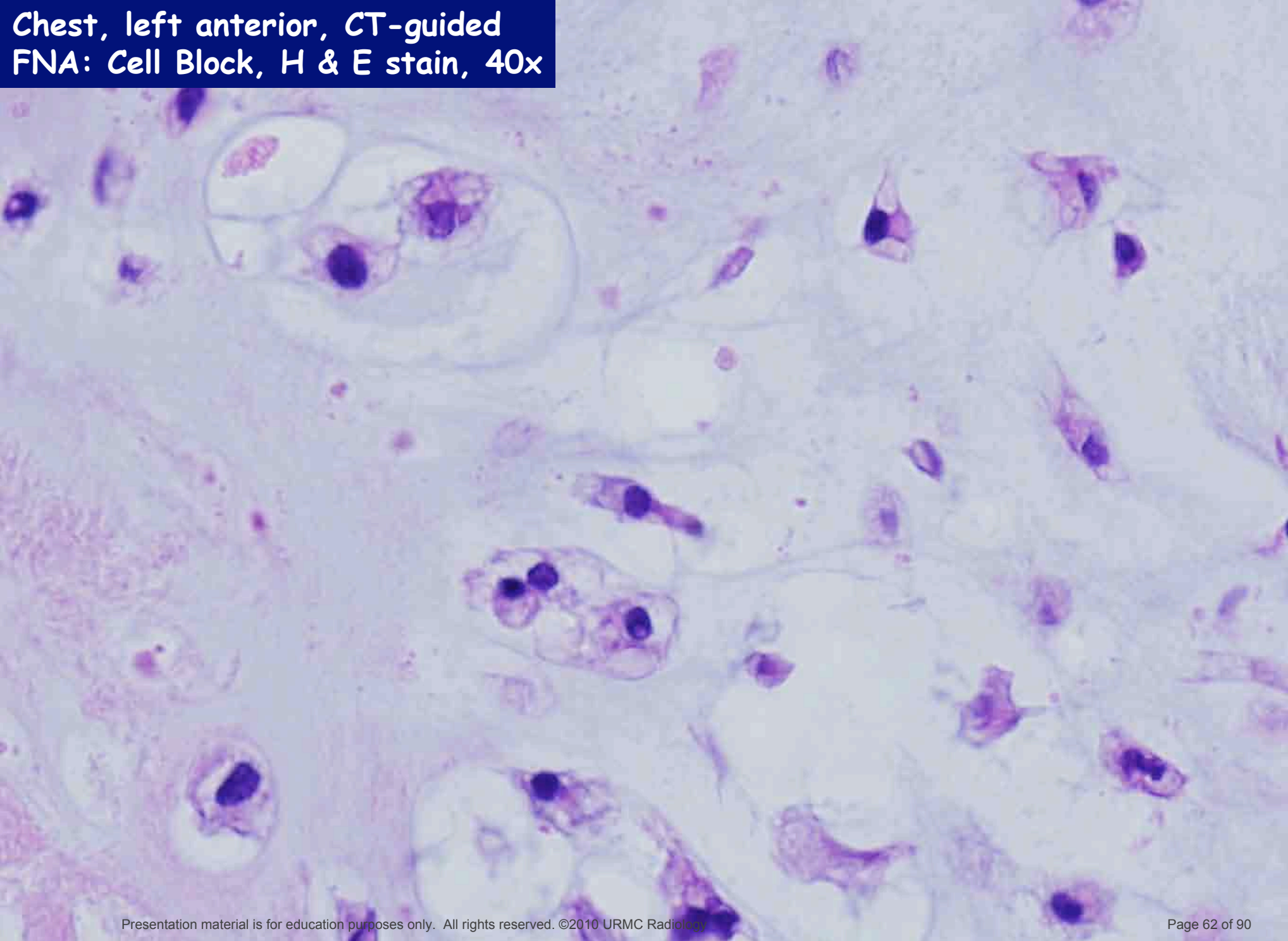
Chest, left anterior, CT-guided FNA: Papanicolaou stain, 20x



Chest, left anterior, CT-guided
FNA: Cell Block, H & E stain, 20x



Chest, left anterior, CT-guided FNA: Cell Block, H & E stain, 40x



Chest, left anterior, CT-guided fine needle aspiration:

Chondrosarcoma (metastatic/recurrent),
Grade II; with marked necrosis.

Cell block and cytologic preparations examined.

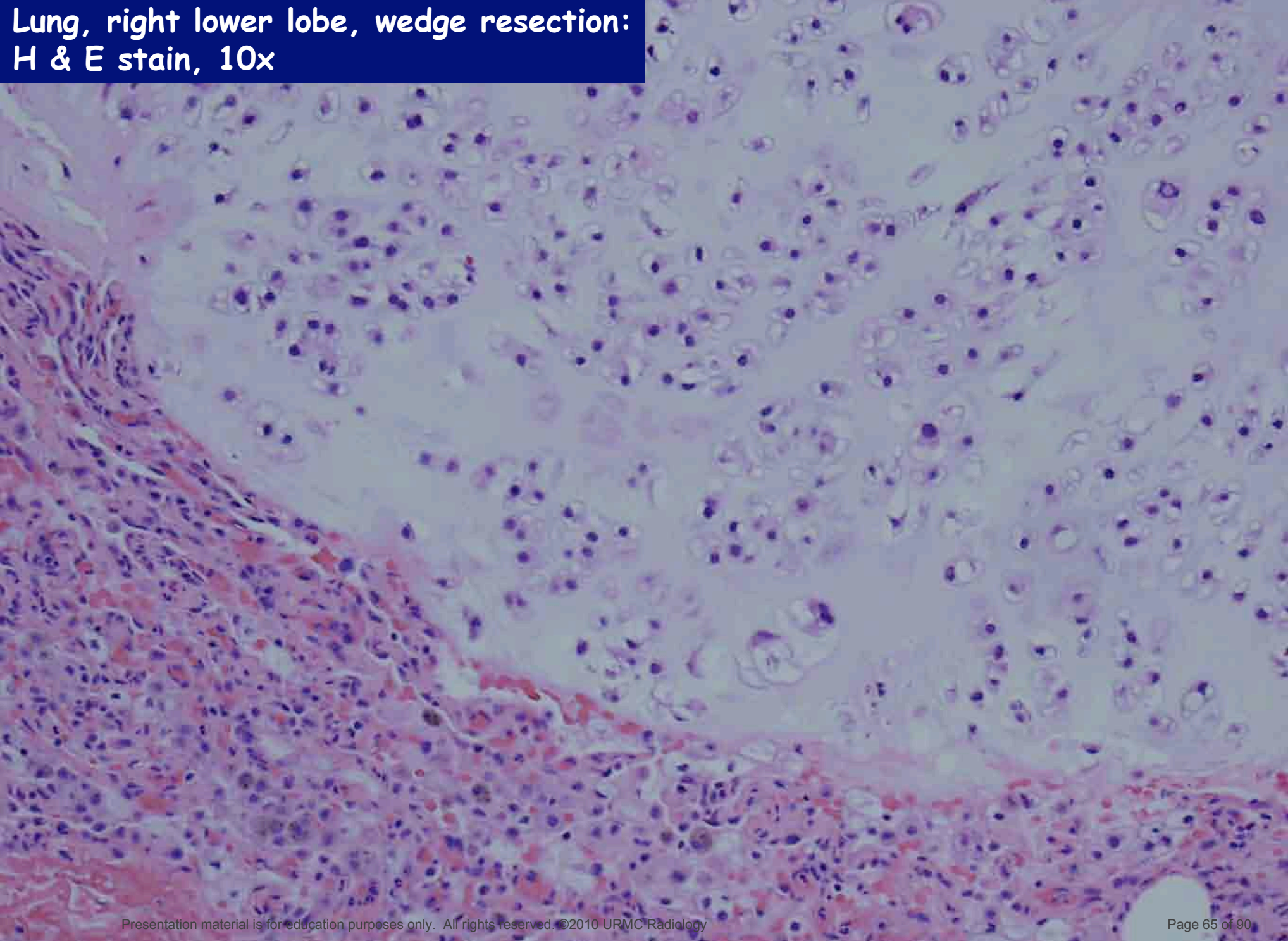
Comment: The specimen consists of malignant chondrocytes, some with double nuclei, in a chondroid matrix background. Approximately 50% of the tumor cells are non-viable (necrotic). Due to the location of the tumor, clinical correlation is recommended to determine whether this is metastatic or recurrent disease.

