INTERESTING CASE PRESENTATION

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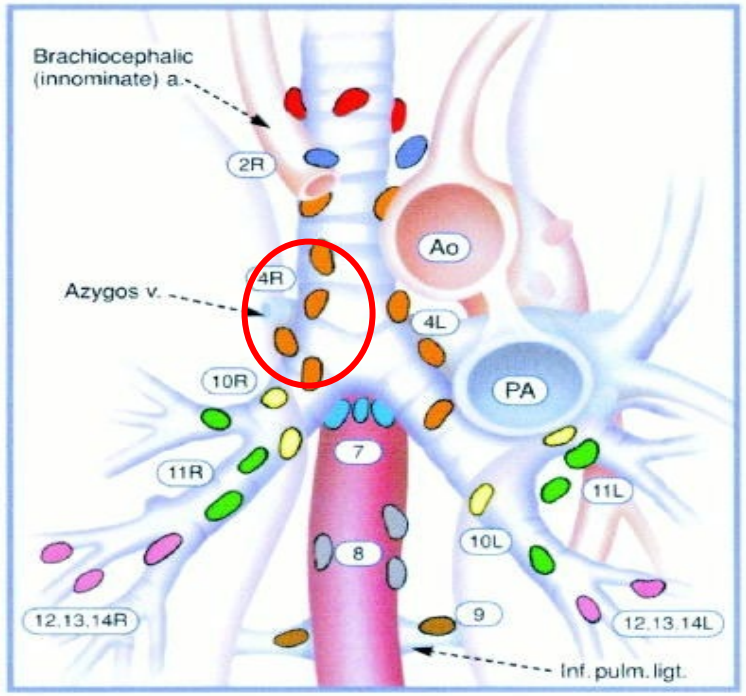
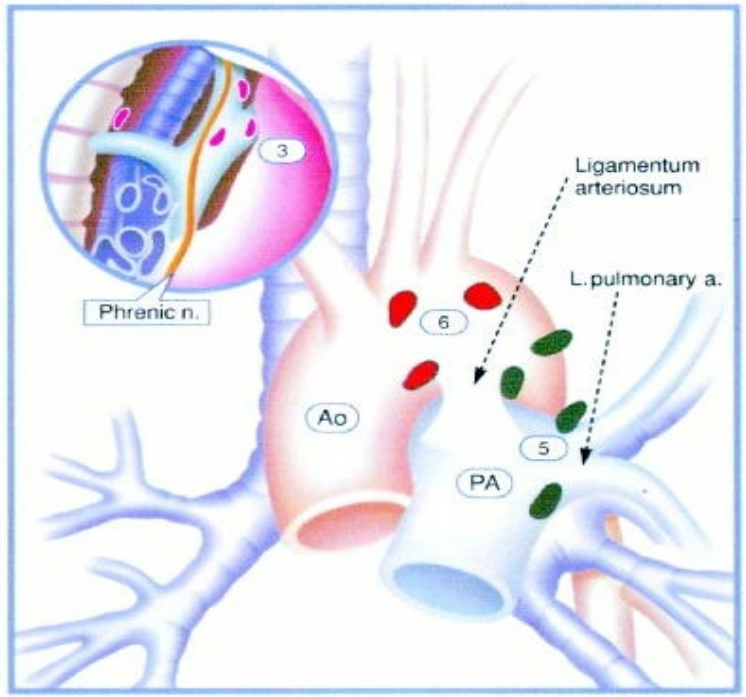
Board Member IAC

Chair; IAC CT Board Examination

CASE 1:

- 51-year-old woman
- Slowly enlarging paratracheal lymph node (4R)
- History of breast carcinoma – 2 years ago
- Smoking history
- Lymph node, 4R, endobronchial ultrasound-guided fine needle aspiration





Superior Mediastinal Nodes

- **1** Highest Mediastinal
- **2** Upper Paratracheal
- **3** Pre-vascular and Retrotracheal
- **4** Lower Paratracheal (including Azygos Nodes)

N_2 = single digit, ipsilateral
N_3 = single digit, contralateral or supraclavicular

Aortic Nodes

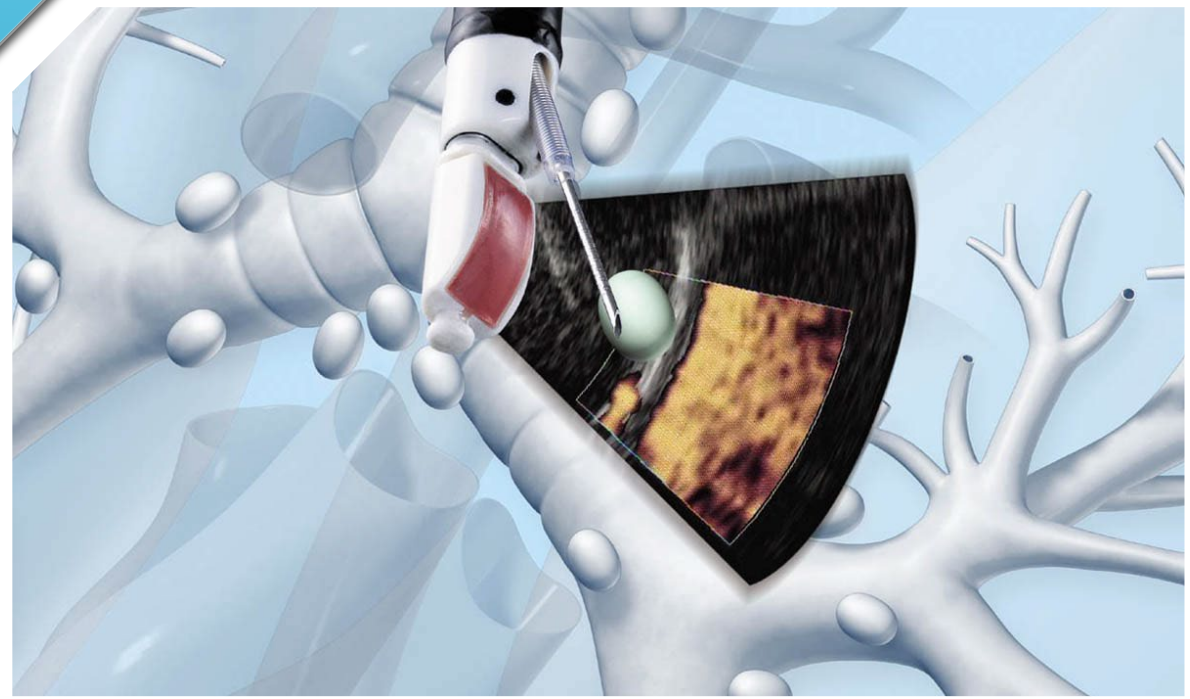
- **5** Subaortic (A-P window)
- **6** Para-aortic (ascending aorta or phrenic)

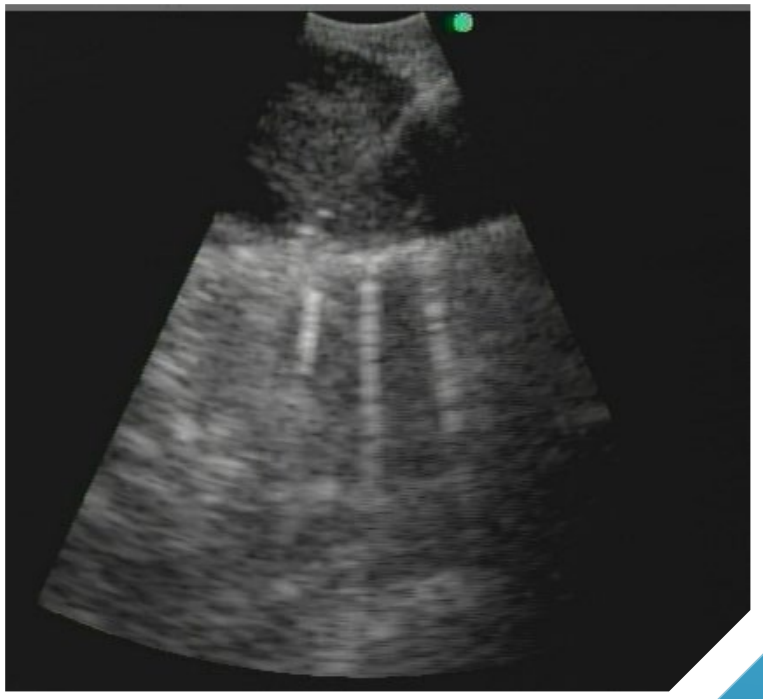
Inferior Mediastinal Nodes

- **7** Subcarinal
- **8** Paraesophageal (below carina)
- **9** Pulmonary Ligament

N_1 Nodes

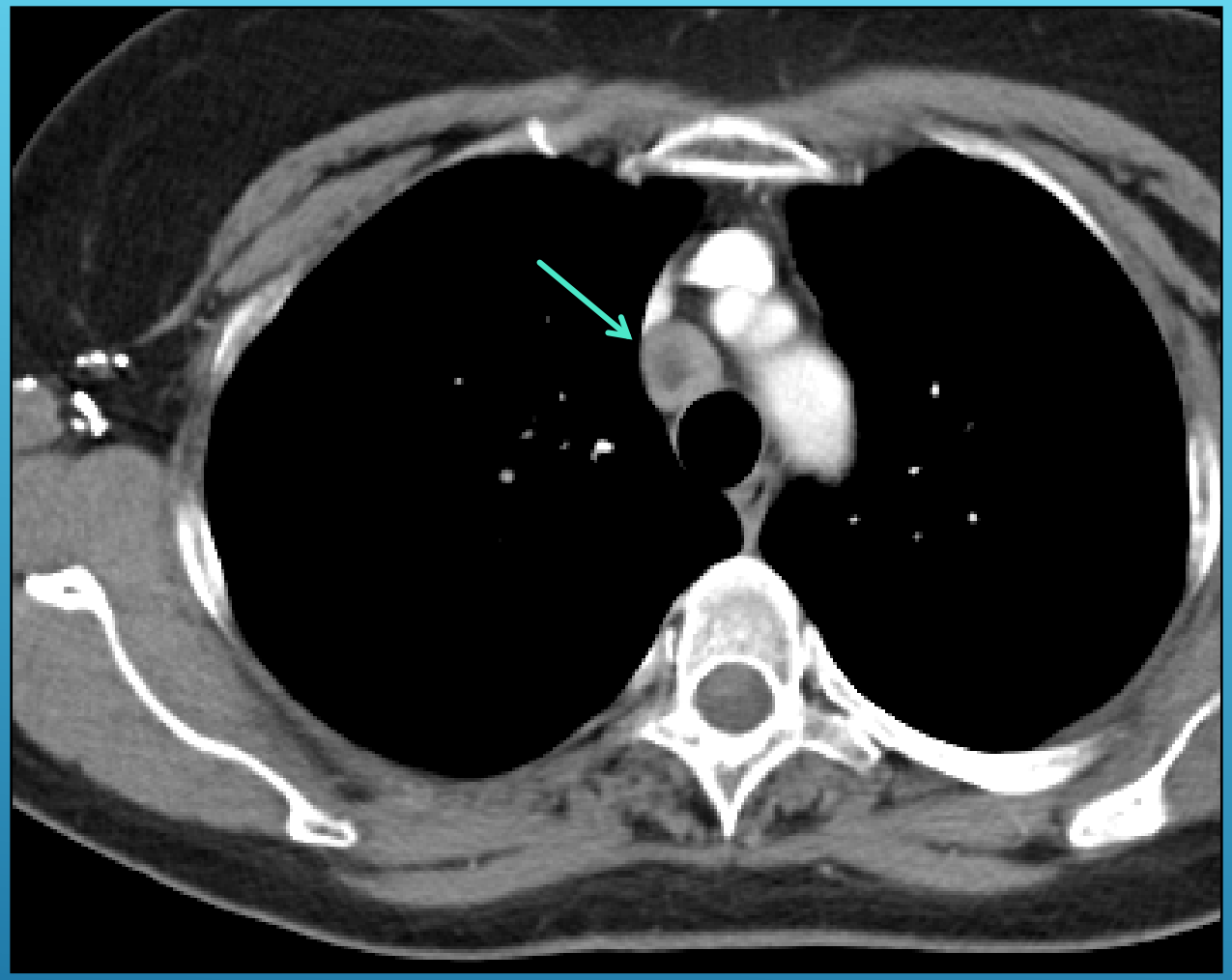
- **10** Hilar
- **11** Interlobar
- **12** Lobar
- **13** Segmental
- **14** Subsegmental



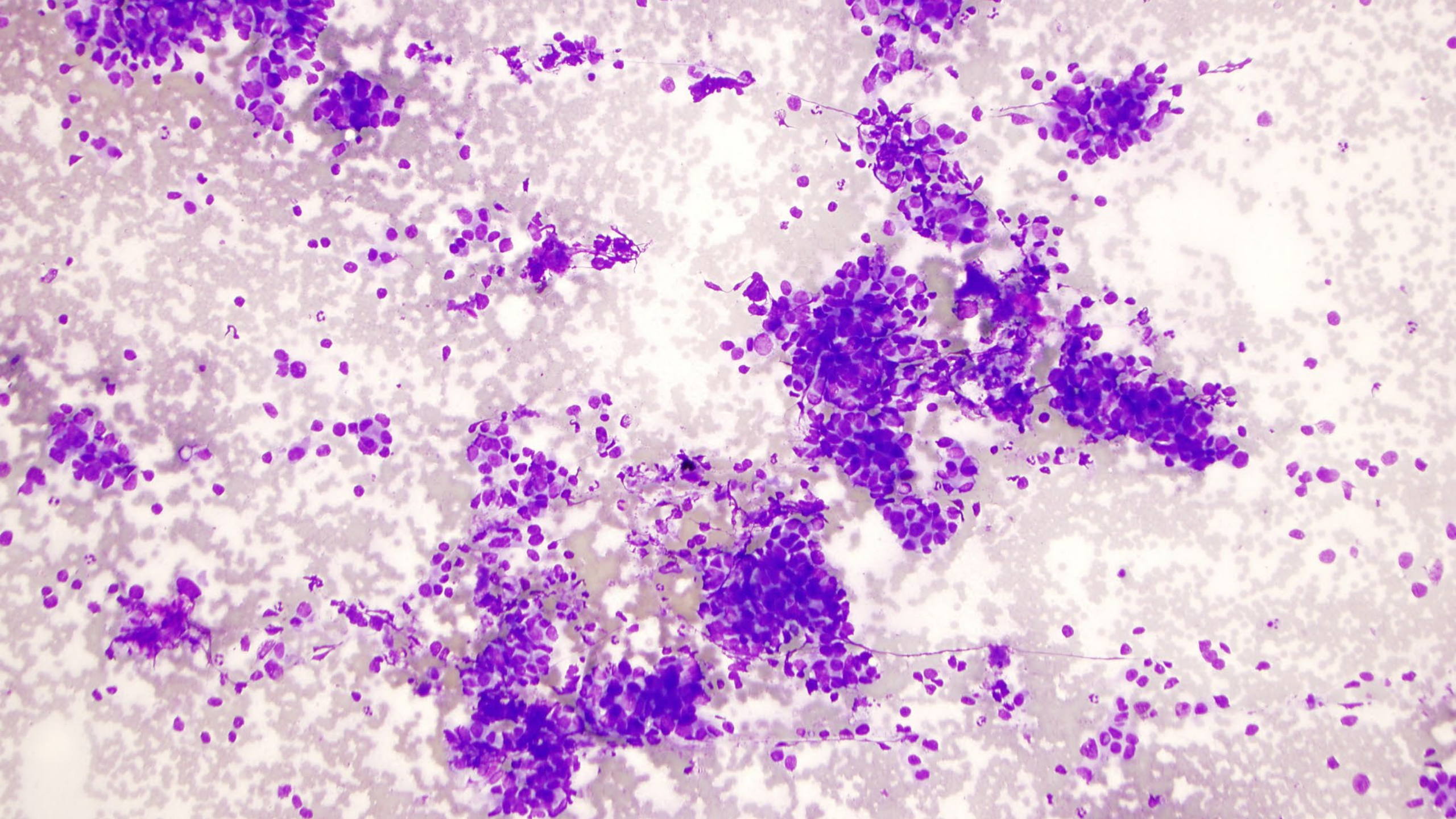


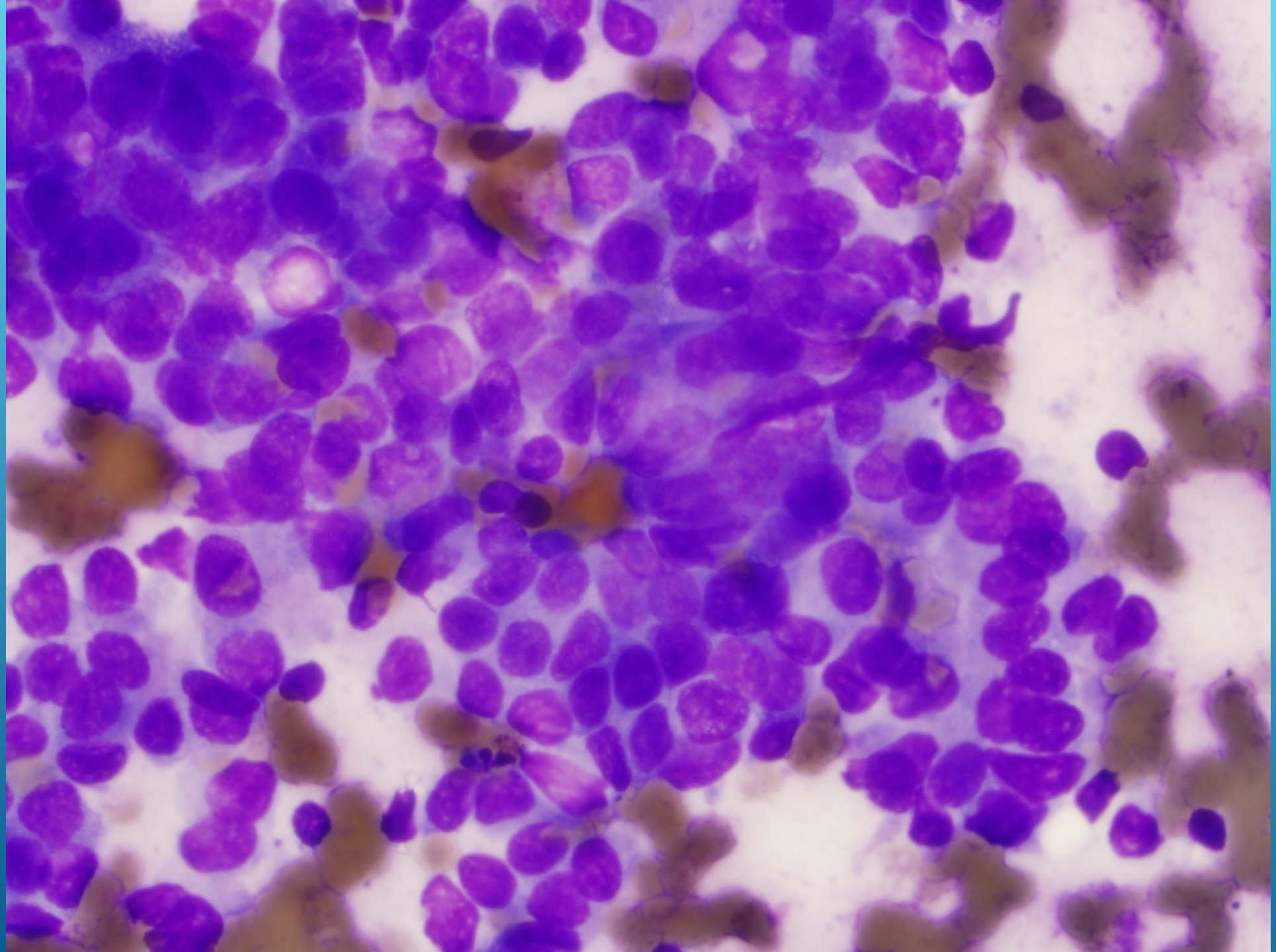
SONOGRAPHIC IMAGES ACQUIRED DURING ENDOBRONCHIAL ULTRASOUND-GUIDED PARATRACHEAL LYMPH NODE BIOPSY WITH NEEDLE TIP