Lung, right lower lobe, wedge resection and partial lobectomy:

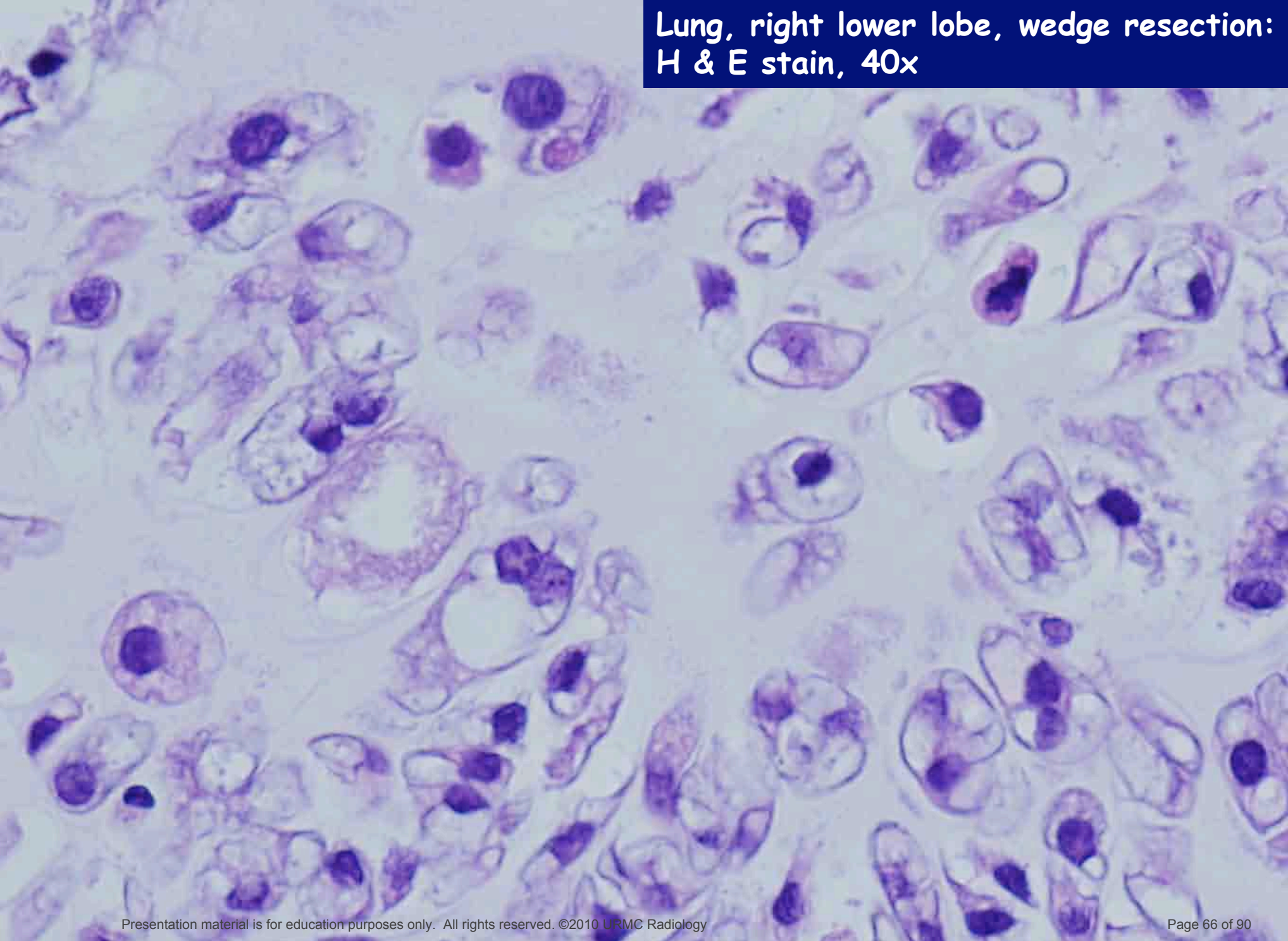
Metastatic chondrosarcoma, Grade II.

Patient's history includes chondrosarcoma involving left clavicle with invasion of skeletal muscle, 3.5 cm in largest dimension (6 years ago). Four years ago patient presented with chondrosarcoma, intermediate nuclear grade in left neck resection.. The mass was 5.5 cm with lymphovascular invasion.

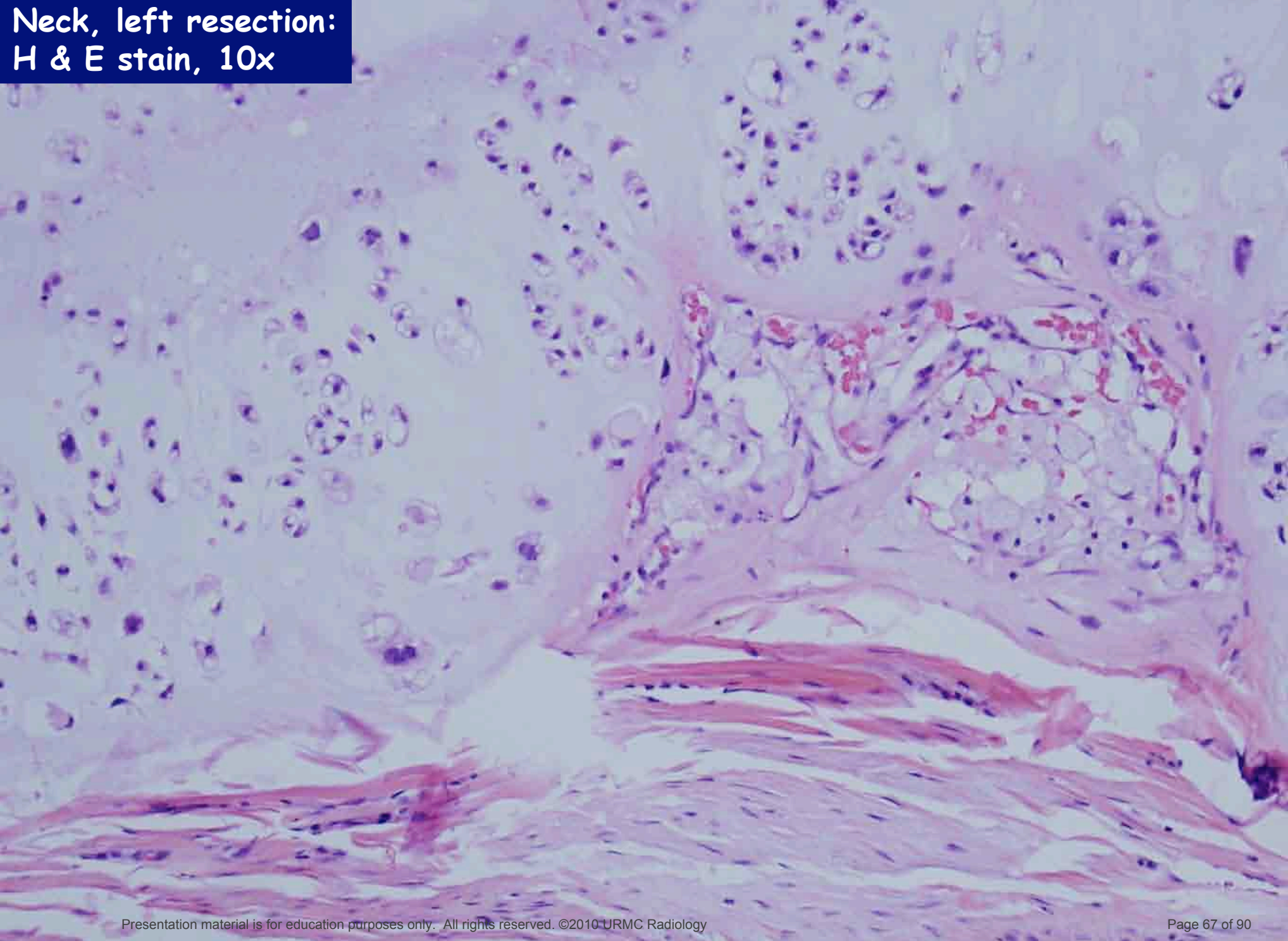
Lung, right lower lobe, wedge resection: H & E stain, 10x



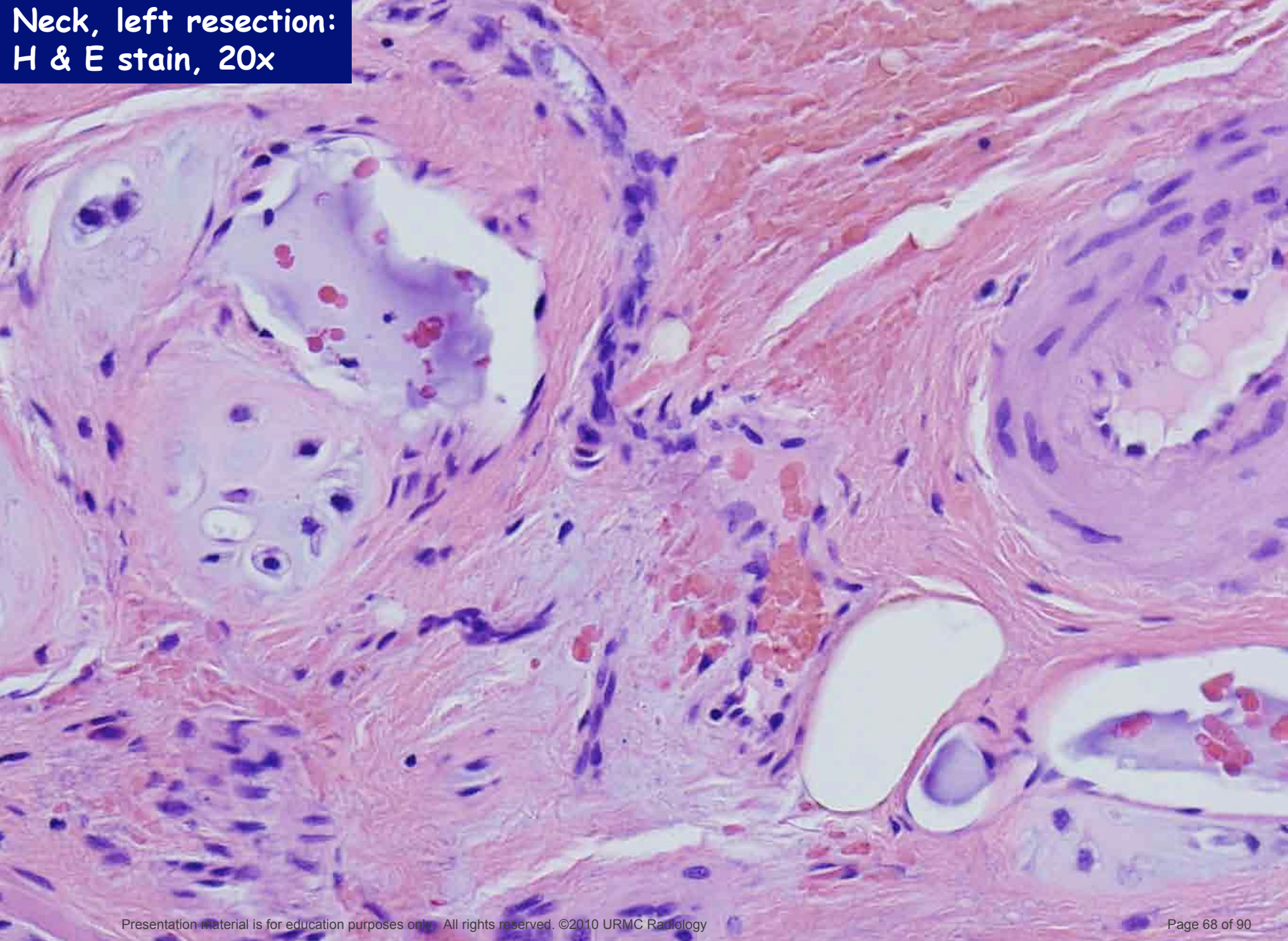
Lung, right lower lobe, wedge resection: H & E stain, 40x