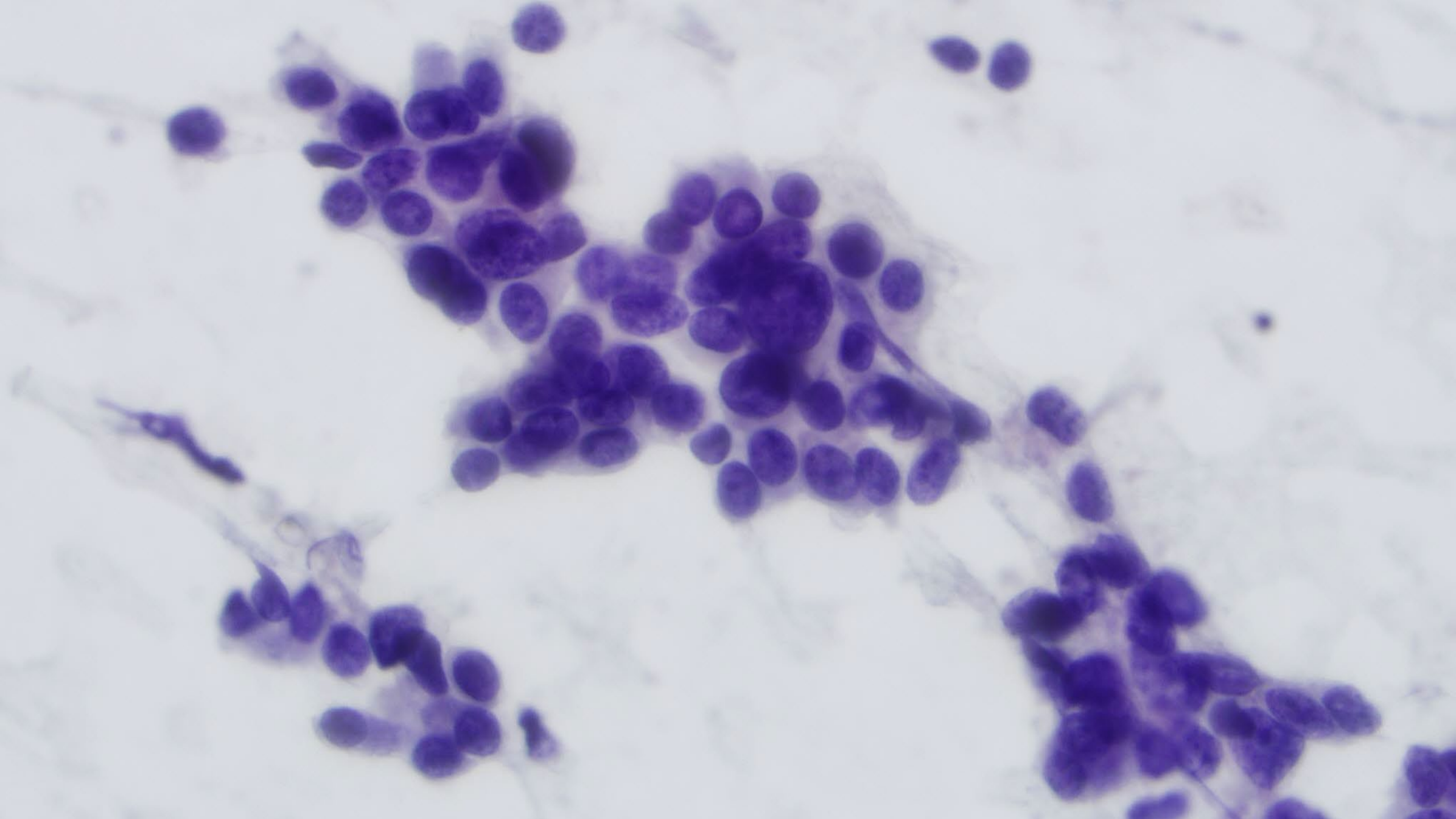
IMAGING

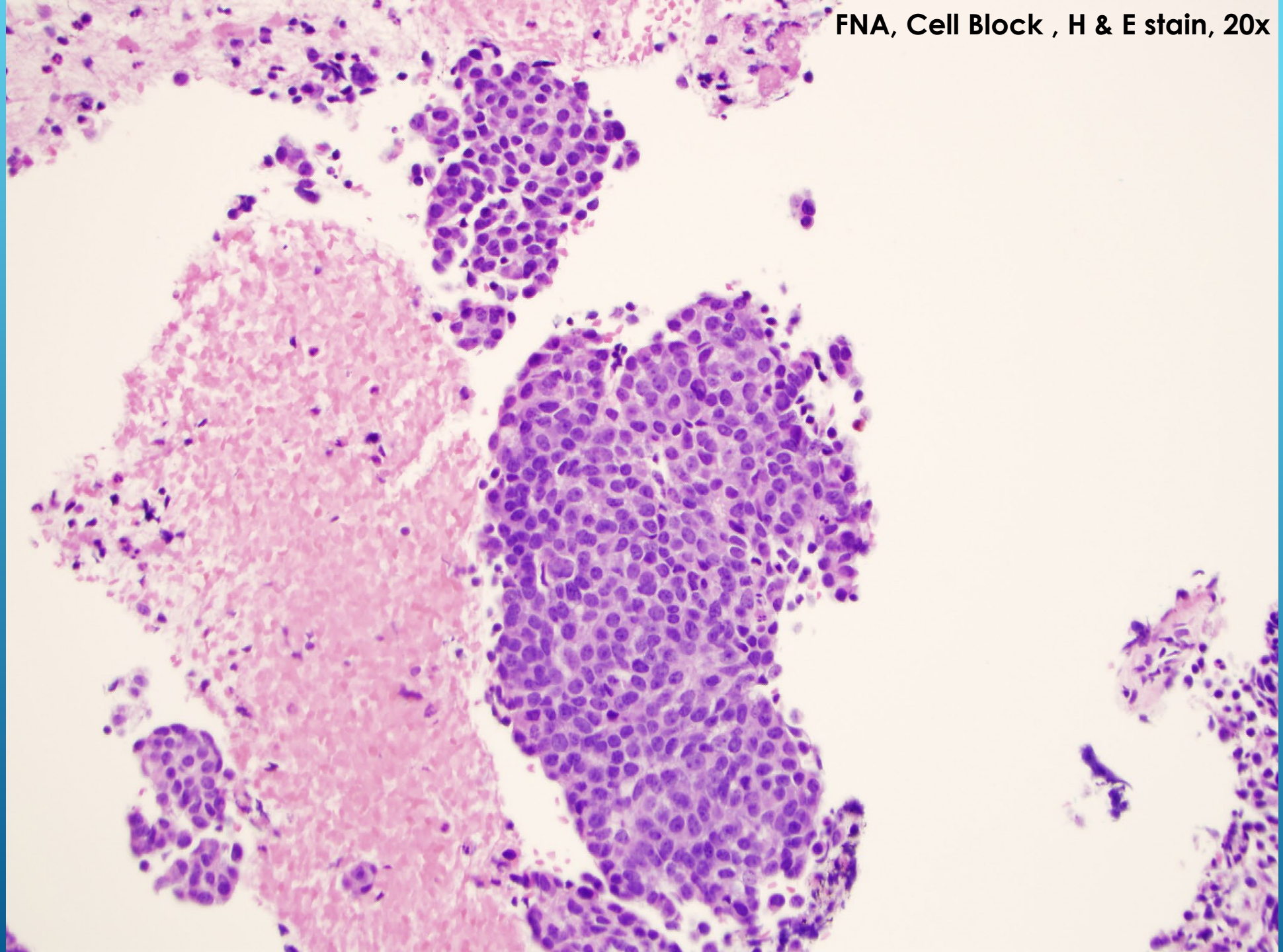


Axial contrast enhanced CT image through the mediastinum showing an enlarged right paratracheal lymph node with central low attenuation which may reflect necrosis.







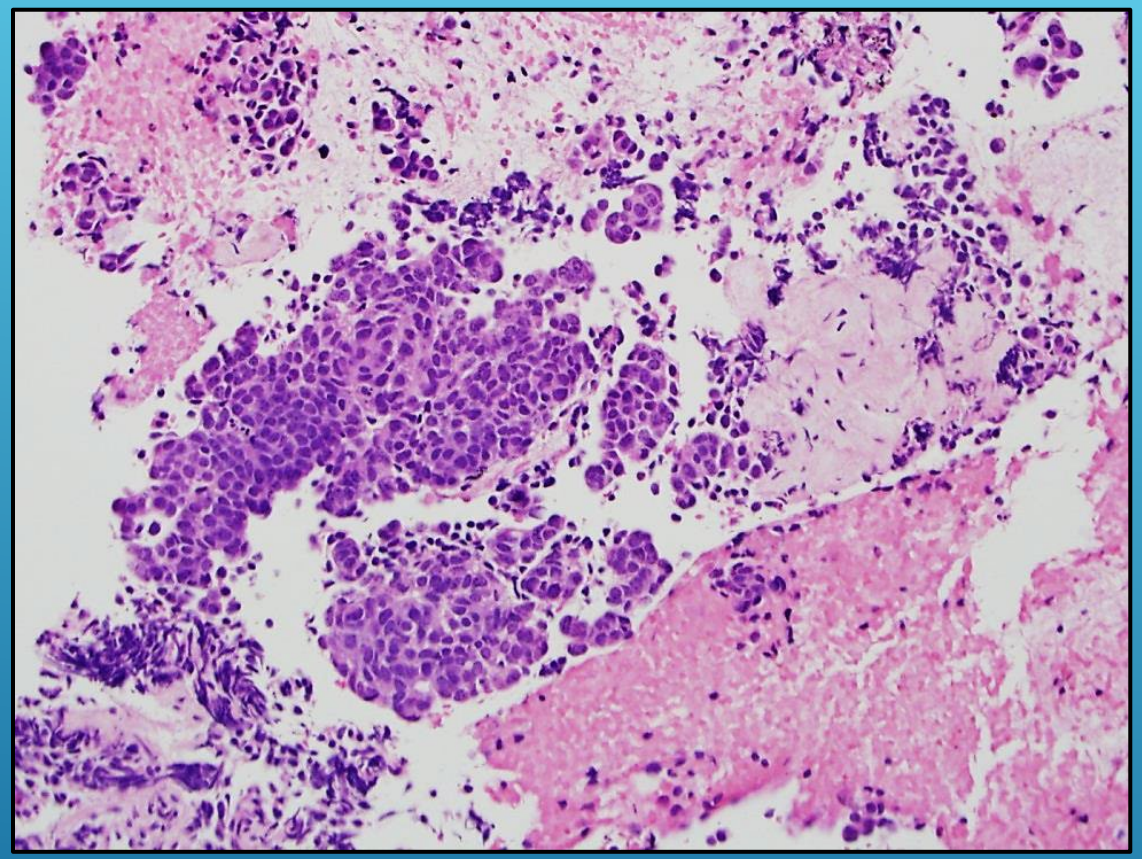


FNA, Cell Block , H & E stain, 20x

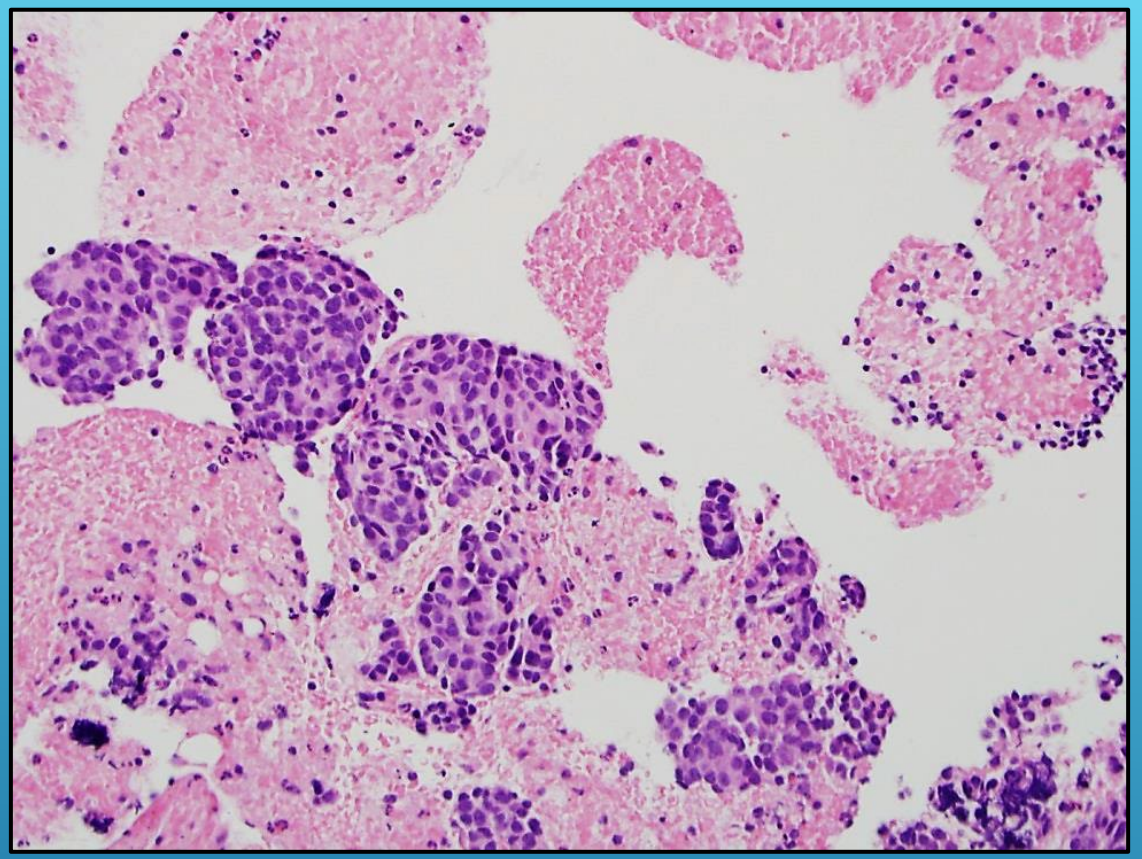
CASE 1: WHAT IS YOUR INTERPRETATION?

1. Adenocarcinoma, lung primary
2. Adenocarcinoma, endometrial primary
3. Adenocarcinoma, colon primary
4. Poorly differentiated squamous cell carcinoma
5. Adenocarcinoma, breast primary