Neck, left resection: H & E stain, 10x



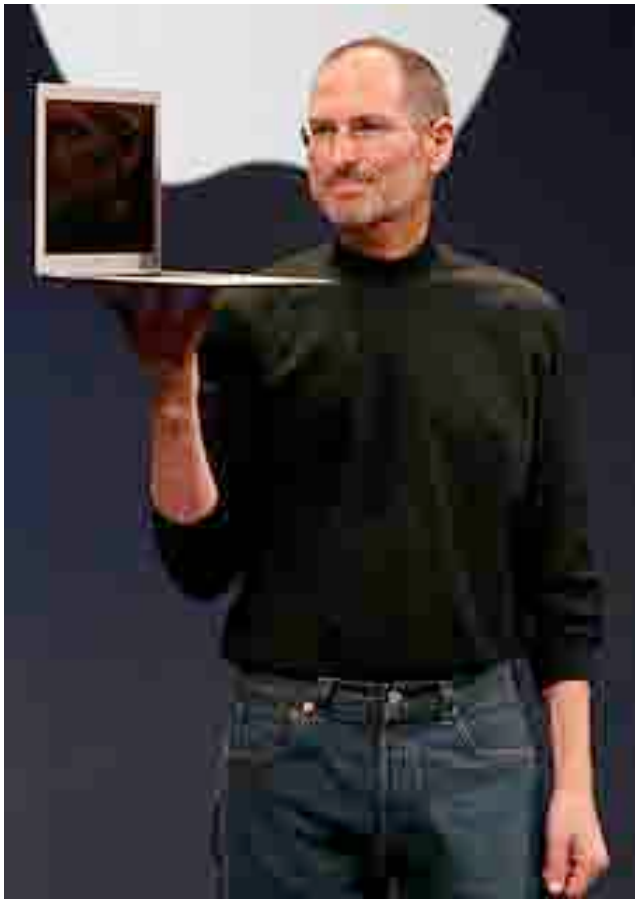
Neck, left resection: H & E stain, 20x



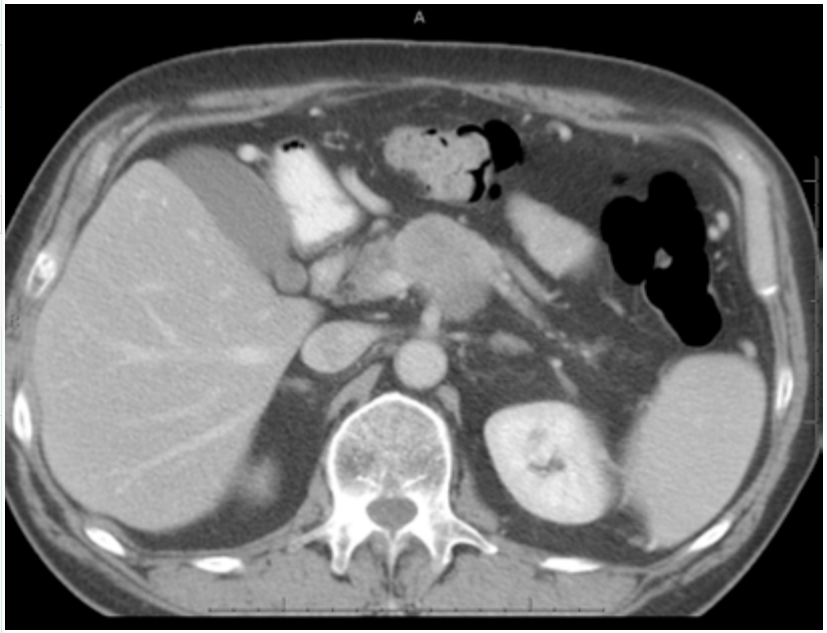
Chondrosarcoma

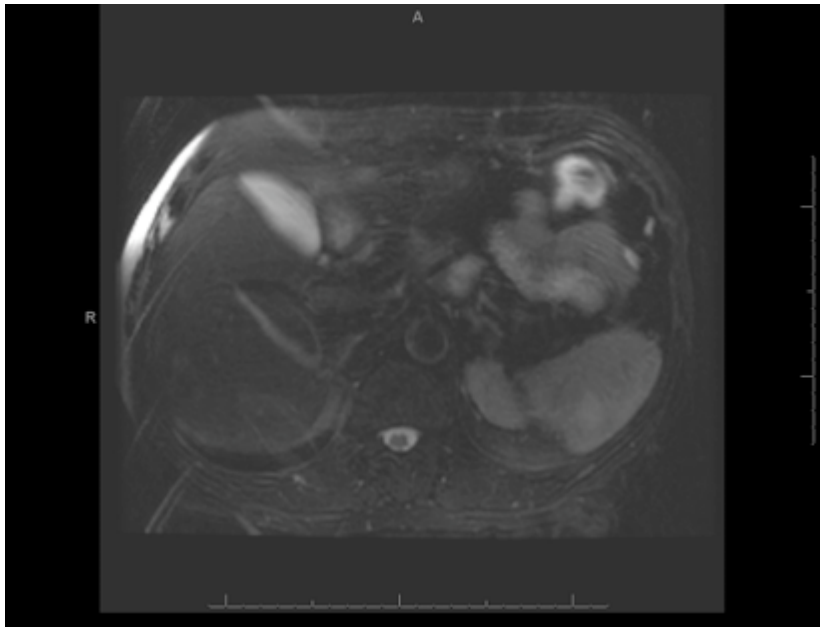
- Arise mostly in bone, less often soft tissue
- Produce a chondroid matrix rather than osteoid or bone
- Tumors are aggressive and destructive
- Graded I – III, important in treatment and prognosis

Case 5



- 65 year-old man presents with abdominal pain





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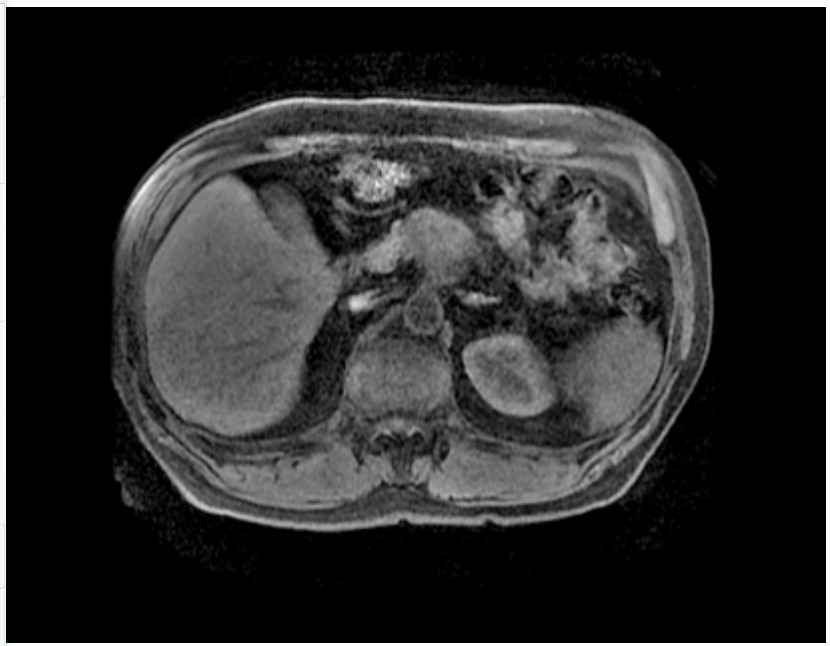


T1 fat sat

T1 fat sat w/ c

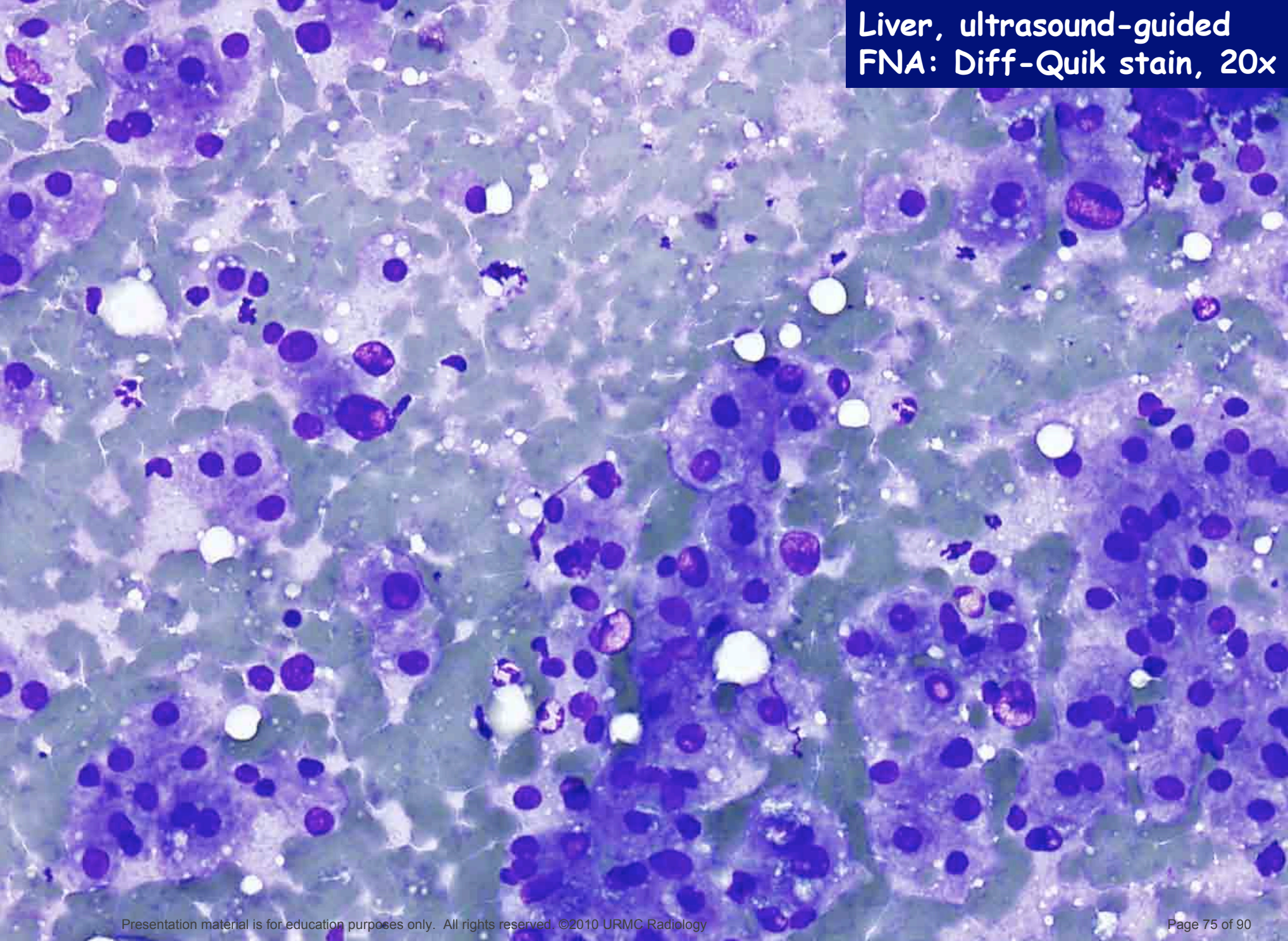
Differential: Solid lesions of the pancreas

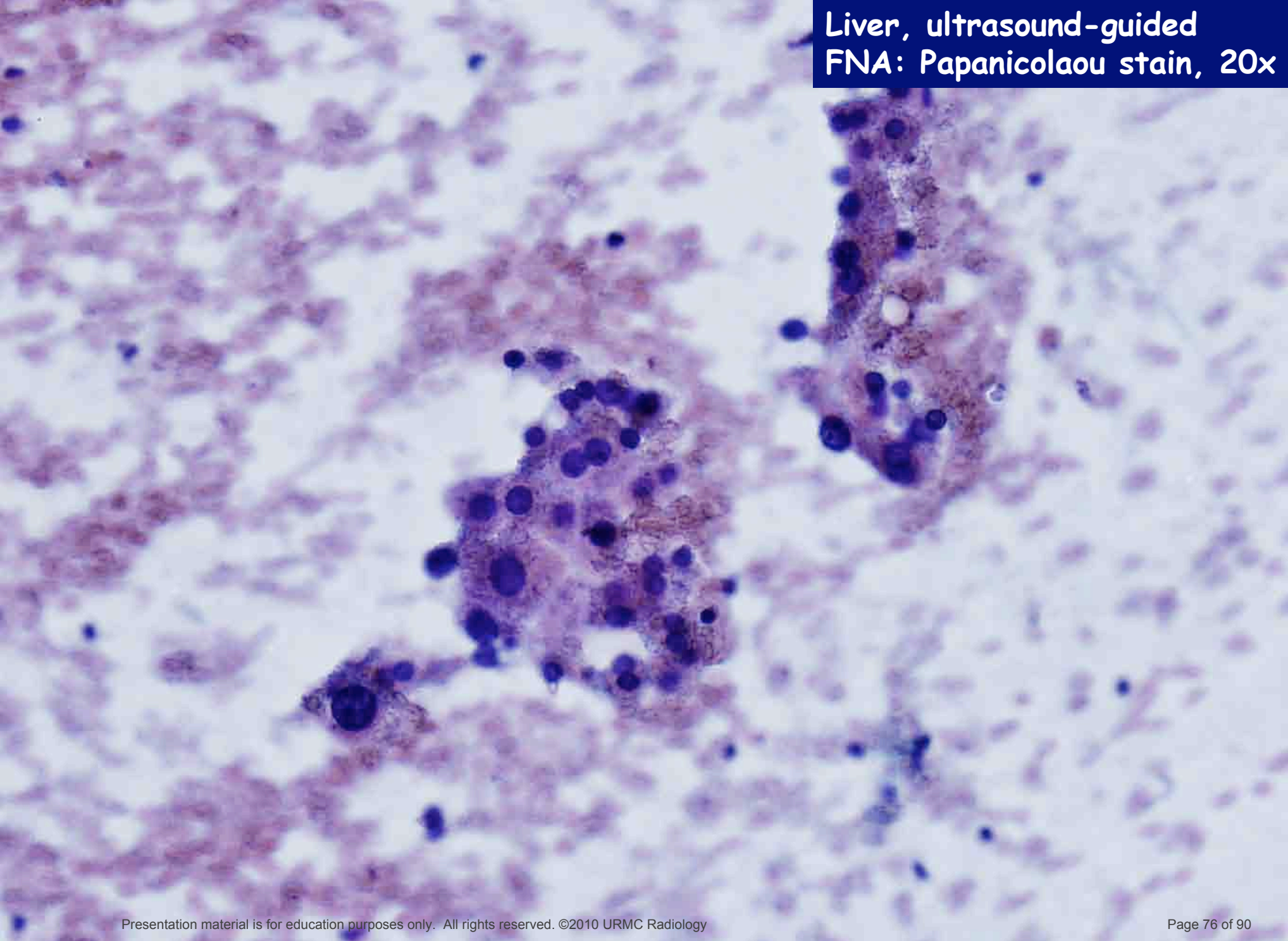
- Adenocarcinoma
- Chronic pancreatitis
- Neuroendocrine tumor
- Metastases
- Lymphoma

Octreotide Scan

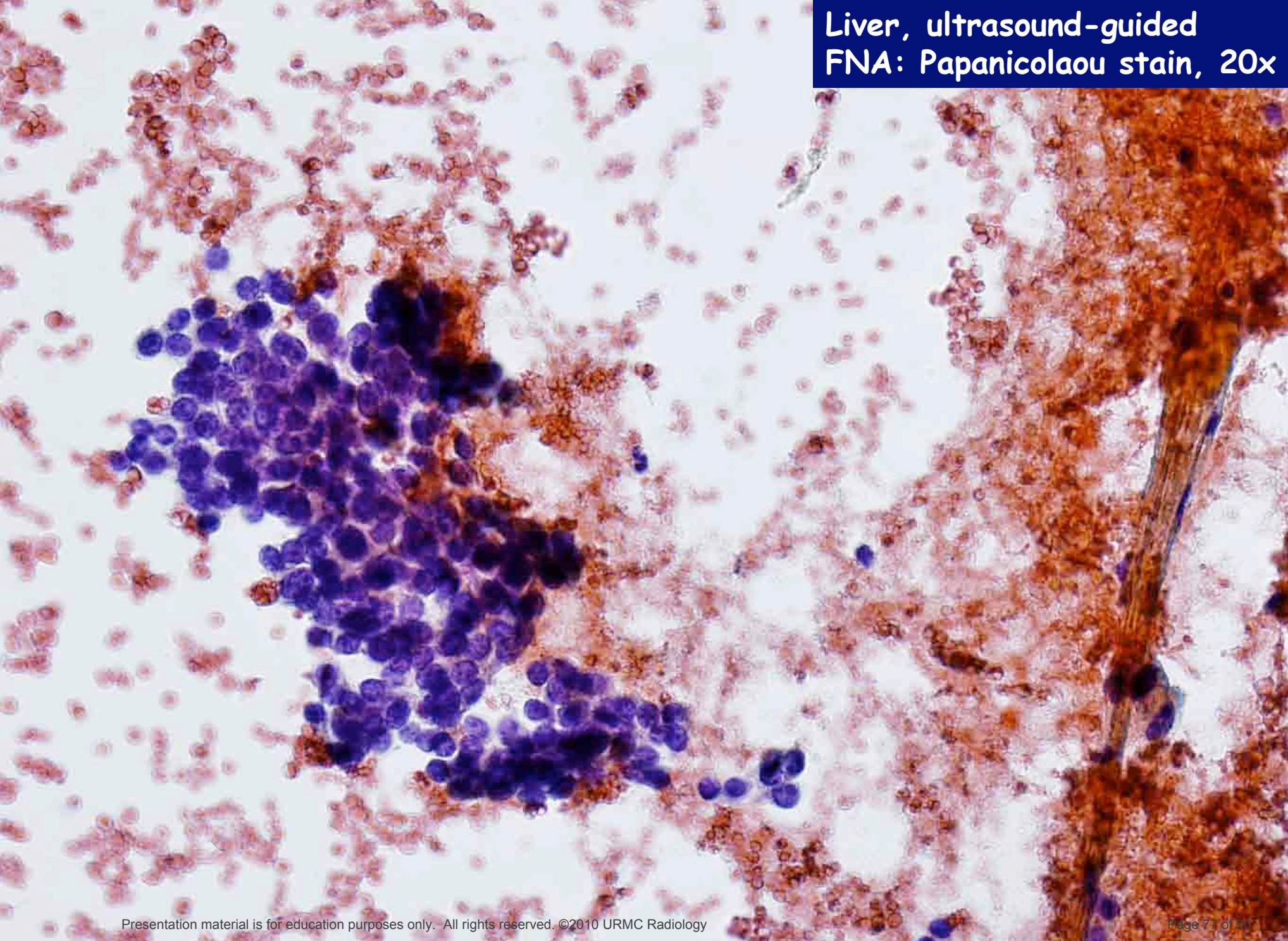
- Indium 111 labeled pentetreotide aka Octreoscan
- Binds somatostatin receptors, which are found in many neuroendocrine tumors
- Normal uptake in thyroid, liver, gallbladder, spleen, kidneys and bladder
- 5 different subtypes of somatostatin receptors w/ various expression of these receptors on tumors

Site of Origin	Tumor	Sensitivity (%)
GI	Carcinoid	89
Pancreas	Islet cell carcinoma:	
	Gastrinoma	100
	Glucagonoma	100
	Insulinoma	42
	VIPoma	100
Adrenal Medulla	Pheochromocytoma	86
Pituitary	Pituitary adenoma	71
Lung	Small cell carcinoma	100
CNS	Paraganglioma	100