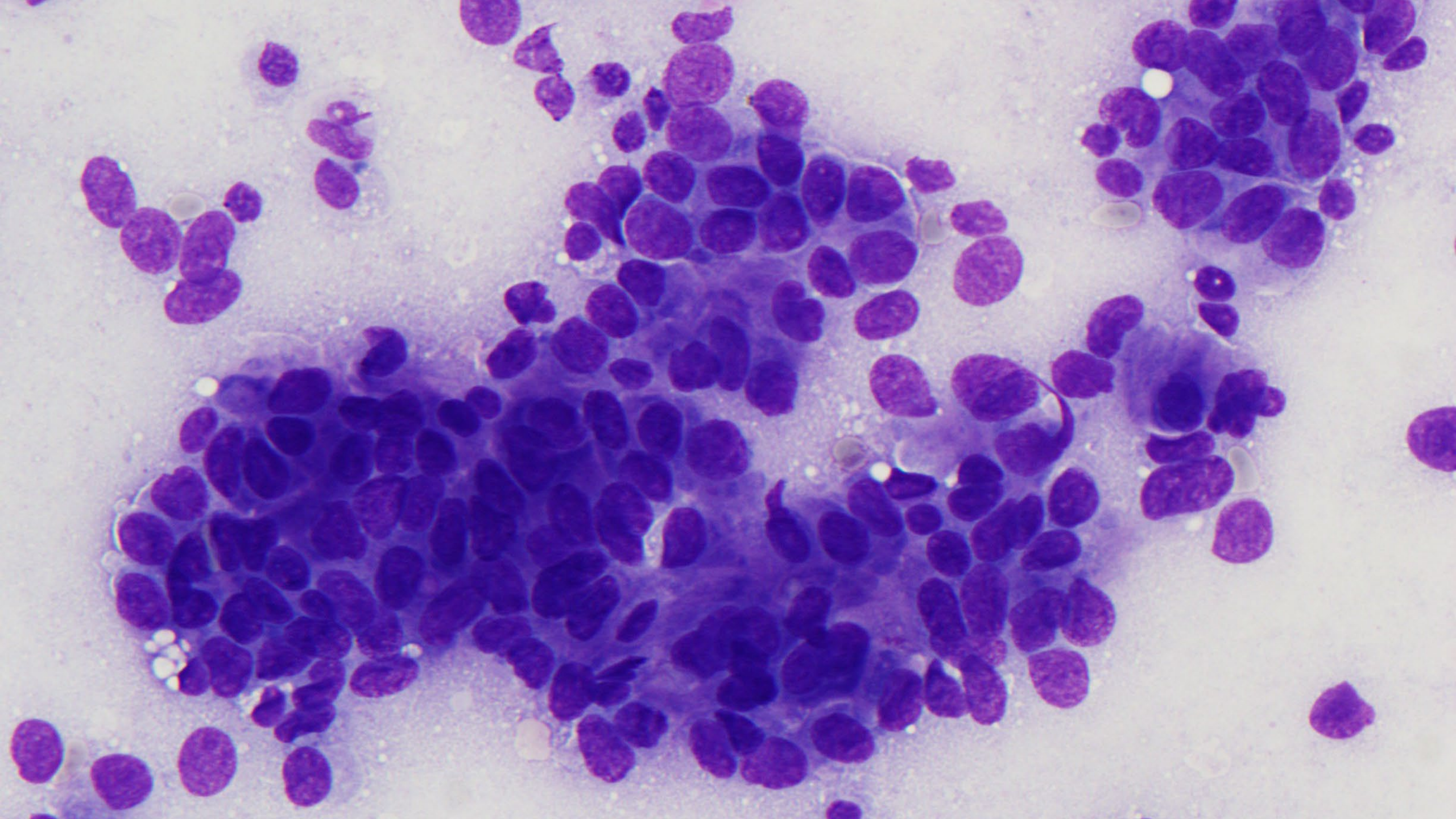
Cell Block

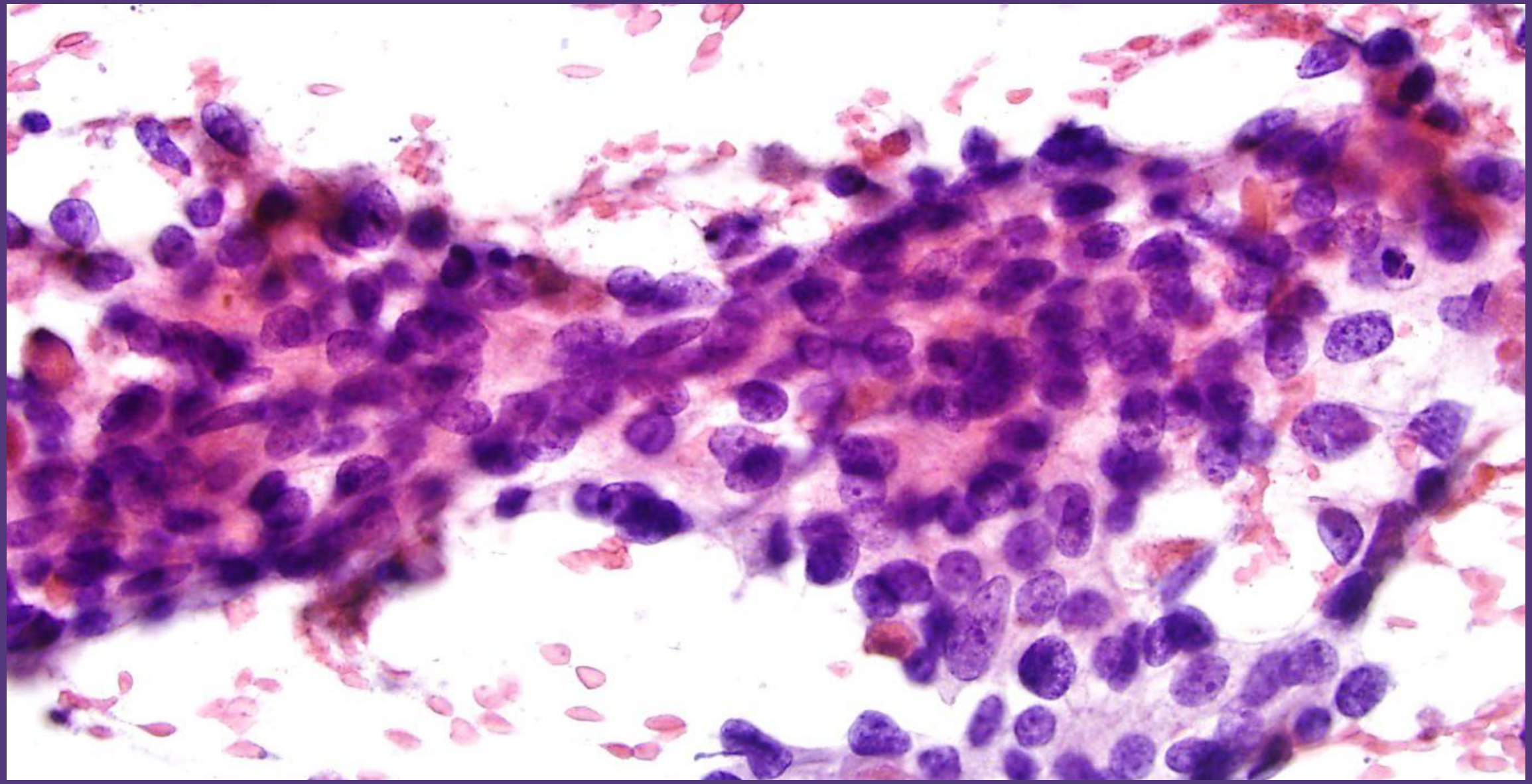


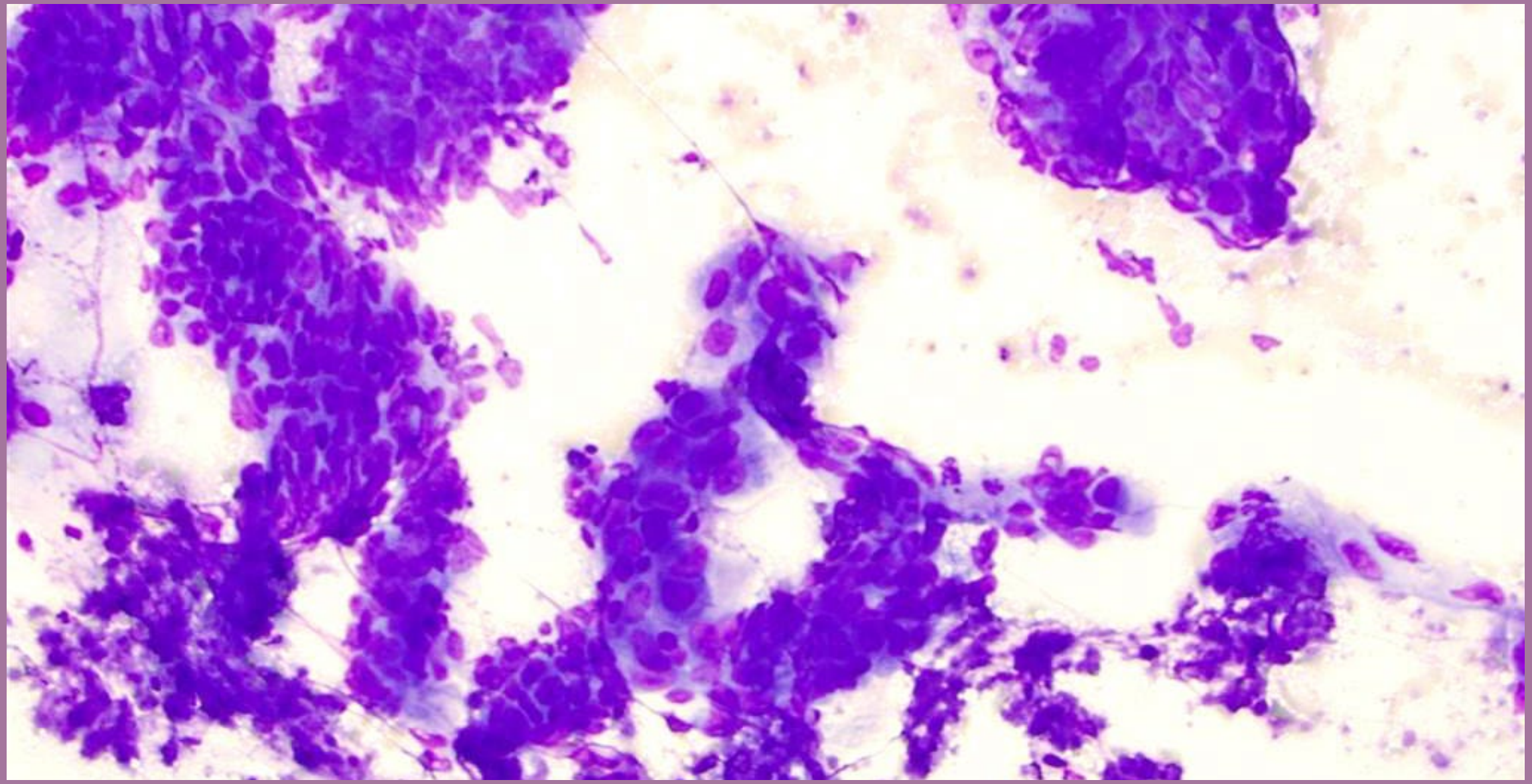
Endobronchial Biopsy

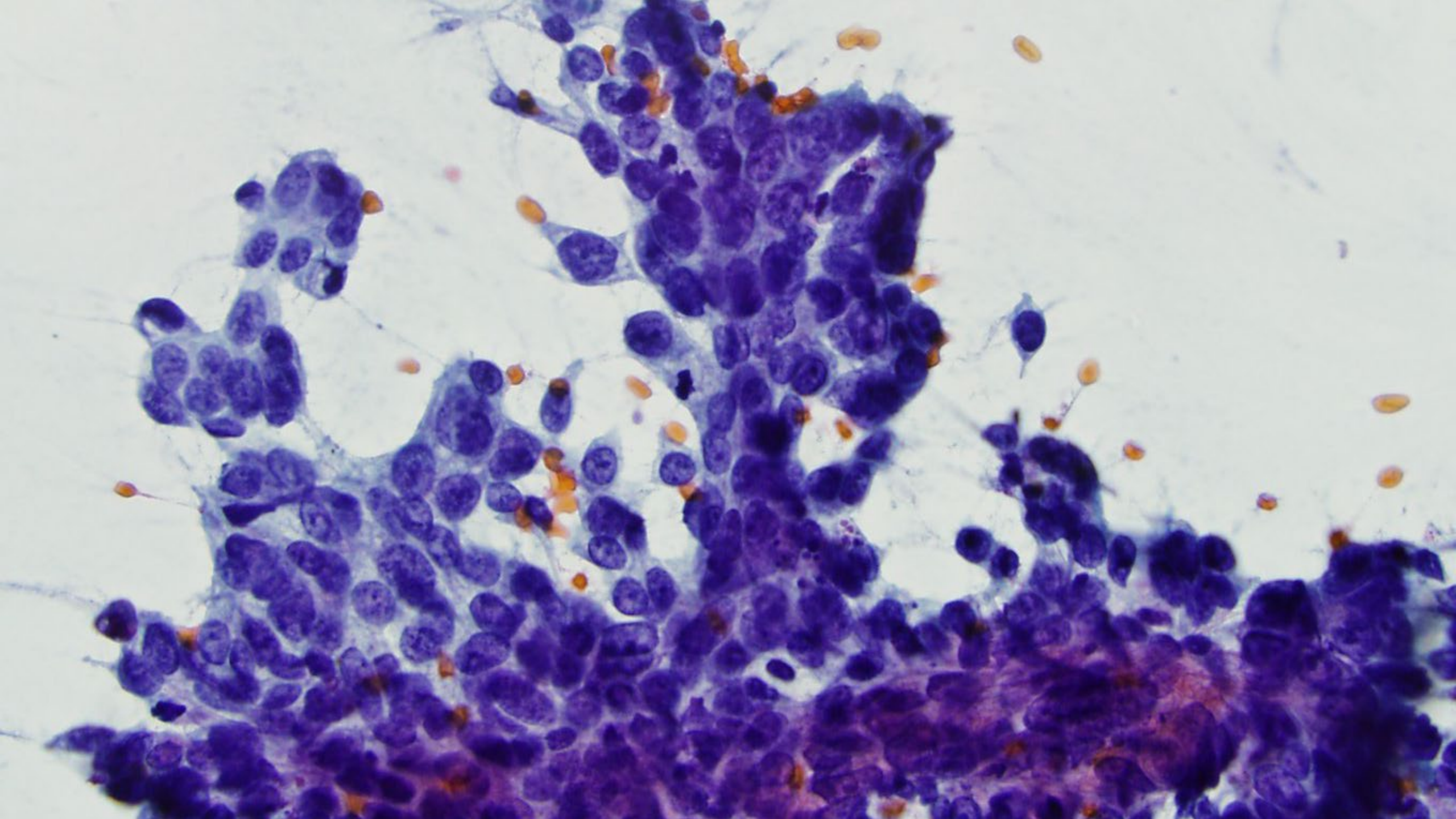


MORPHOLOGY





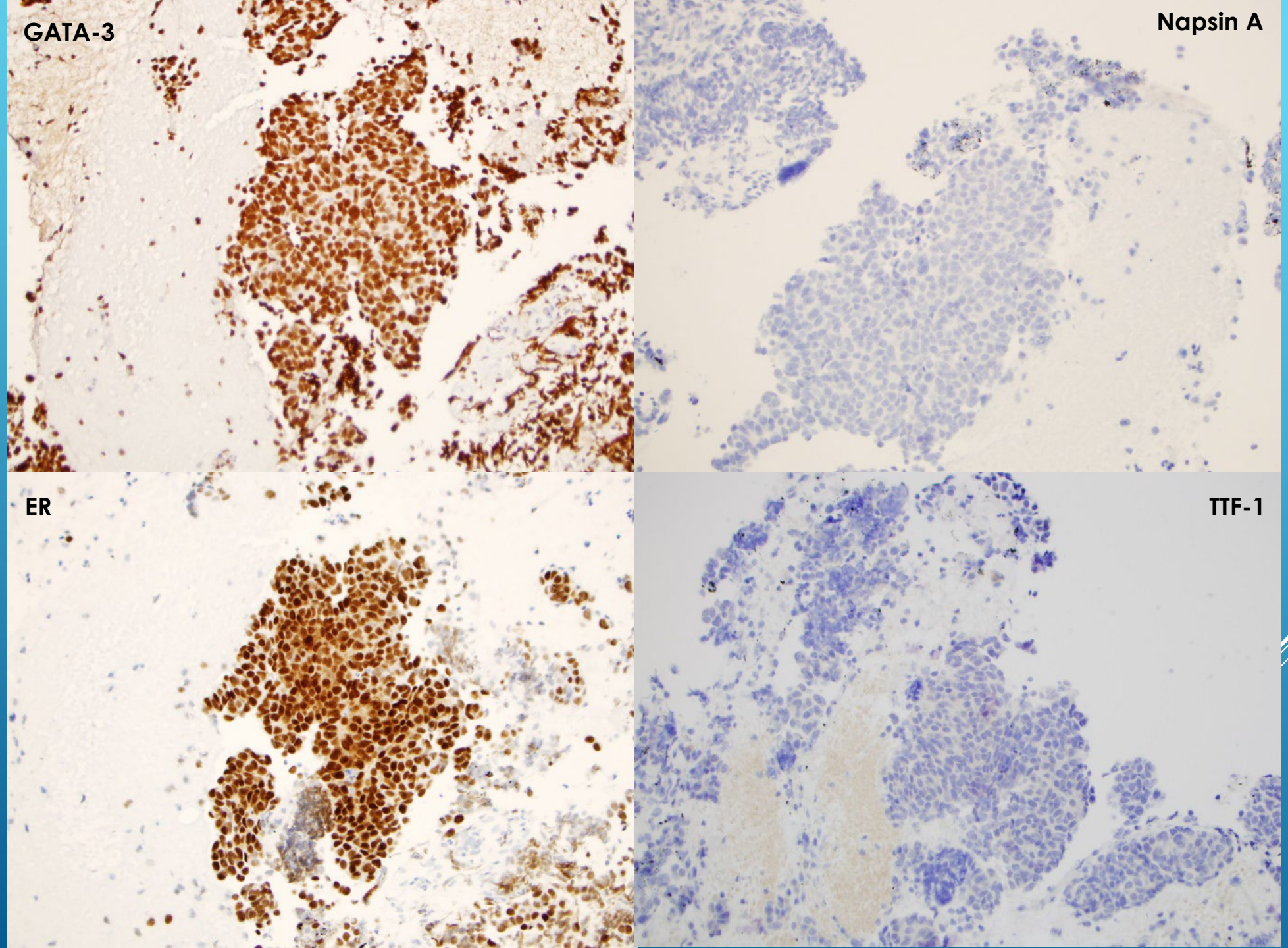




LYMPH NODE, 4R, ENDOBRONCHIAL ULTRASOUND – GUIDED FINE NEEDLE ASPIRATION:

- Malignant tumor cells present derived from carcinoma, favor breast primary. Cell block and cytologic preparations examined.

- Comment: Malignant tumor cells are positive for GATA-3 and negative for mammoglobin, BRST-2 (GCDFP), TTF-1 and Napsin A. The immunohistochemical pattern supports the diagnosis of adenocarcinoma, favor breast primary.


GATA-3
Napsin A
ER
TTF-1

LYMPH NODE, 4R, ENDOBRONCHIAL CORE BIOPSY:

Metastatic breast carcinoma.

Comment: Tumor cells are positive for GATA-3 and negative for mammoglobin.

- ER - Positive Allred score 8/8
- PR - Negative Allred score 0/8
- Her-2Neu – Negative (1+)

INVASIVE DUCTAL CARCINOMA

Breast cancer is the most common malignancy in women globally and in US.

Most common type of breast cancer (80%).

Inherited genetic mutation in one of two genes, BRCA-1 and BRCA-2 increases the risk of breast cancer by 50 to 85%.

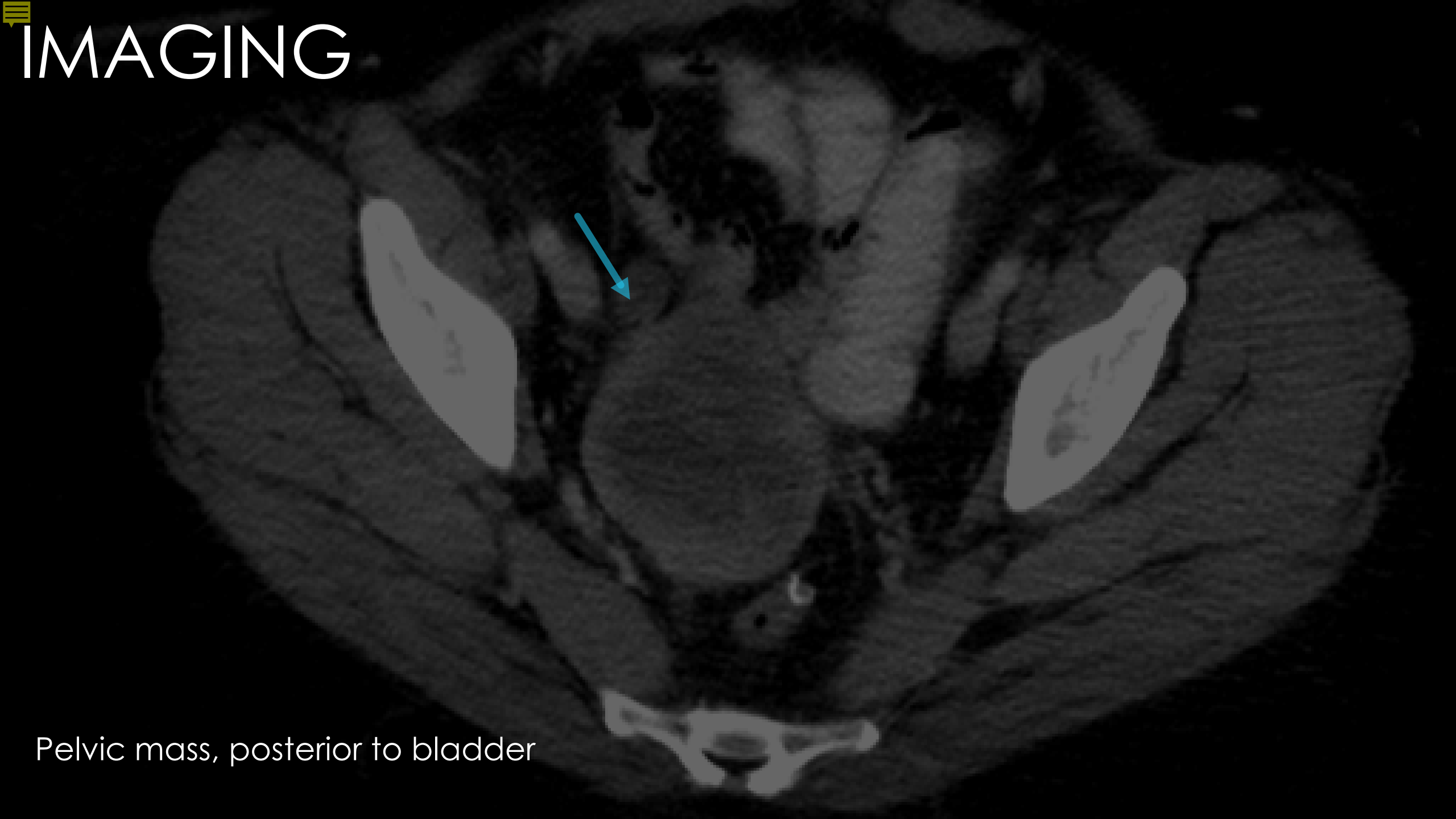
Common sites of metastasis: bones, lung and liver.