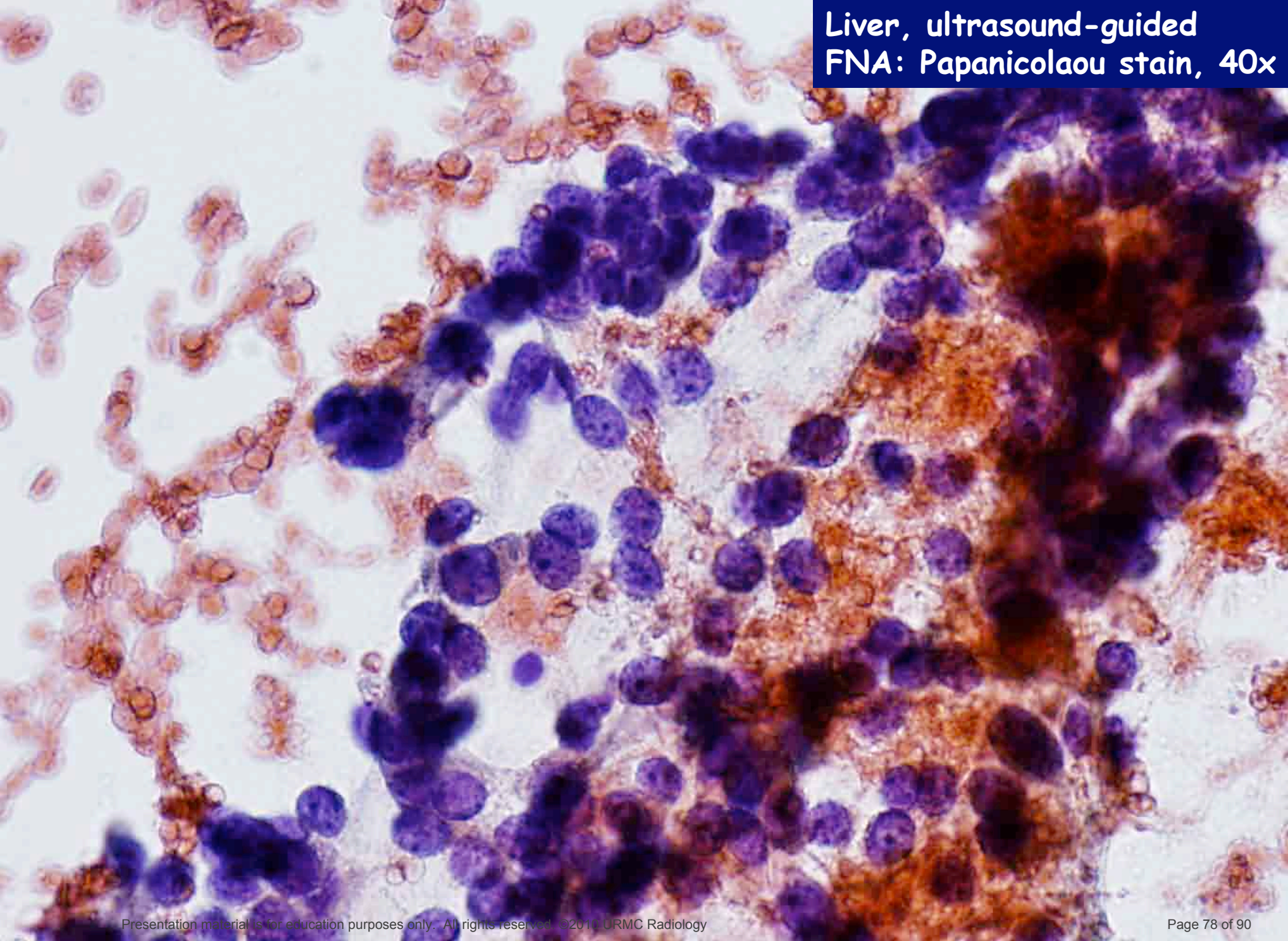


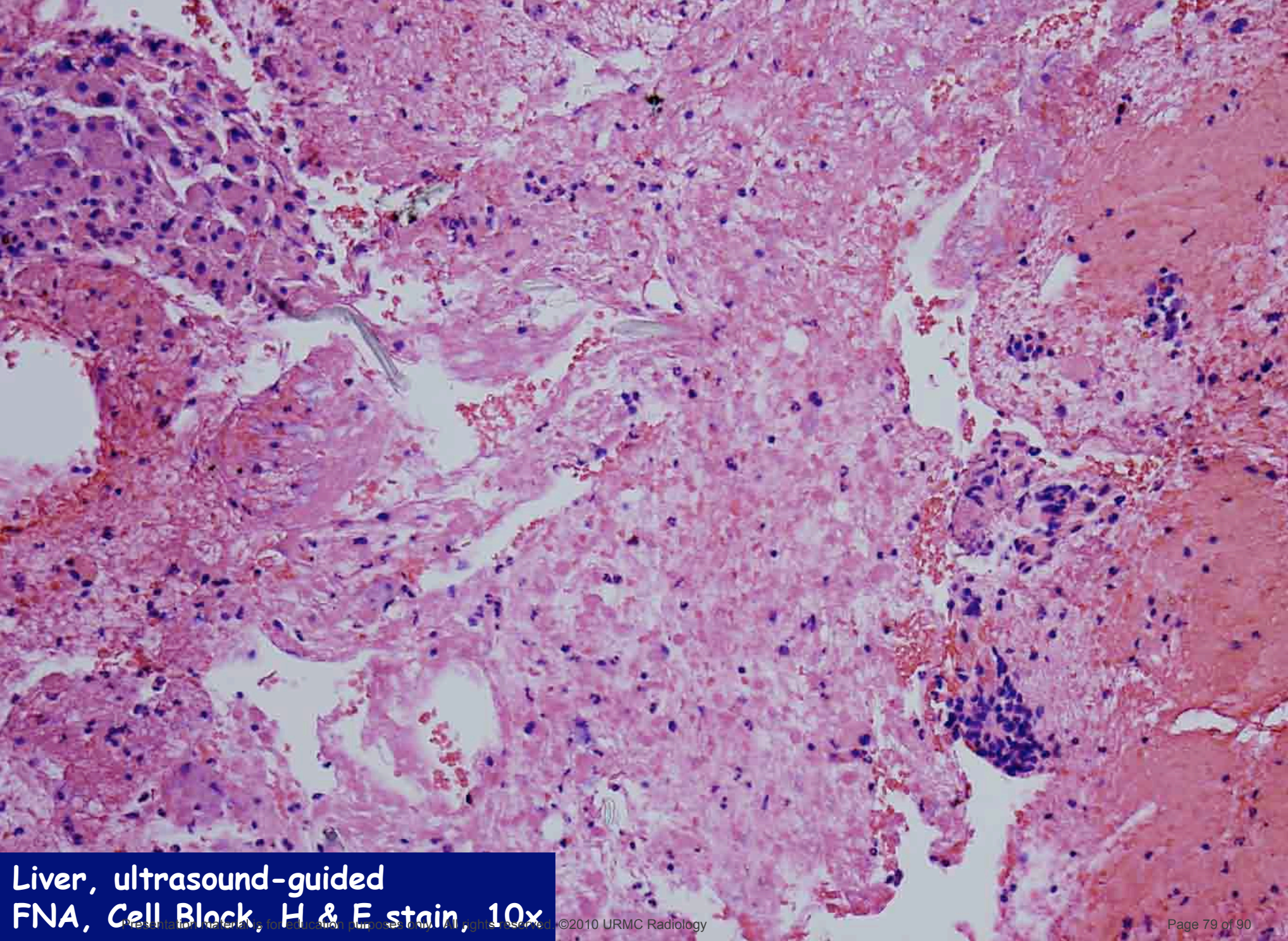


Liver, ultrasound-guided FNA: Papanicolaou stain, 20x



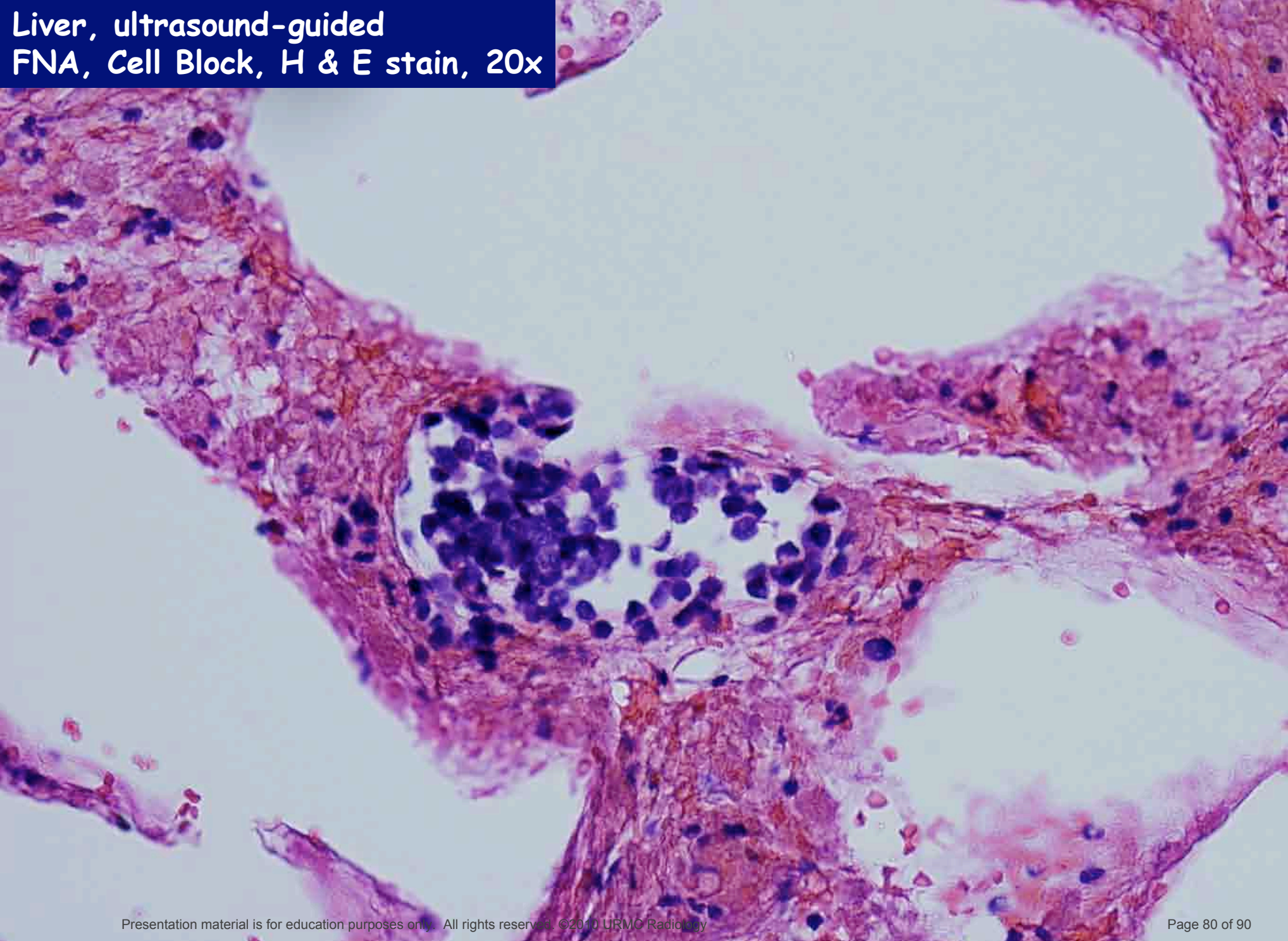
Liver, ultrasound-guided FNA: Papanicolaou stain, 40x





Liver, ultrasound-guided