Common immunostains used for metastatic disease diagnosis are: GATA 3, TRPS-1, BRST-2, ER, PR, Her2/neu.

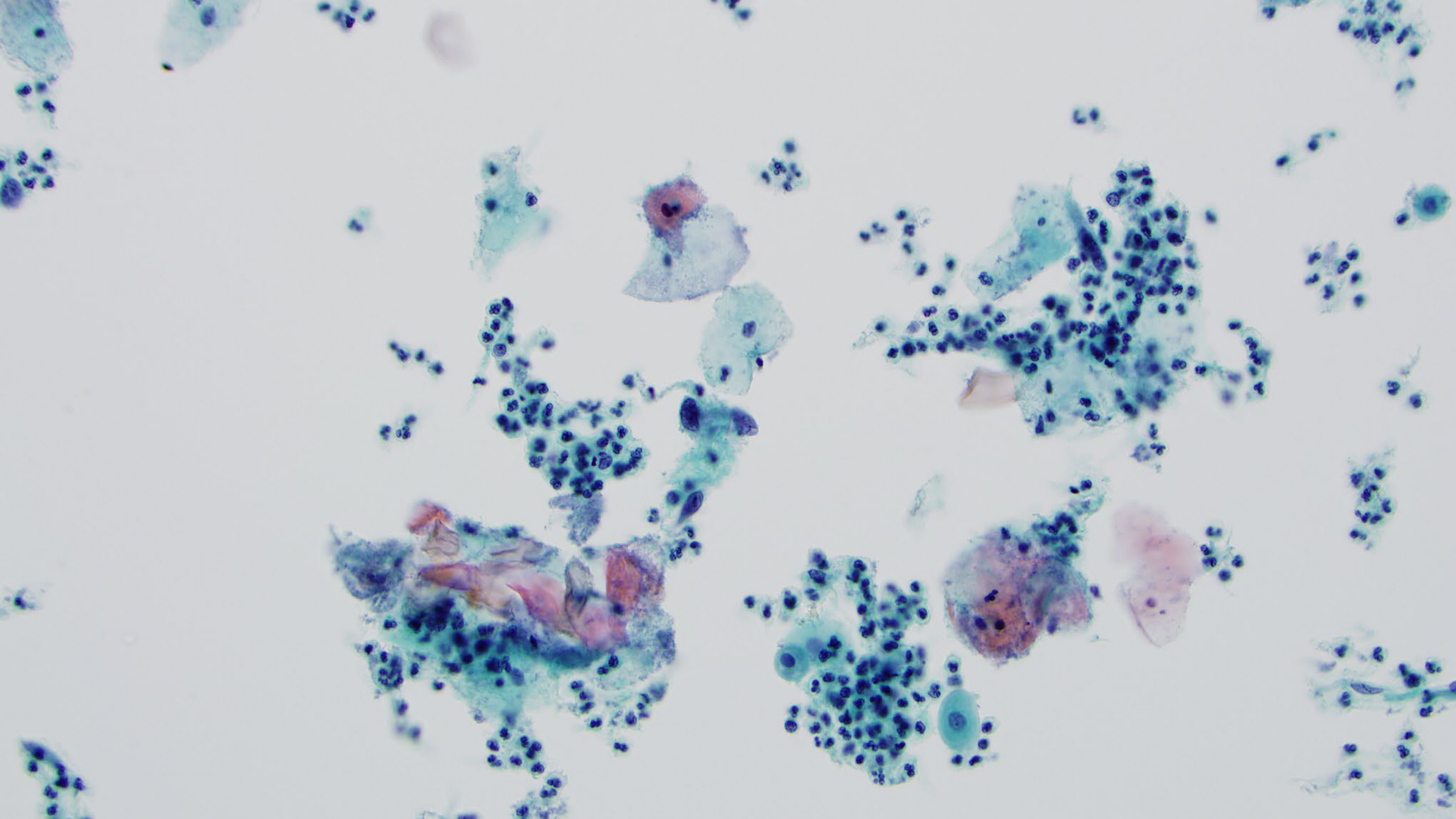
CASE 2:

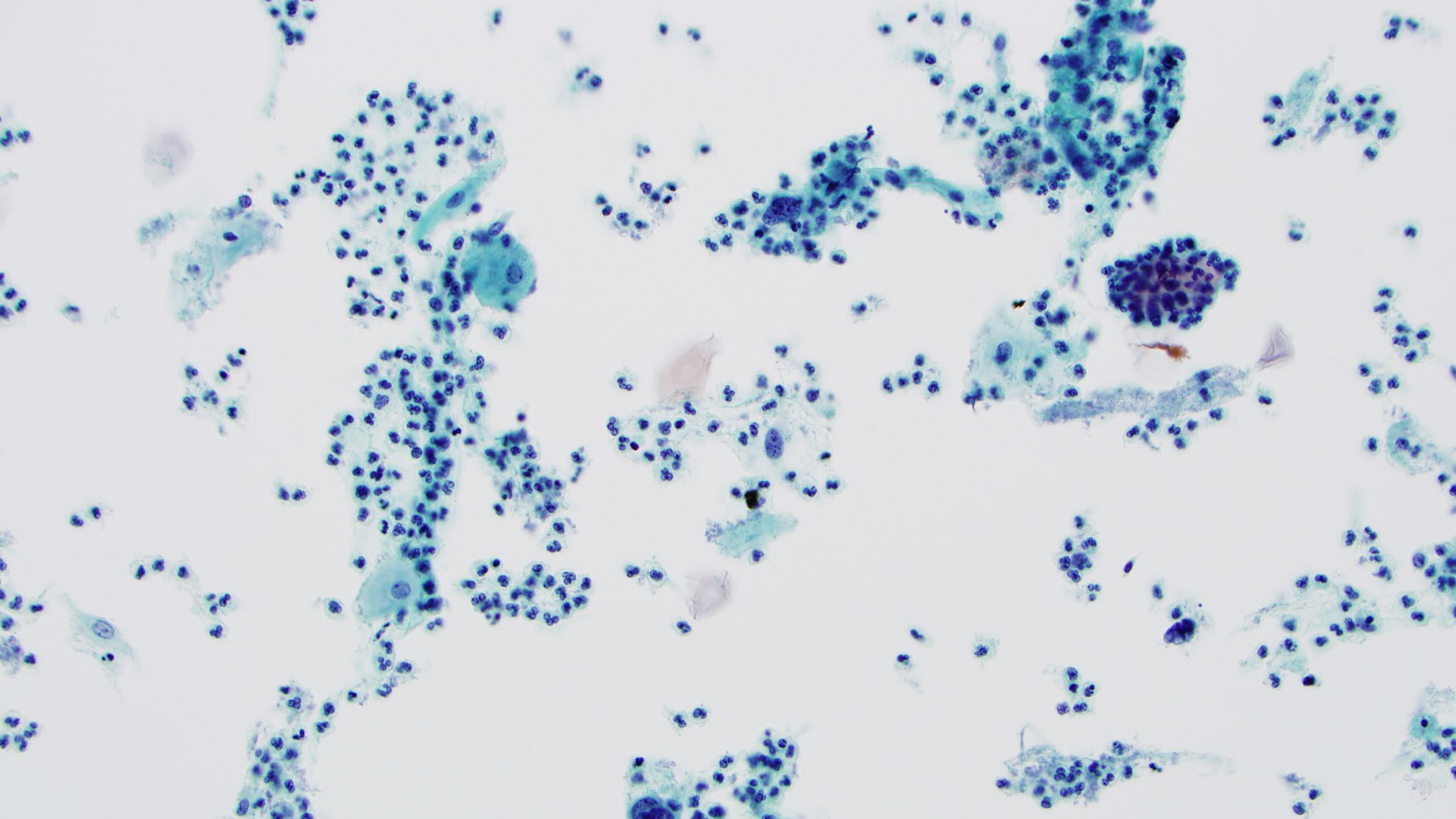
- 43-year-old woman
- Previous abnormal Pap test
- Abdominal pain
- Pelvic mass on CT scan
- Digital Slide; Thin Prep Pap test

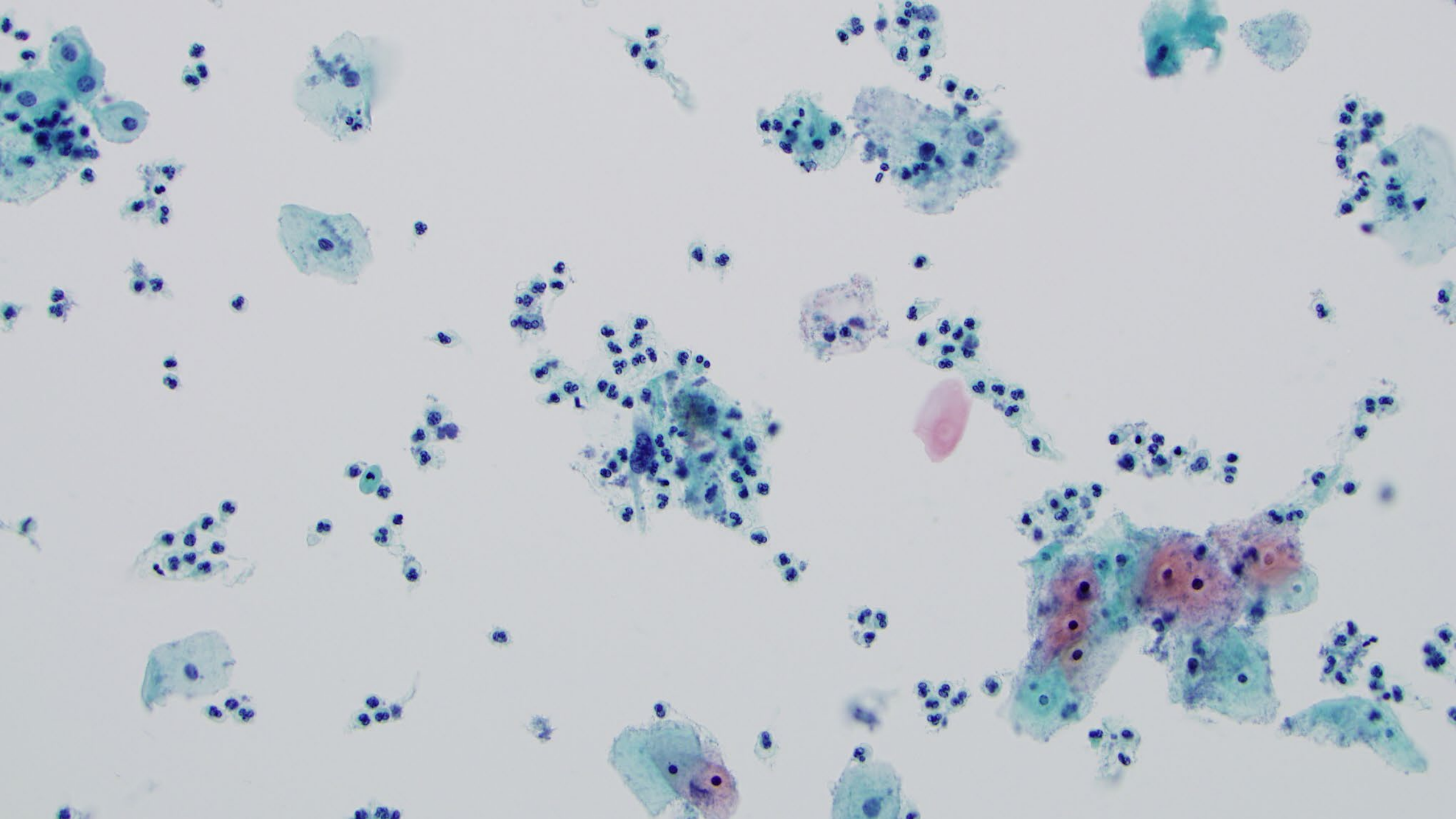
IMAGING

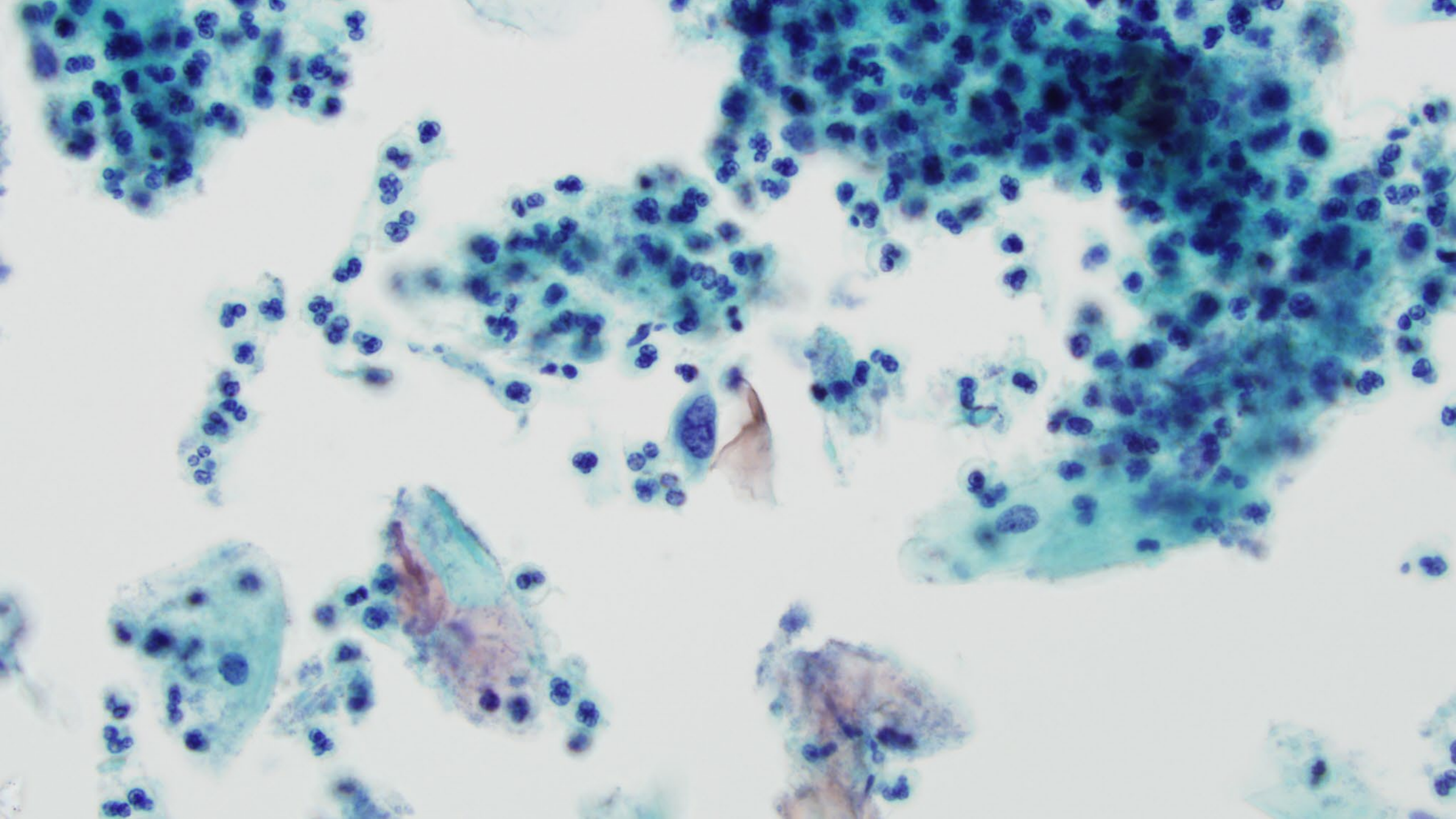


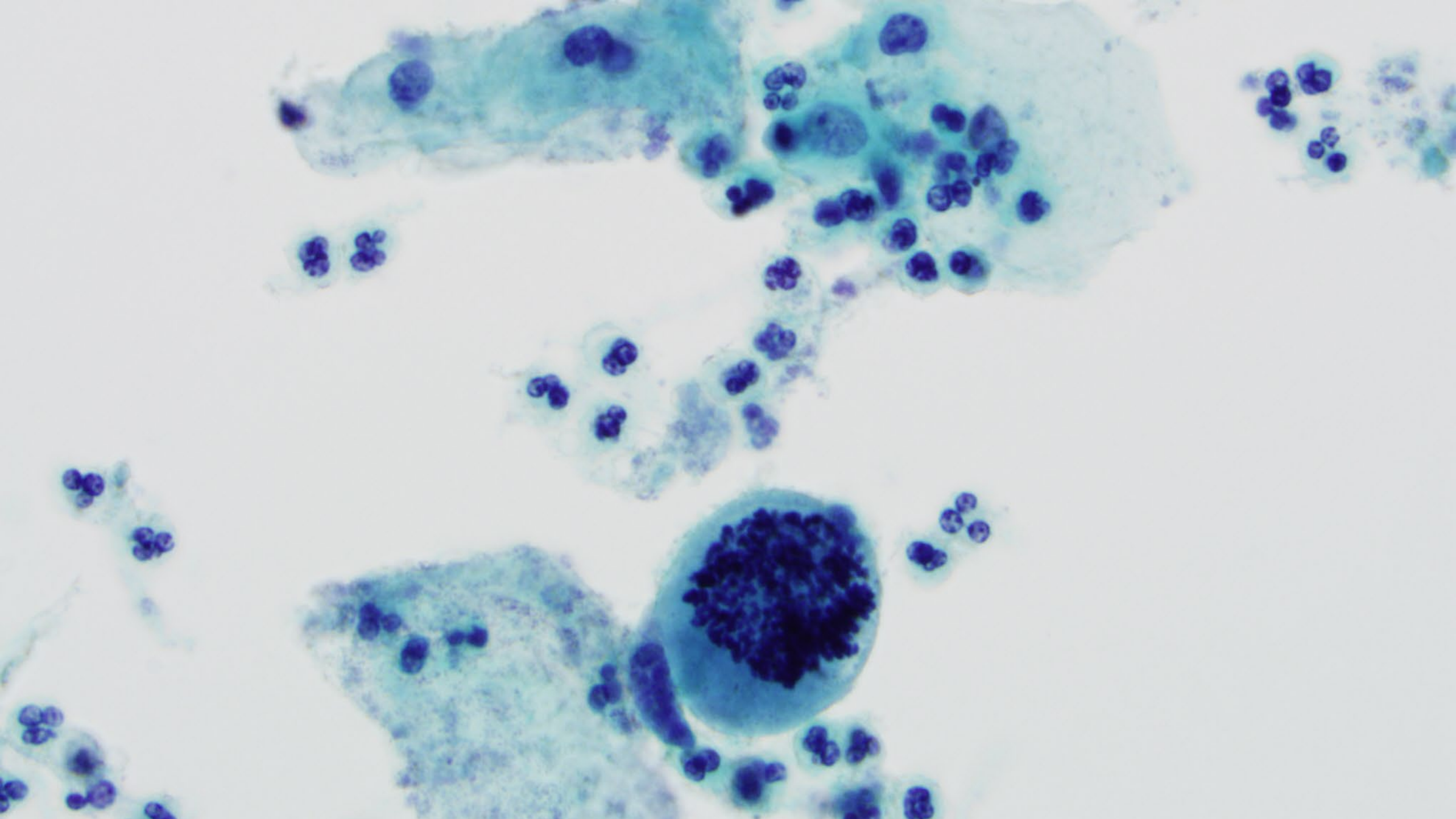
Pelvic mass, posterior to bladder









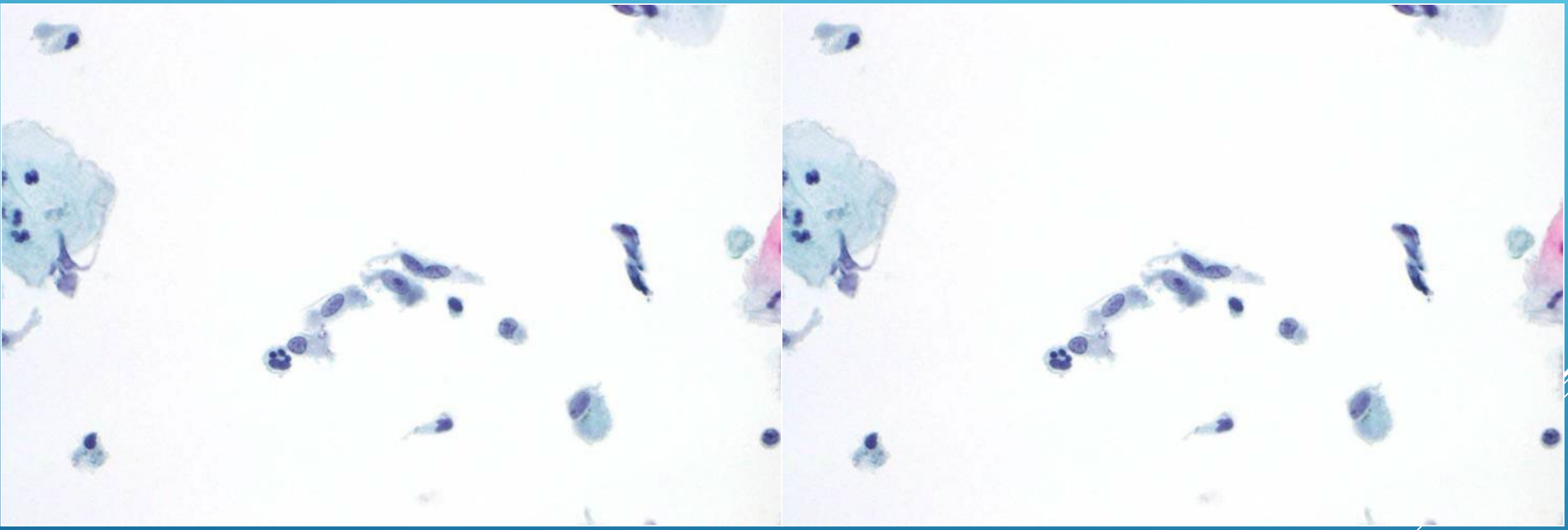


CASE 2:WHAT IS YOUR INTERPRETATION ?