FNA, Cell Block, H & E stain, 10x

Liver, ultrasound-guided FNA, Cell Block, H & E stain, 20x



Liver, ultrasound-guided fine needle aspiration:

Cellular evidence of neuroendocrine neoplasm.

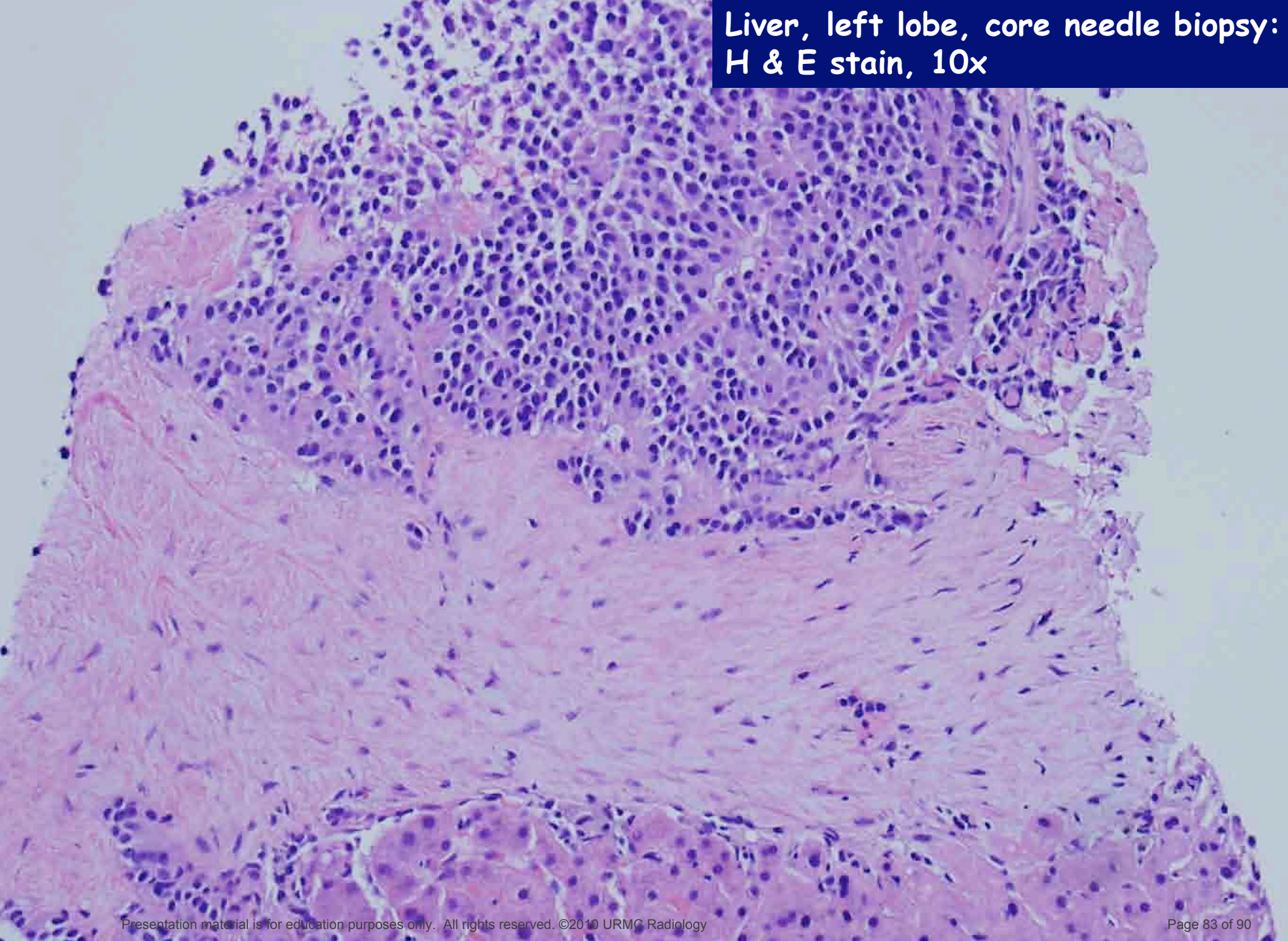
Cell block and cytologic preparations examined.