1. Granulomatous inflammation
2. Radiation/Treatment effect
3. Squamous cell carcinoma
4. Metastatic disease
5. Sarcoma

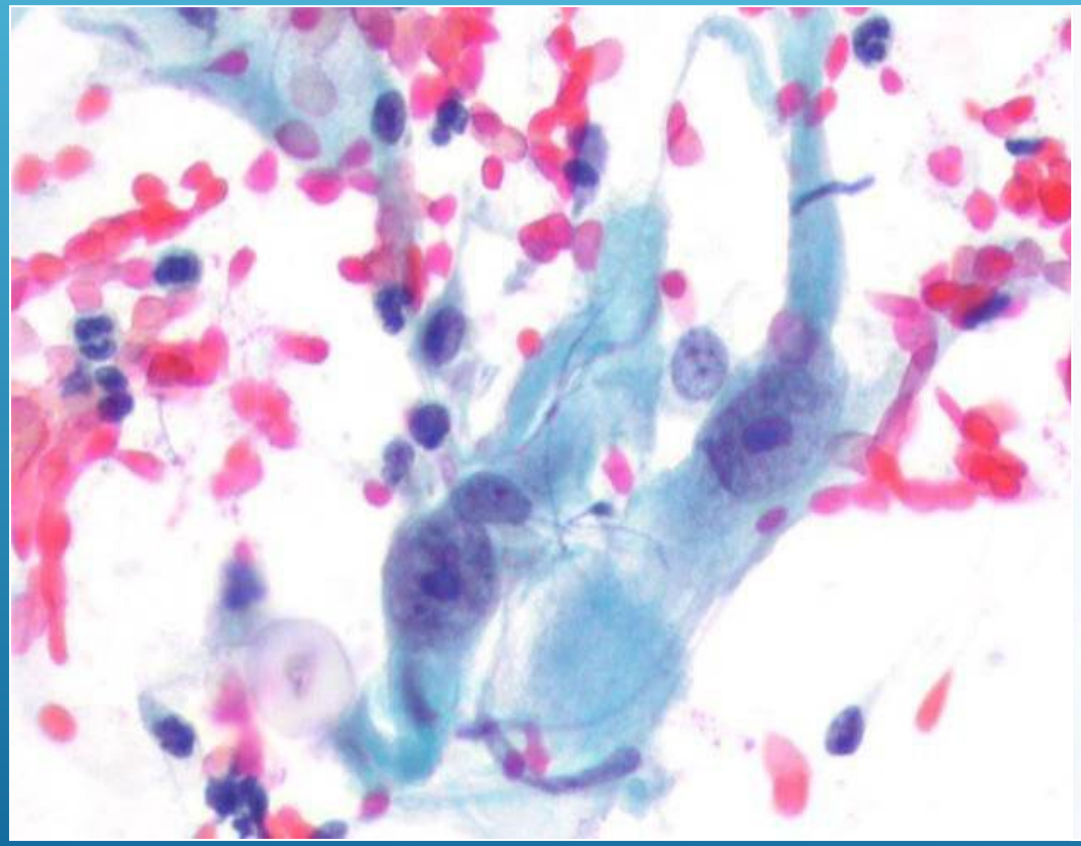
Granulomatous inflammation

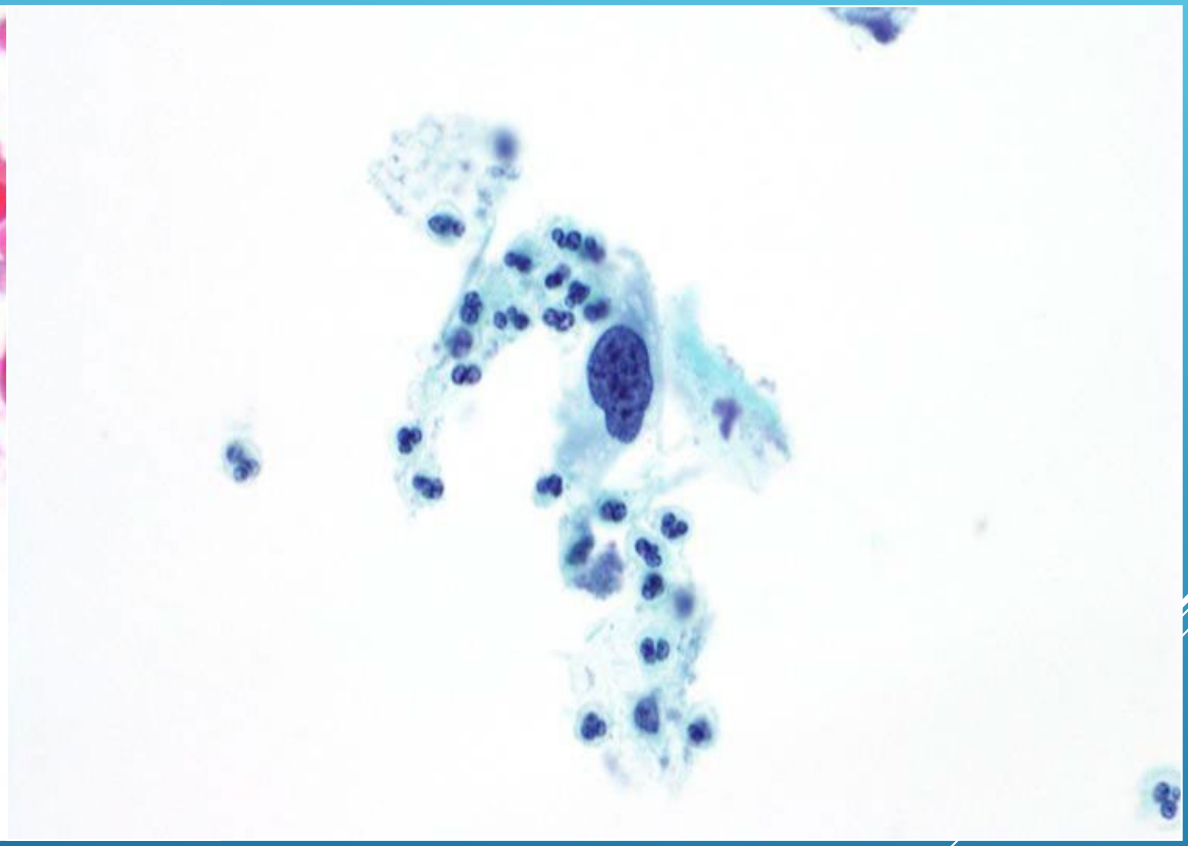
Digital Slide Case 2



Treatment effect

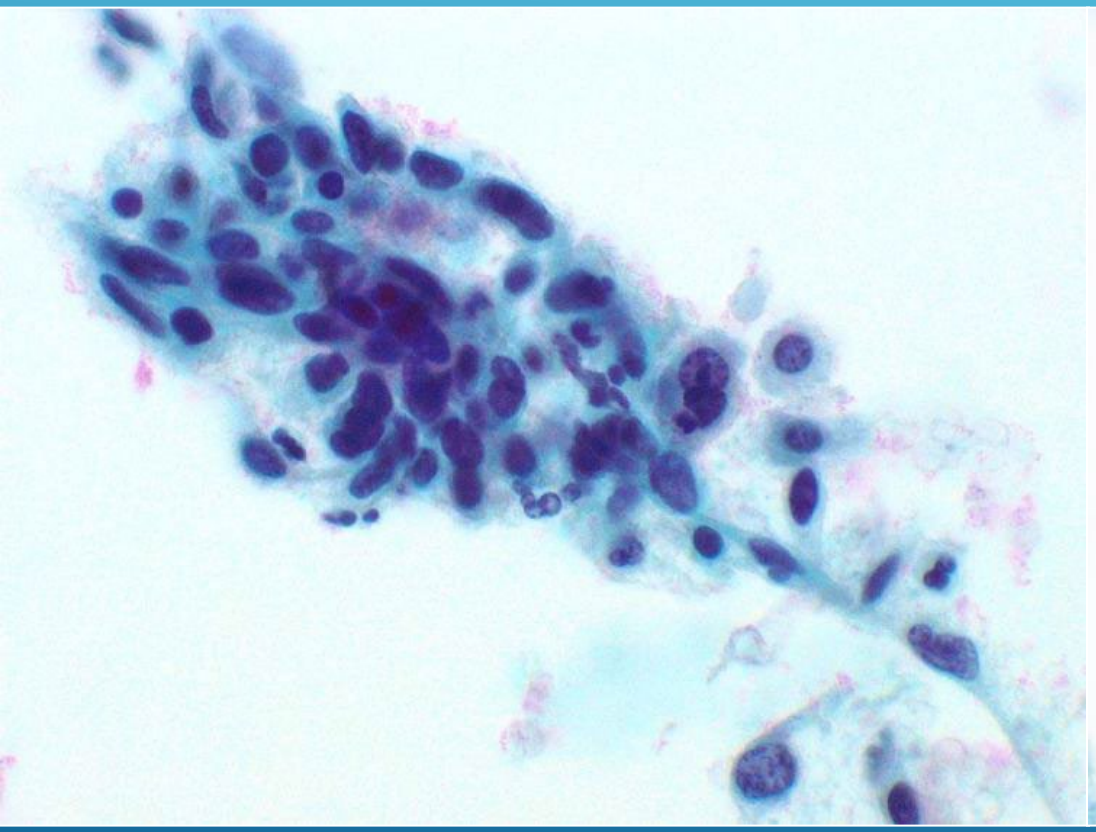
Digital Slide Case 2

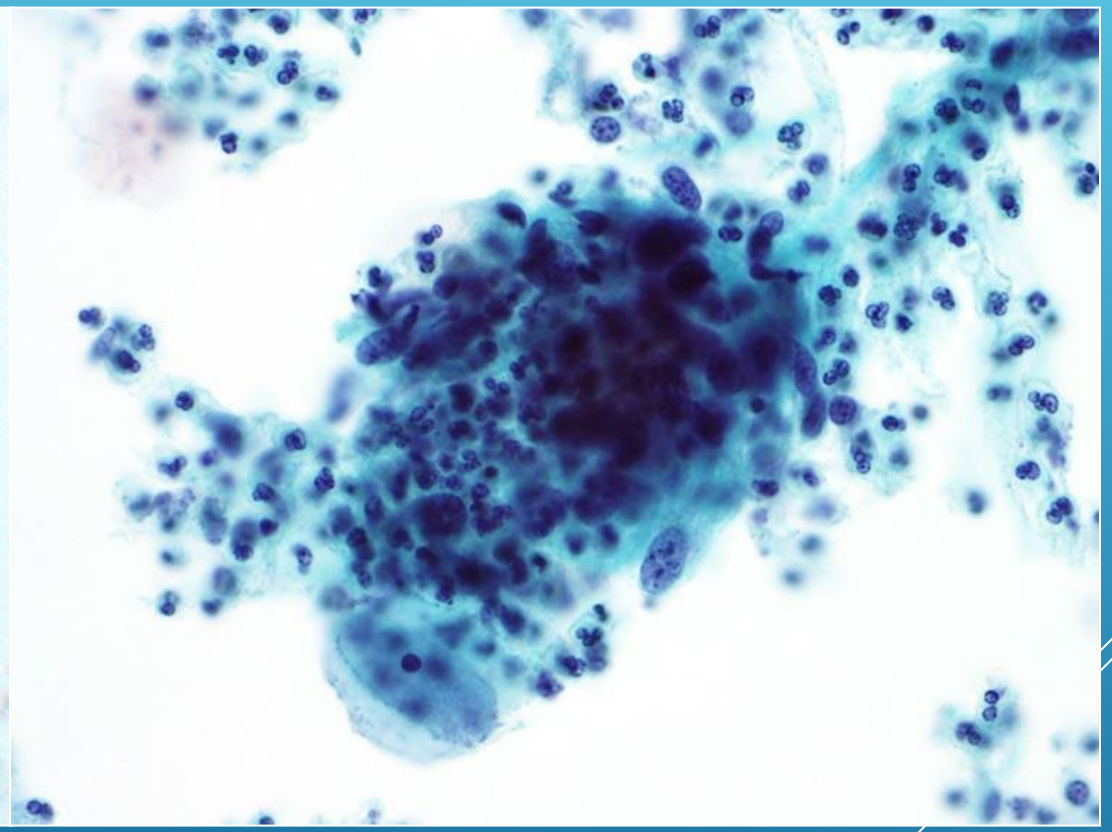




Poorly-differentiated squamous cell carcinoma

Digital Slide Case 2





METASTATIC DISEASE

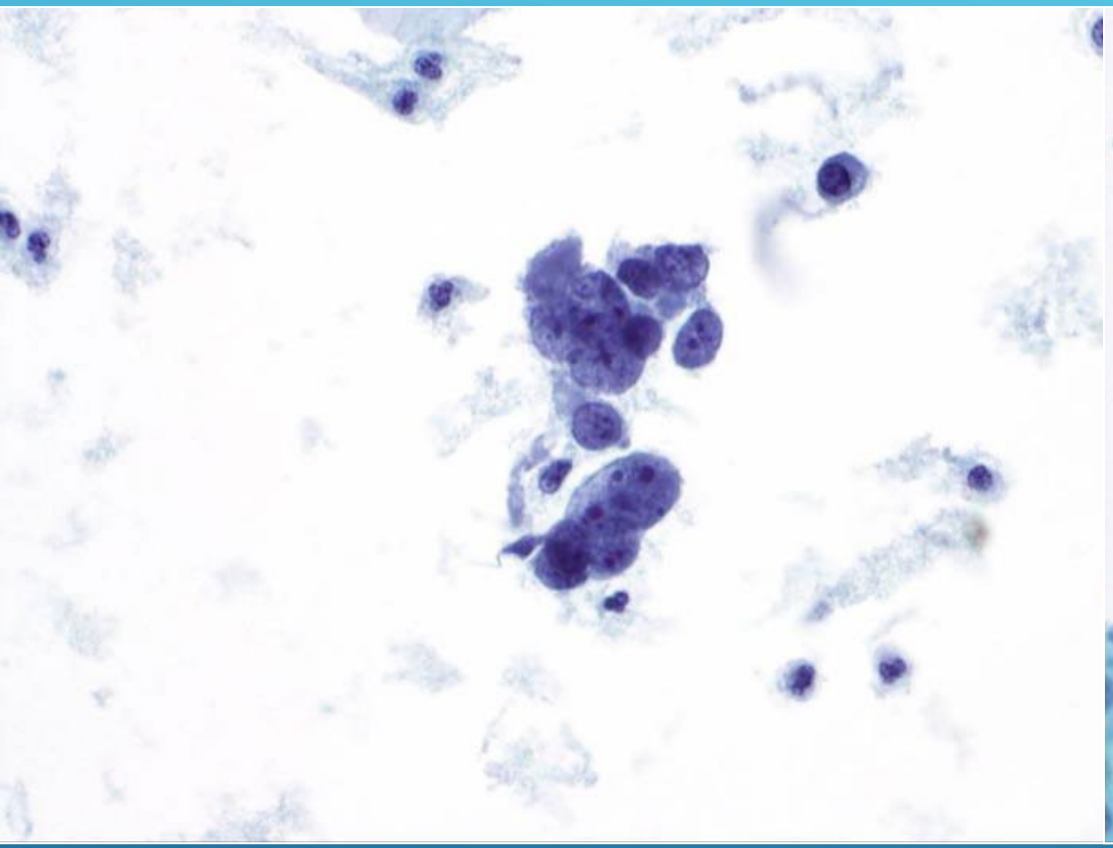
Metastasis to cervical is rare

Few obviously malignant cells in a clean background

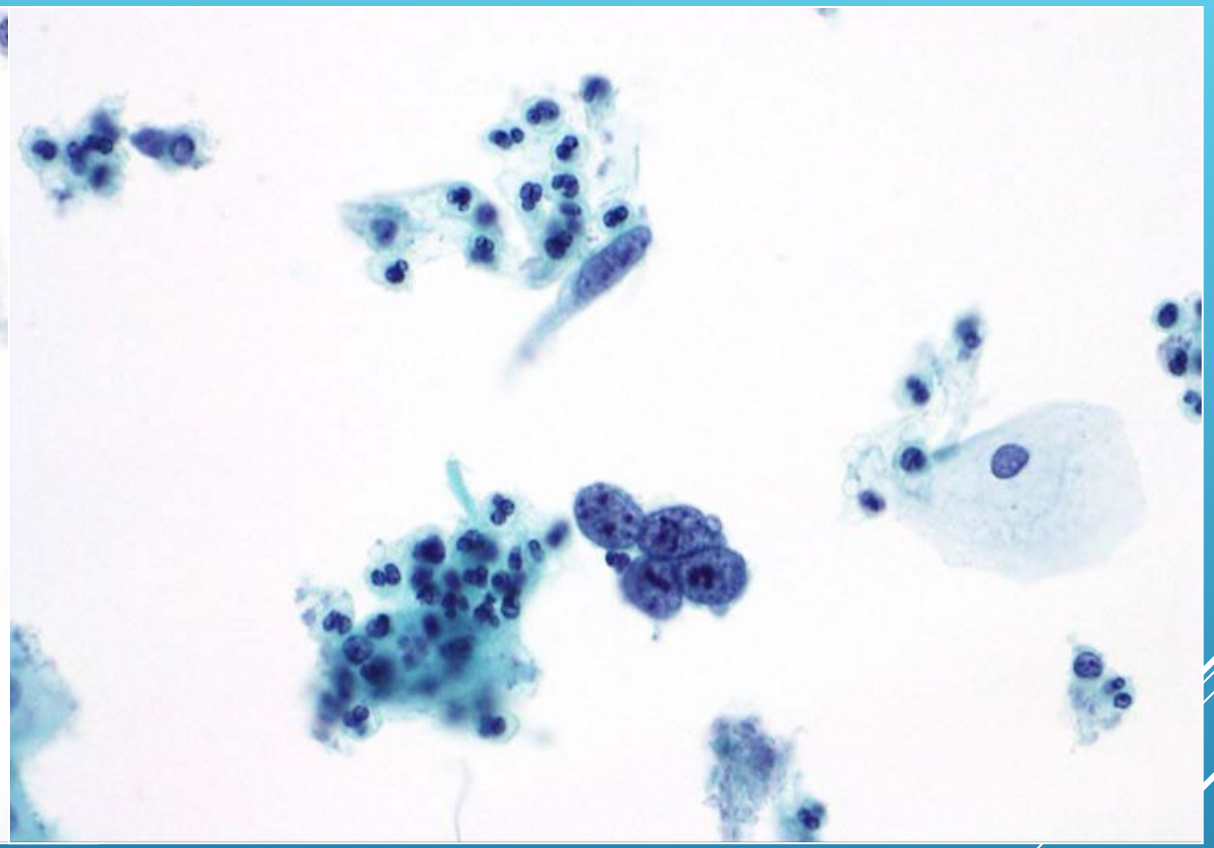
Possible sites in this case:

- Colon cancer
- Melanoma
- Sarcoma (extrauterine primary)

Metastatic Colon CA

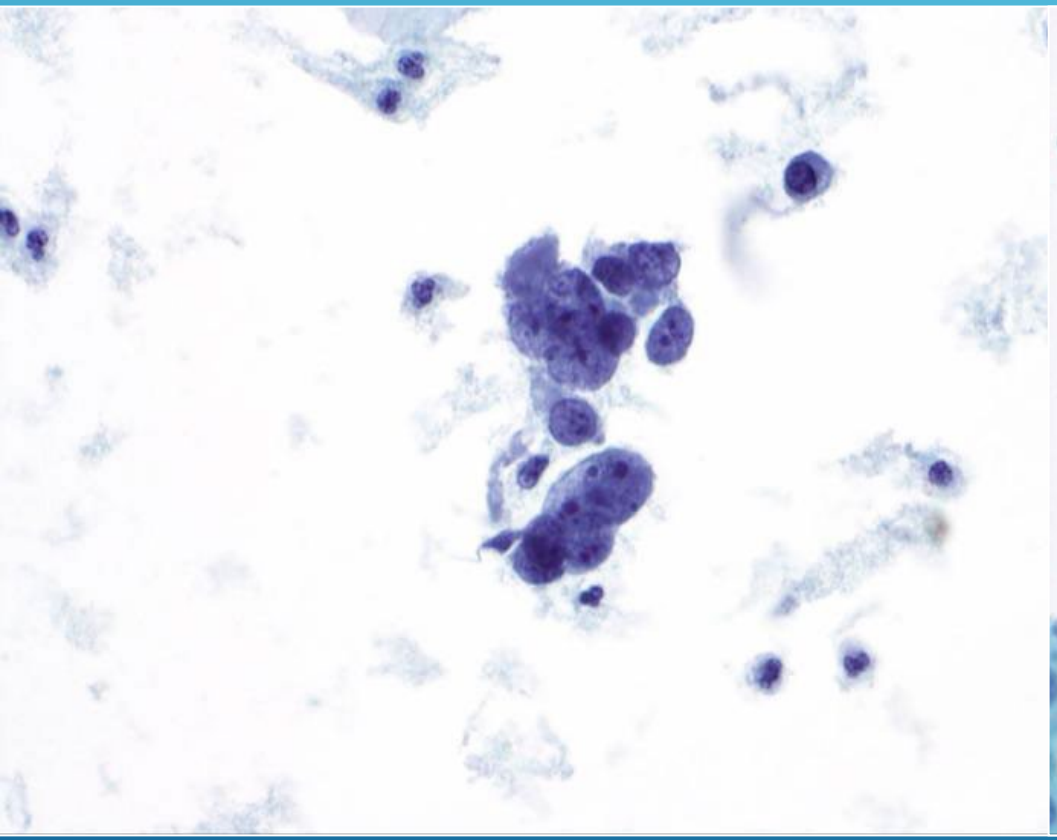


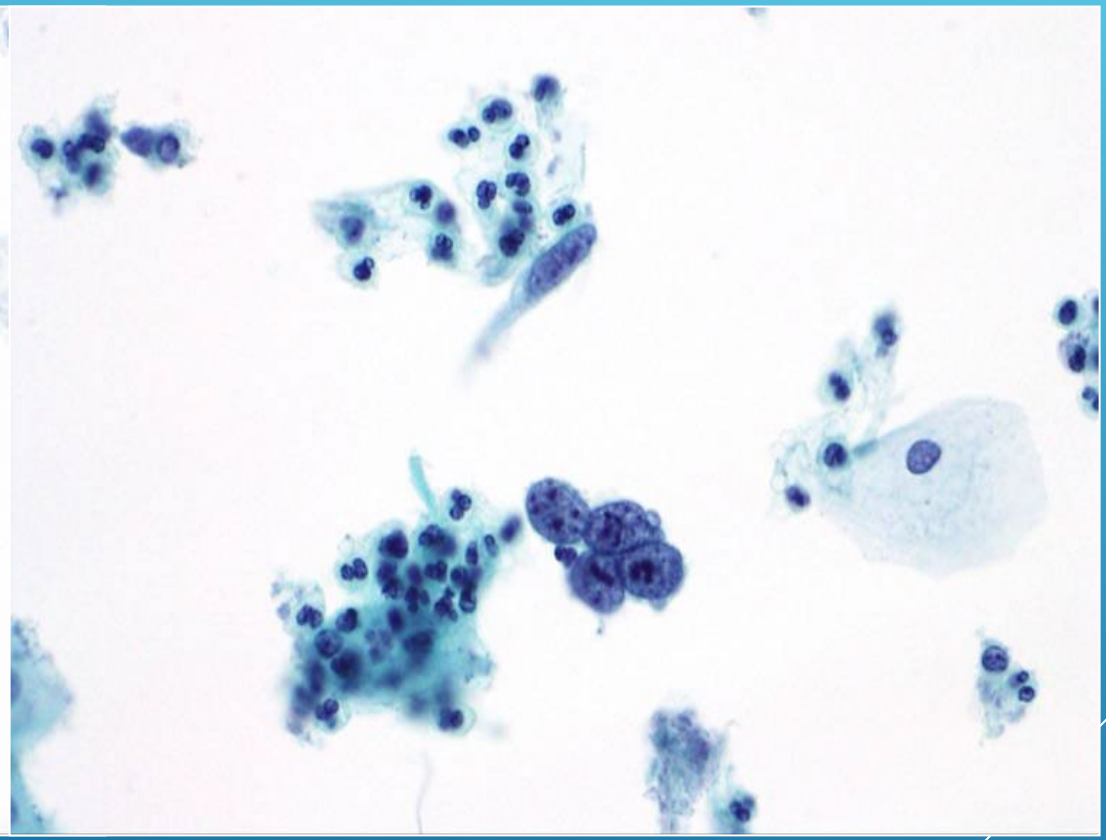
Digital Slide Case 2



Melanoma

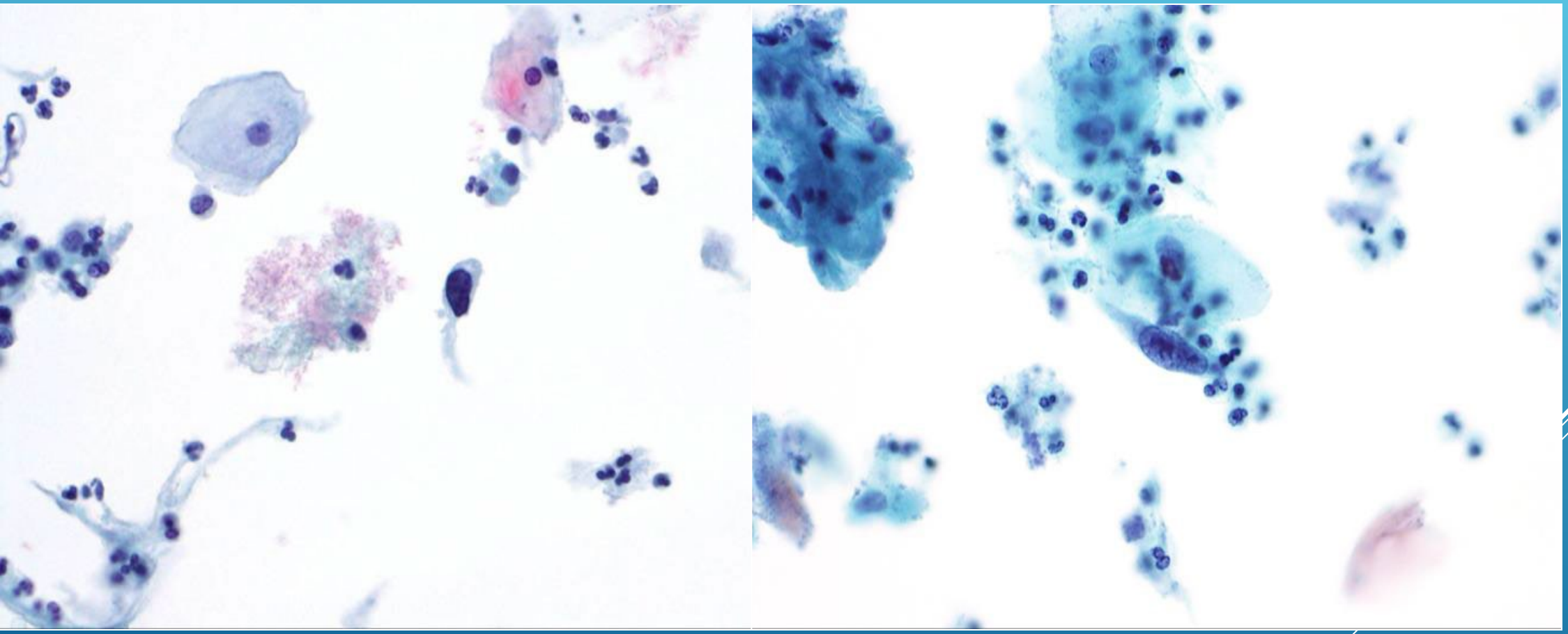
Digital Slide Case 2





MMMT

Digital Slide Case 2



SARCOMA

Rarely detected in pap tests

- <1% of cervical cancers ; <10% of uterine cancers

Detection of tumor cells in pap is affected by several factors:

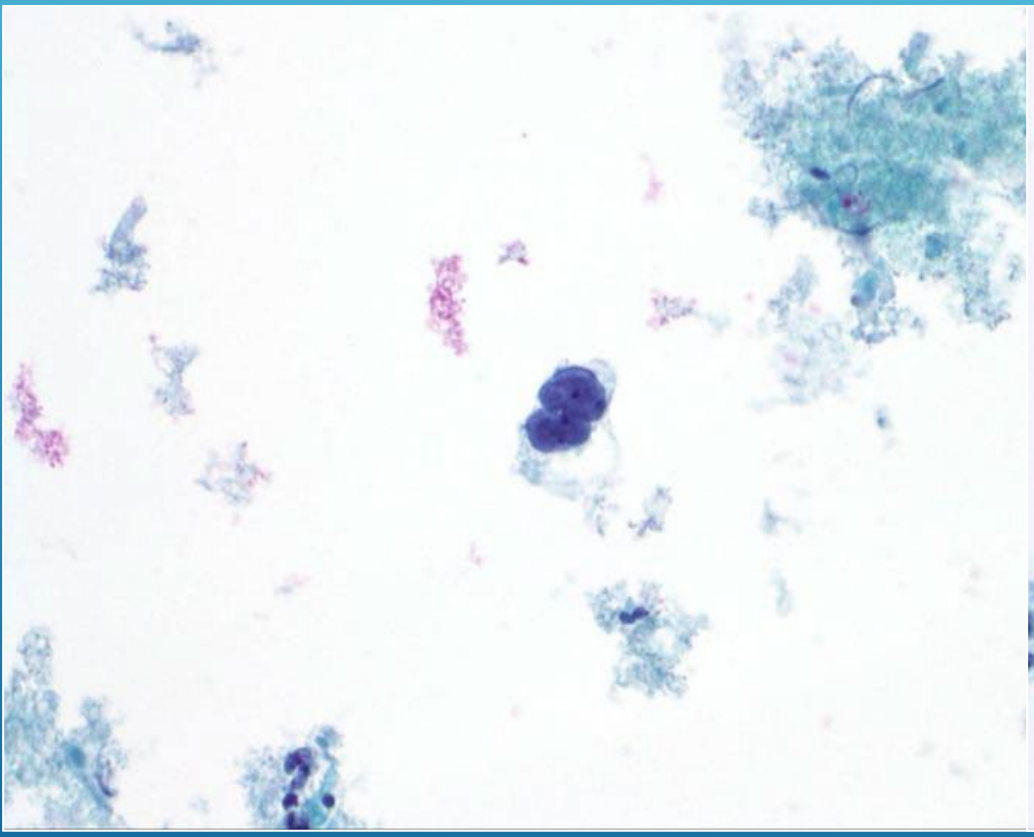
- *Tumor location*
- *Ulceration of mucosal surface*
- *Necrosis*
- *Inflammation*

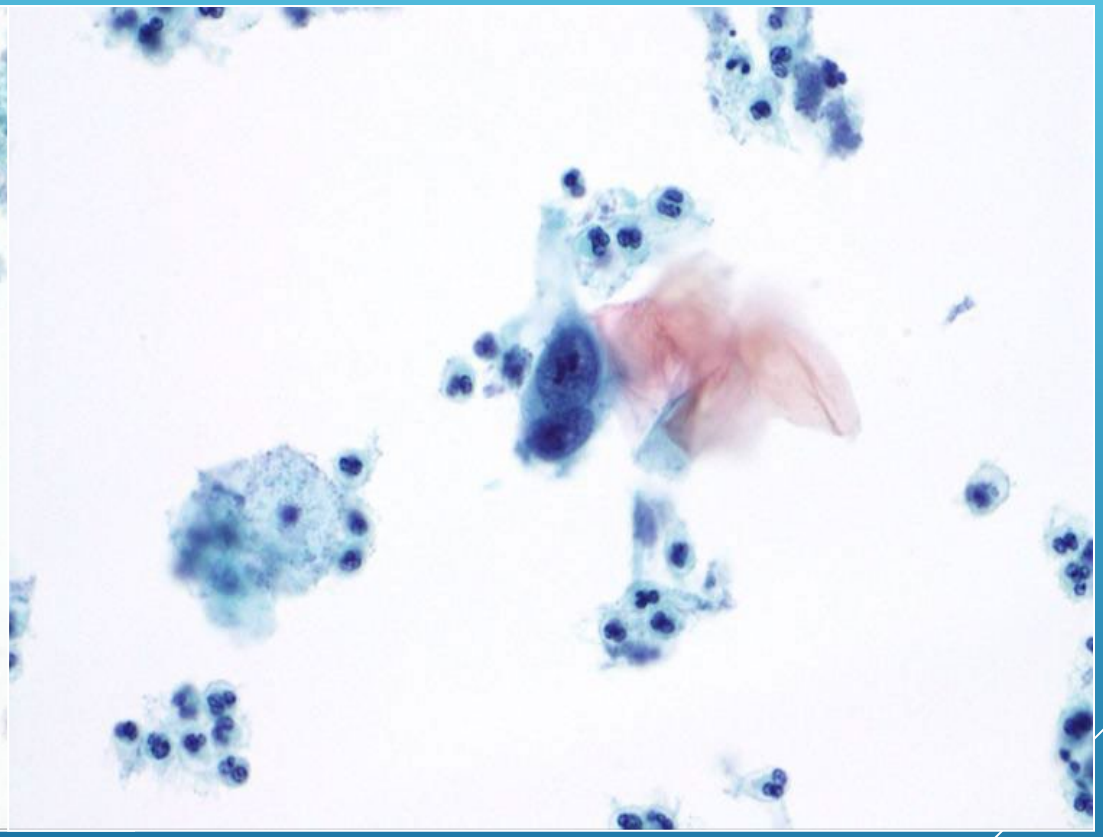
SARCOMAS

Stromal tumors	• Endometrial stromal sarcoma
Smooth muscle tumors	• Leiomyosarcoma *(conventional, epithelioid, myxoid)*
Mesenchymal	• Homologous *(angiosarcoma, fibrosarcoma, neurogenic sarcoma)* • Heterologous *(rhabdomyosarcoma, alveolar soft part sarcoma, rhabdoid tumor, epitheloid sarcoma)*