Liver, left lobe, core needle biopsy:

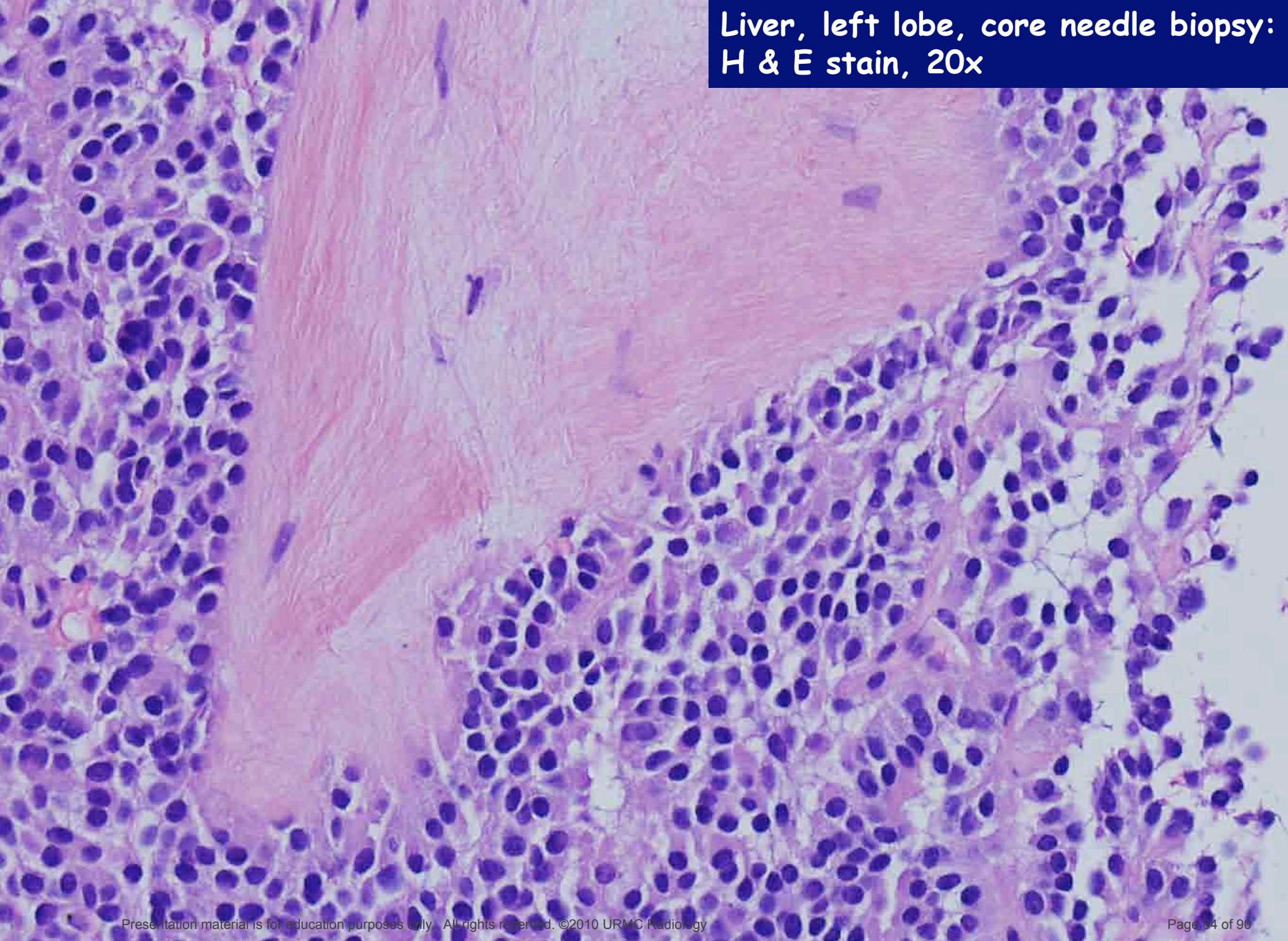
Well-differentiated neuroendocrine carcinoma.

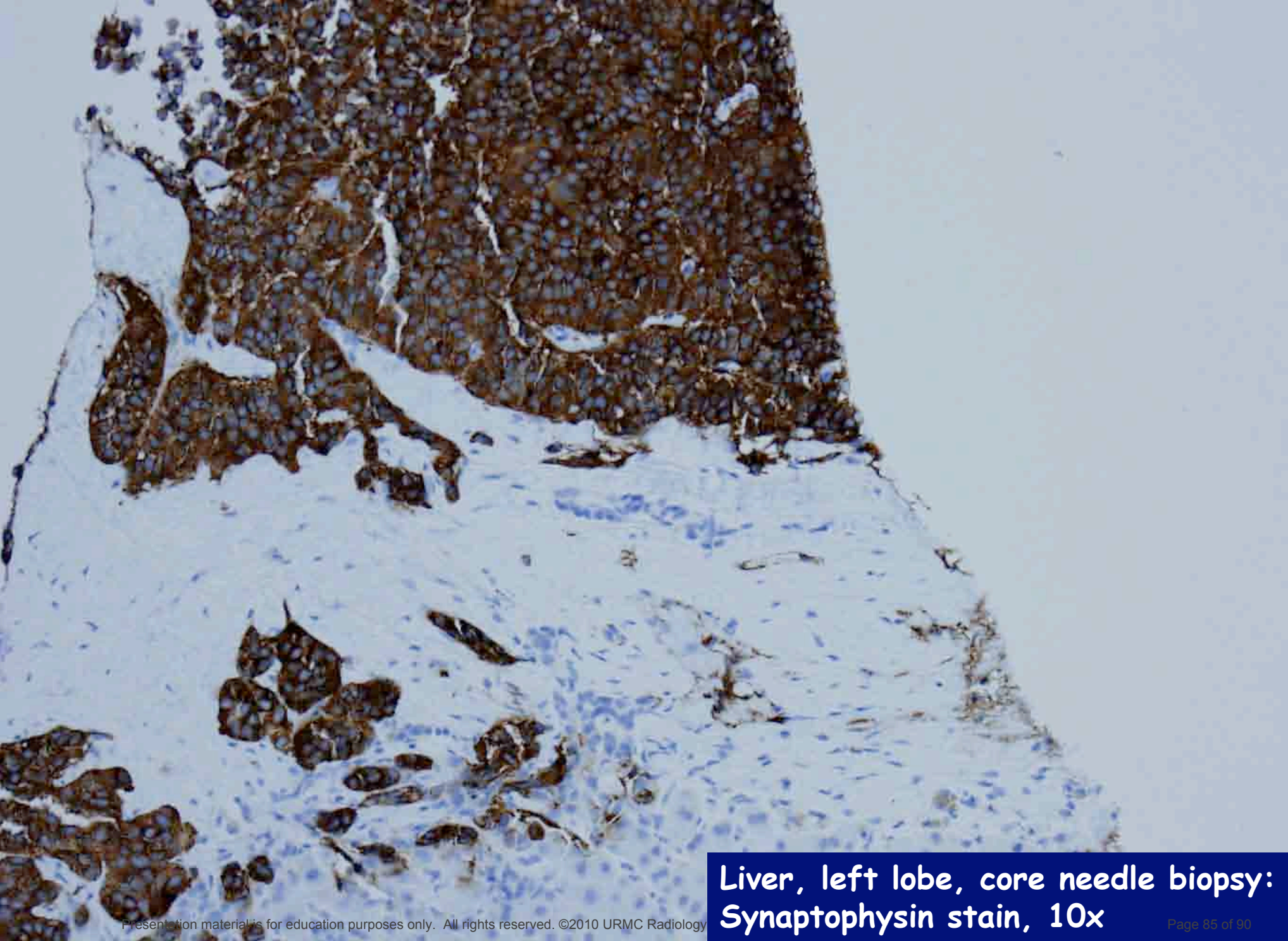
Comment: The neoplasm is strongly positive for synaptophysin supporting a neuroendocrine derivation. In view of the history of pancreatic mass, the carcinoma is consistent with a metastasis from pancreatic endocrine tumor.

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



Liver, left lobe, core needle biopsy:
H & E stain, 20x





Liver, left lobe, core needle biopsy: Synaptophysin stain, 10x

Pancreatic endocrine tumor

- Tumors of endocrine pancreas arise from stem cells located within the ductal epithelium of the exocrine pancreas
- < 5% of all pancreatic neoplasms
- Commonly located in body or tail
- Slow-growing tumors, most are solitary
- Most tumors occur in adults

Pancreatic endocrine tumor

- Tumors occur in sporadic form or as part of multiple endocrine neoplasia (MEN)1 syndrome
- Prognosis of patients with pancreatic endocrine tumors is predicted with presence or absence of liver metastases

Just in case…

- Patrick Swayze- pancreatic adenocarcinoma
- Humphrey Bogart- esophageal carcinoma
- Peter Jennings- bronchogenic carcinoma
- Ted Kennedy Jr.- chondrosarcoma
- Steve Jobs- neuroendocrine tumor of the pancreas

References

- Covidien. Clinical Atlas of Imaging Applications: Octreoscan. 2008.
- Emedicine
- Ziessman, H. et. al. The Requisites: Nuclear Medicine. 2006.

Thanks for your attention!