Leiomyosarcoma

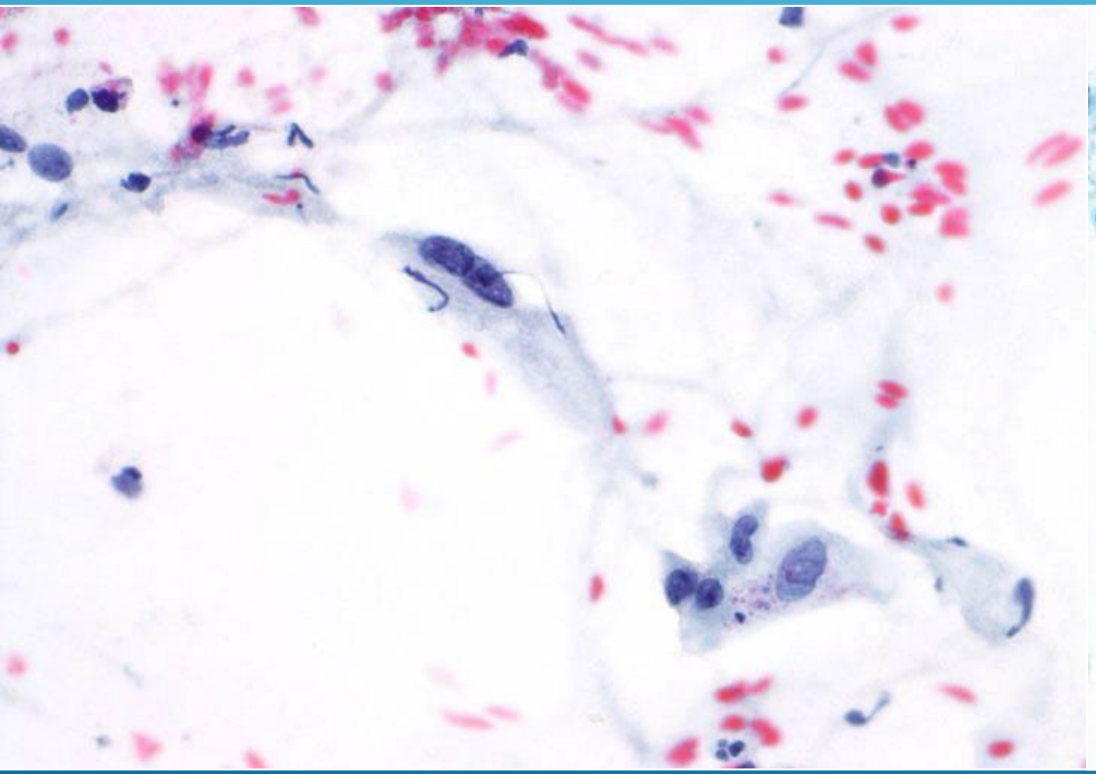
Digital Slide Case 2

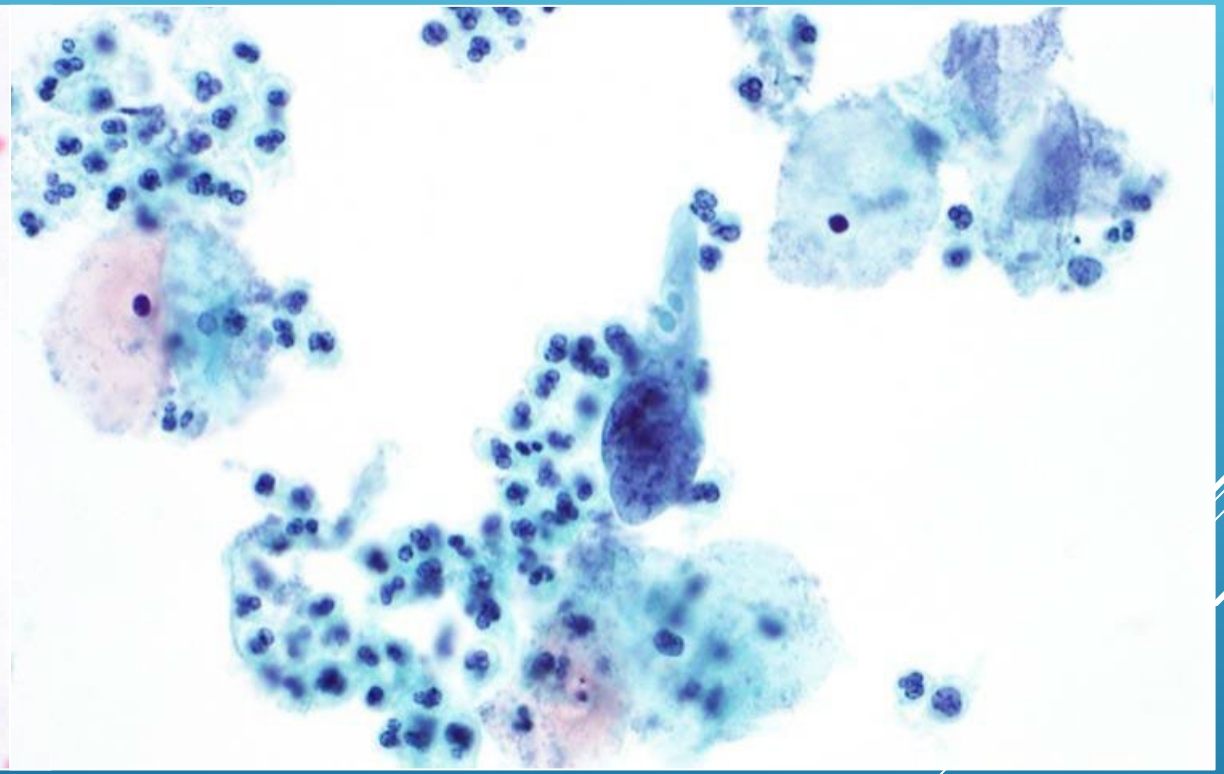


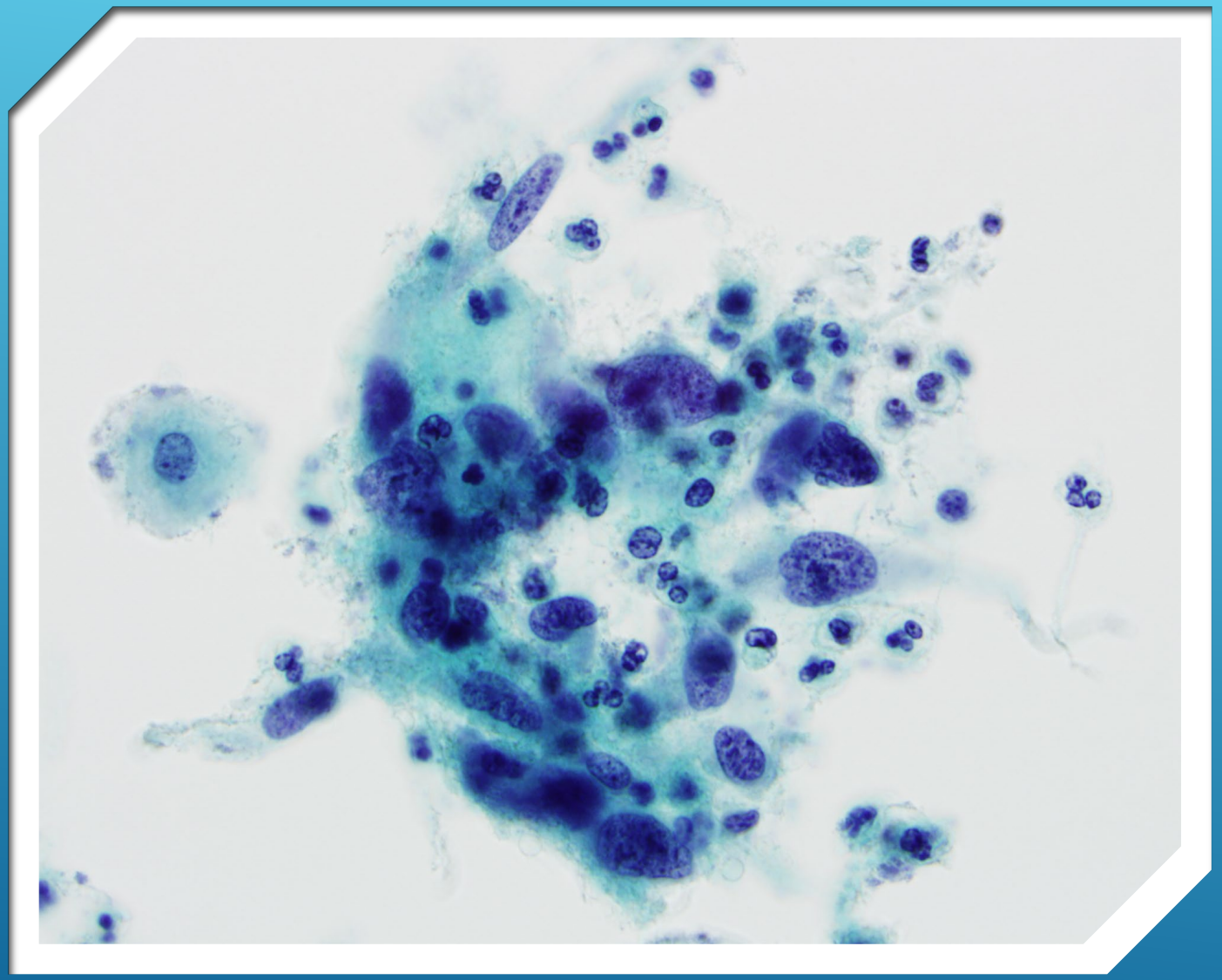


Metastatic malignant fibrous histiocytoma

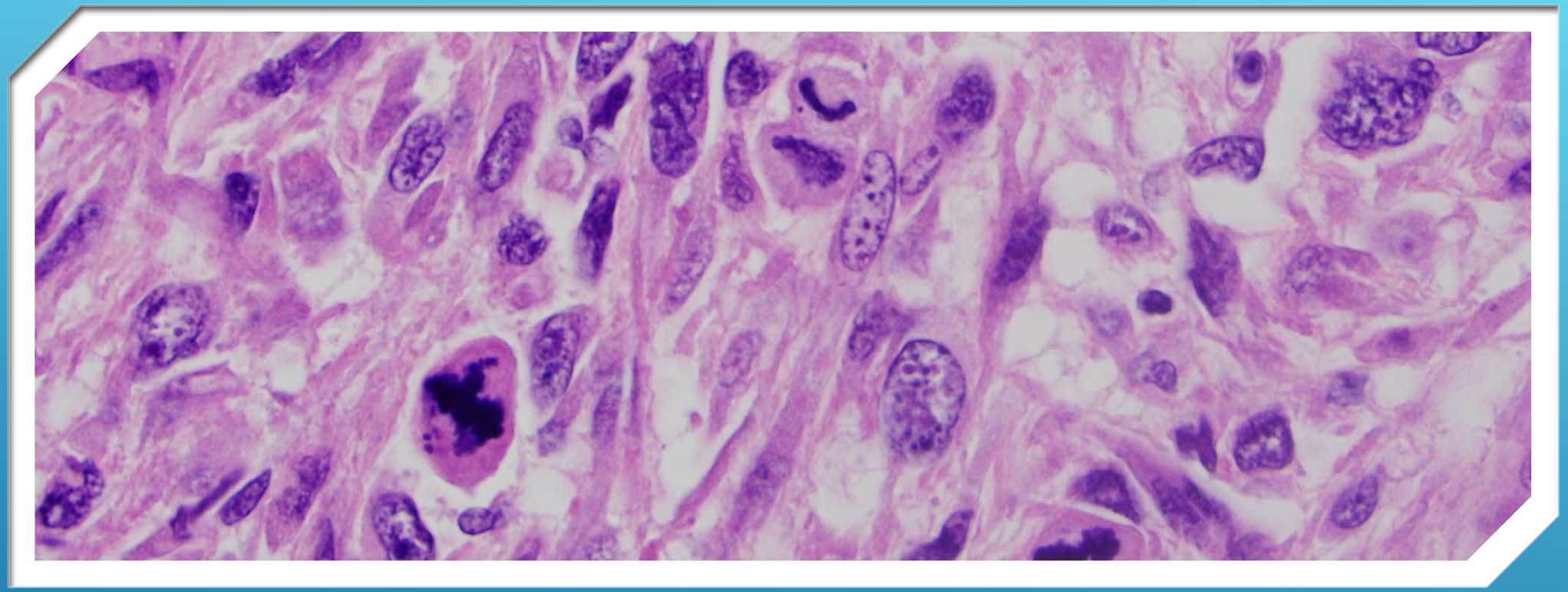
Digital Slide Case 2







LEIOMYOSARCOMA



SURGICAL PATHOLOGY: LEIOMYOSARCOMA

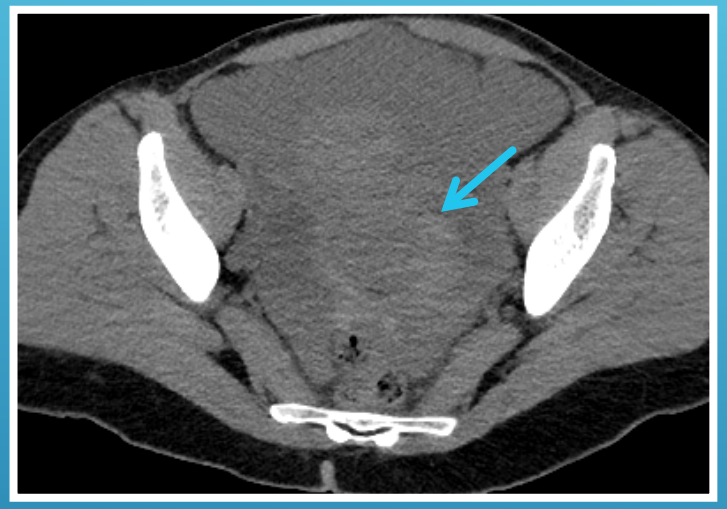
LEIOMYOSARCOMA

- The most common type of uterine sarcoma; smooth muscle tumor
- Rarely detected in Pap test
- Treatment options: hysterectomy, chemotherapy and targeted therapy

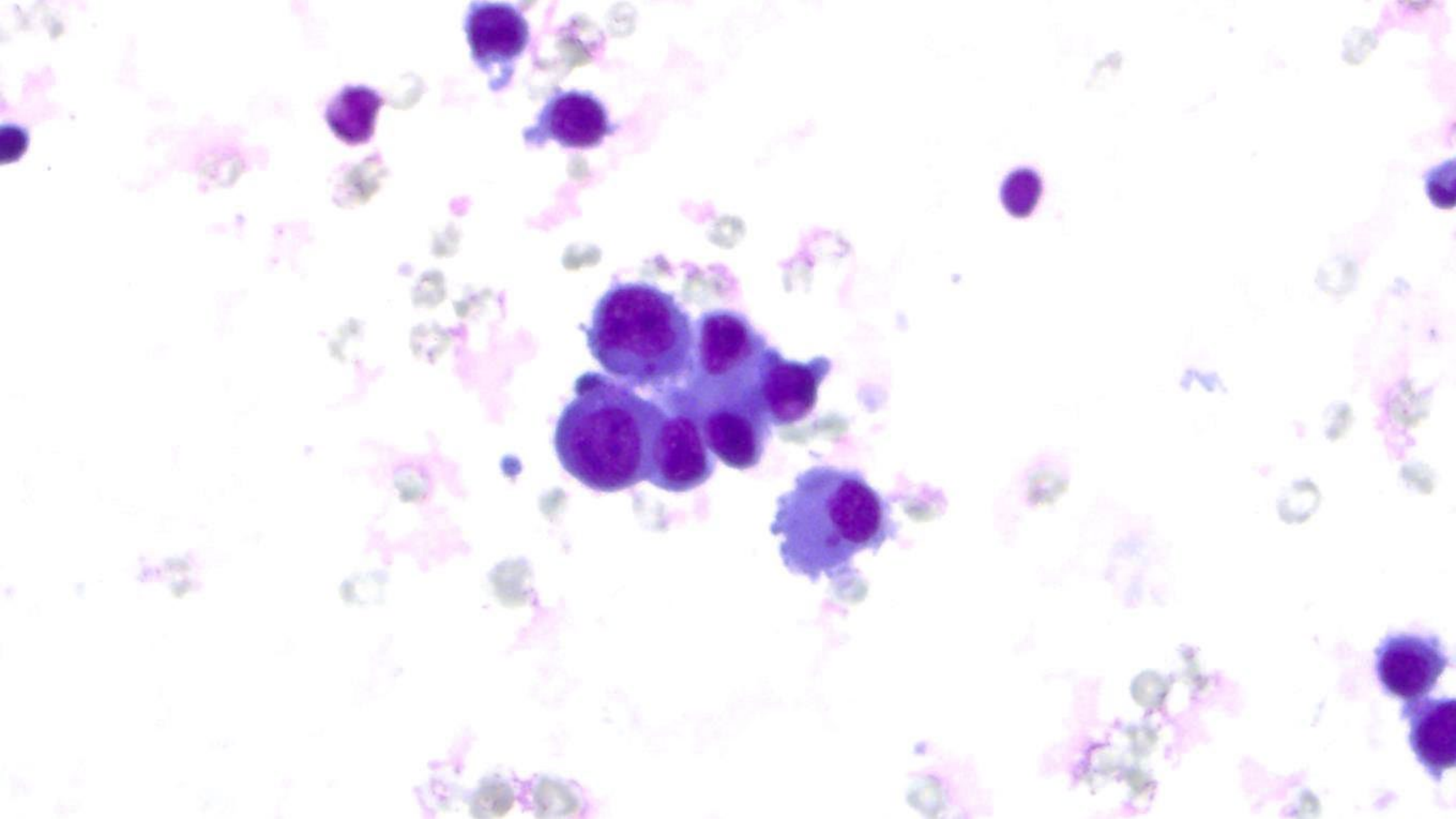
CASE 3:

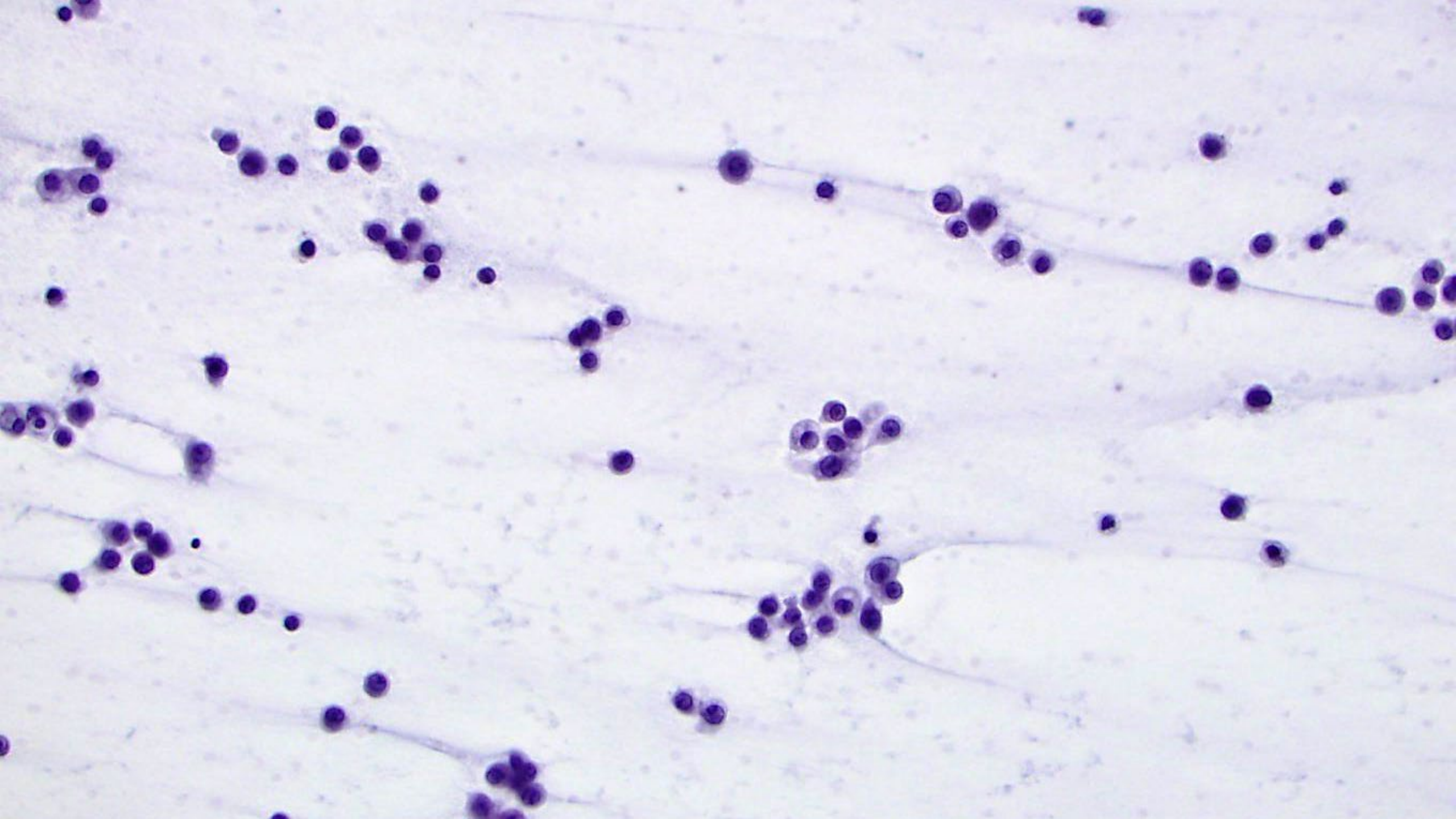
- 35-year-old woman
- Abdominal pain, SOB
- Physical exam reveals an enlarged non-tender abdomen
- History of femur – knee replacement
- Ascites reveals 3,000 ml cloudy, bloody fluid

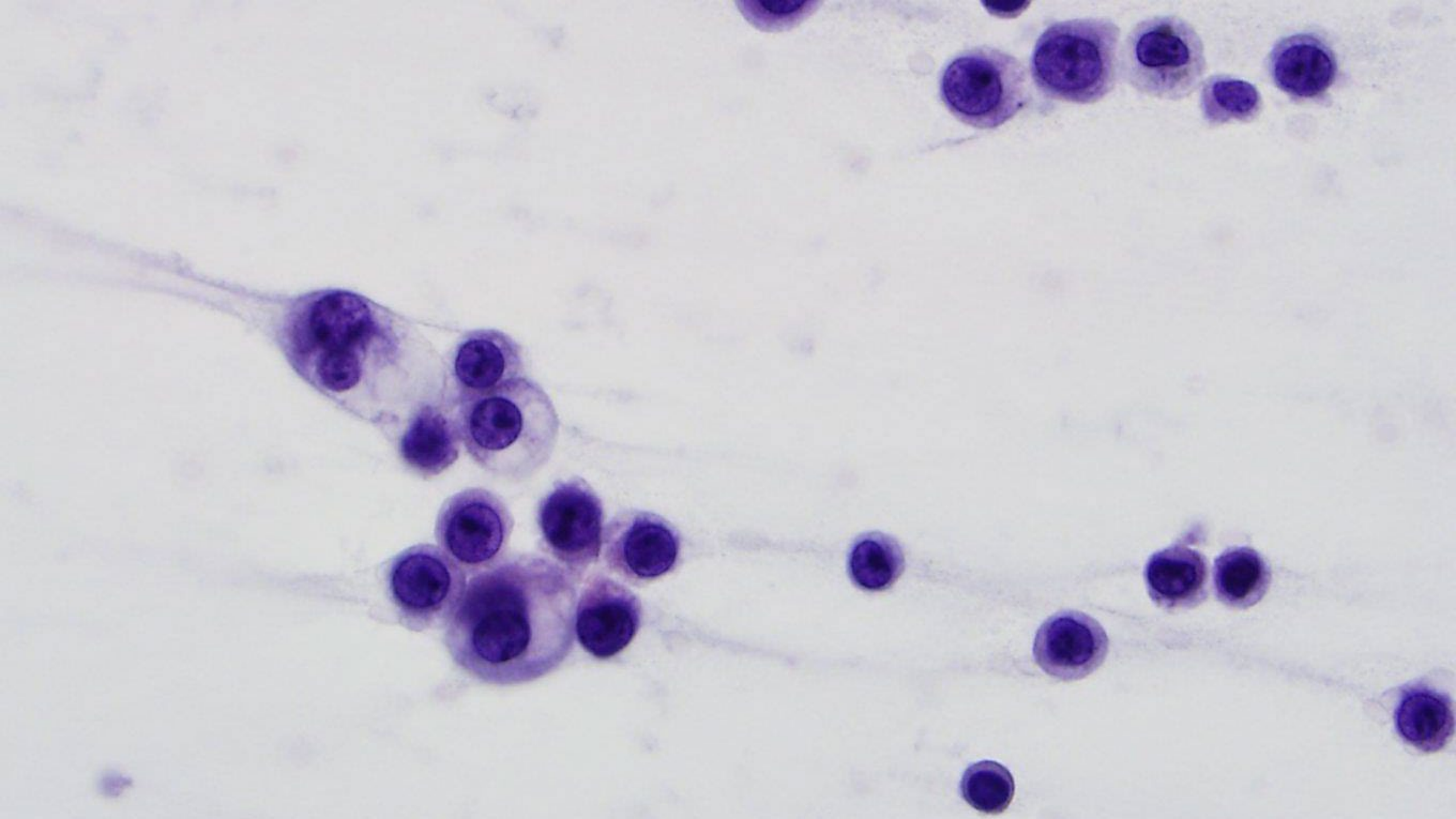
RADIOLOGY:

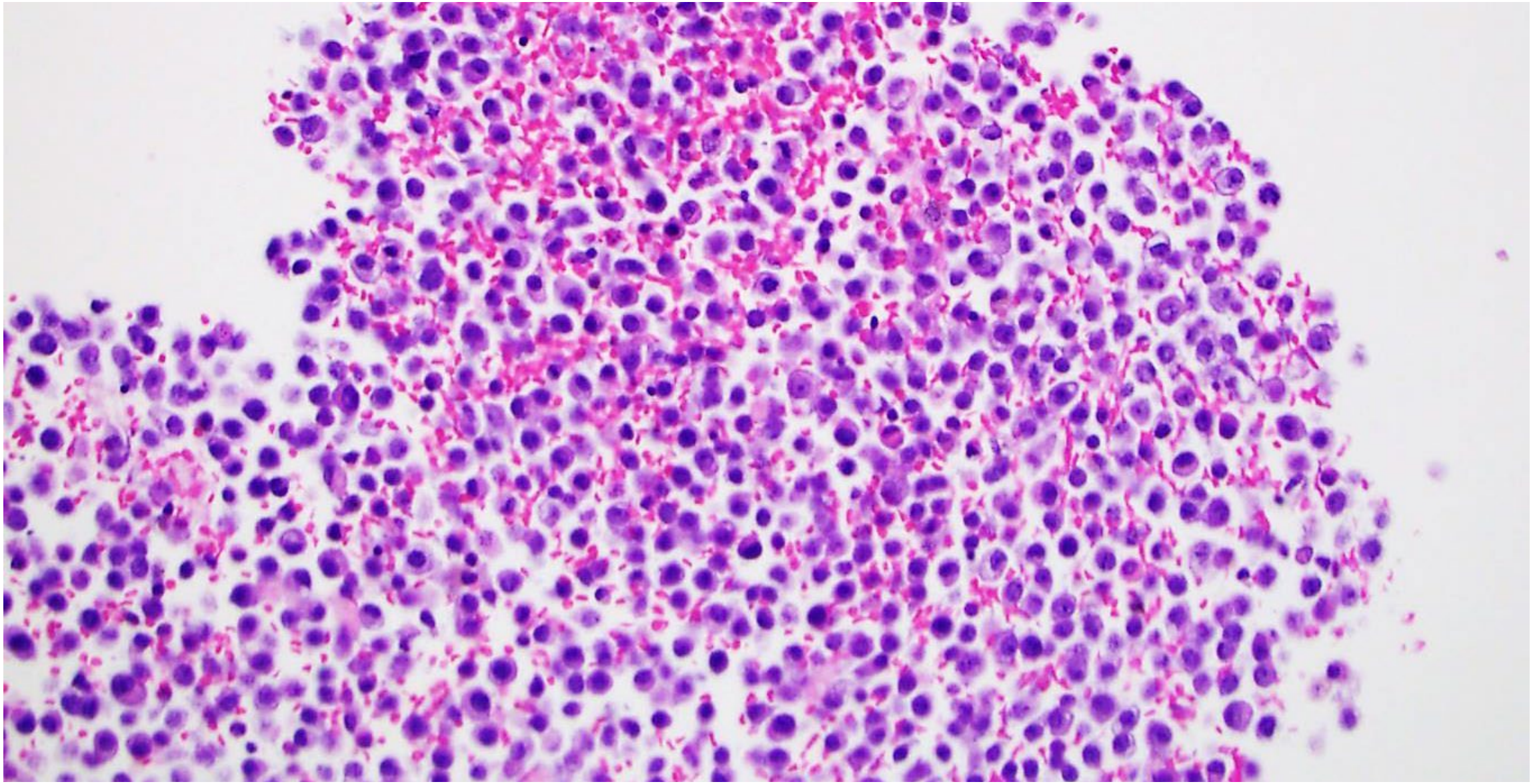


Axial non-contrast enhanced CT and fused PET/CT images show a heterogenous hypermetabolic left adnexal mass lesion (*blue arrows* with a moderate amount of intra-abdominal ascites (*yellow arrow*).



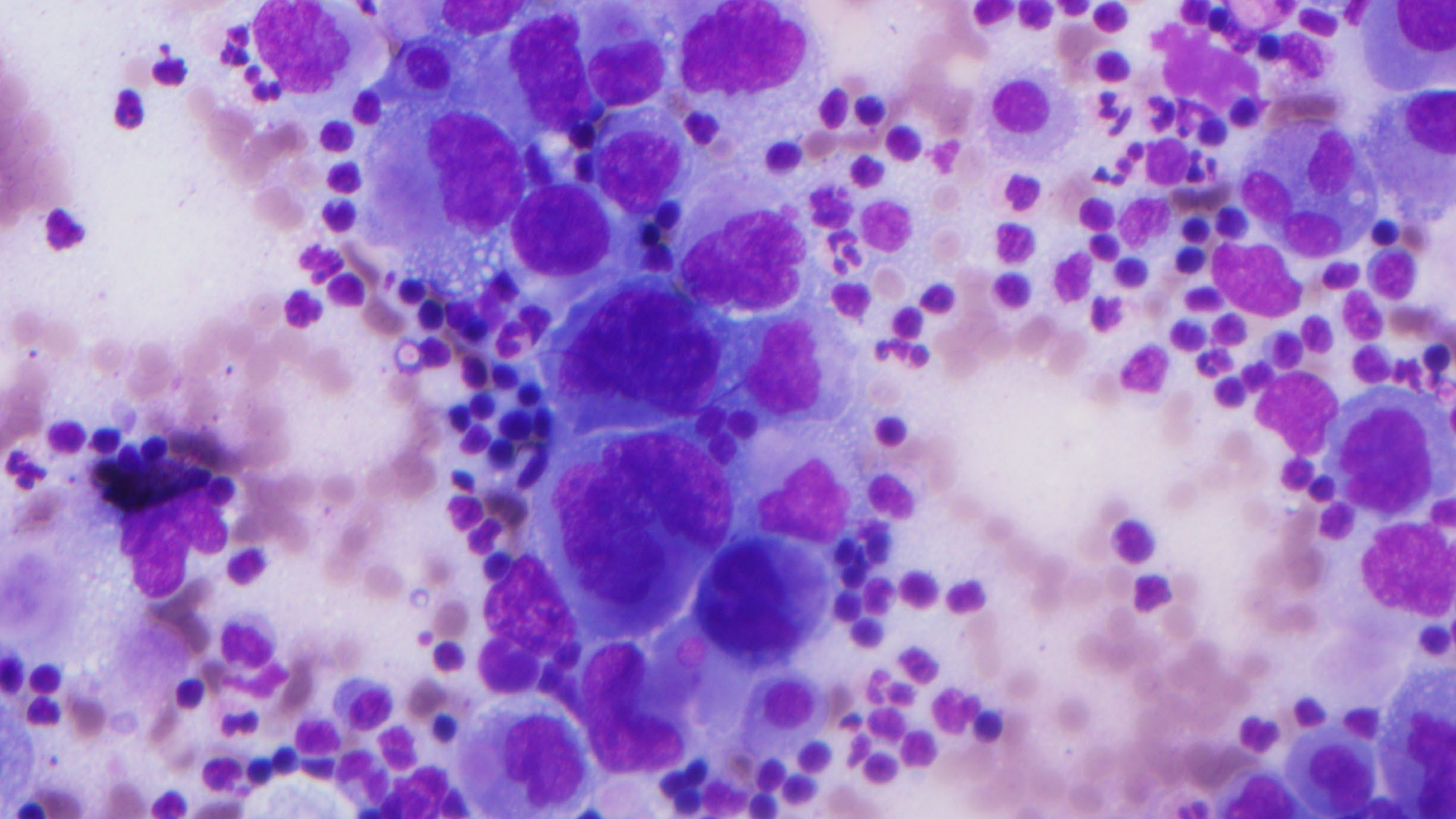


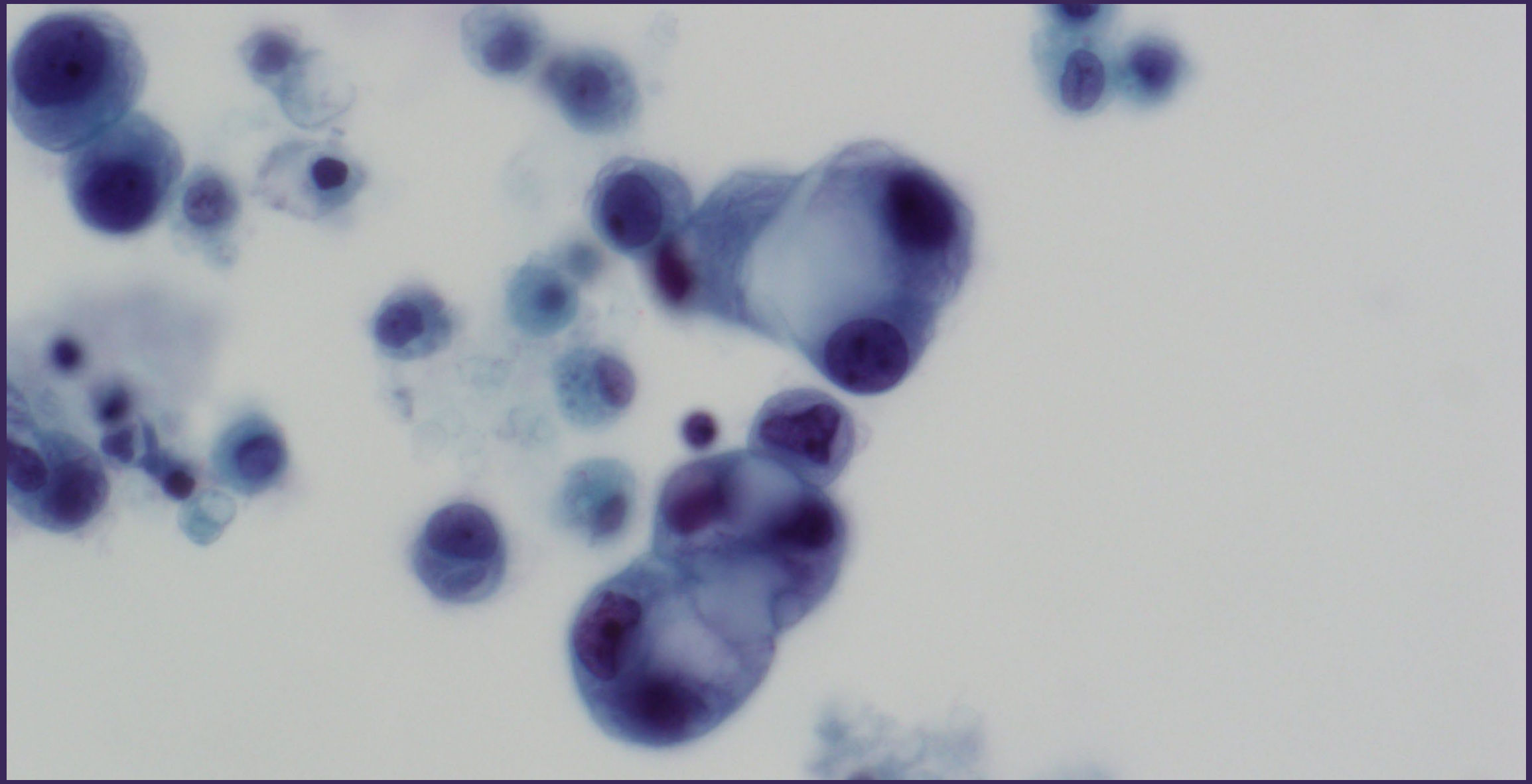


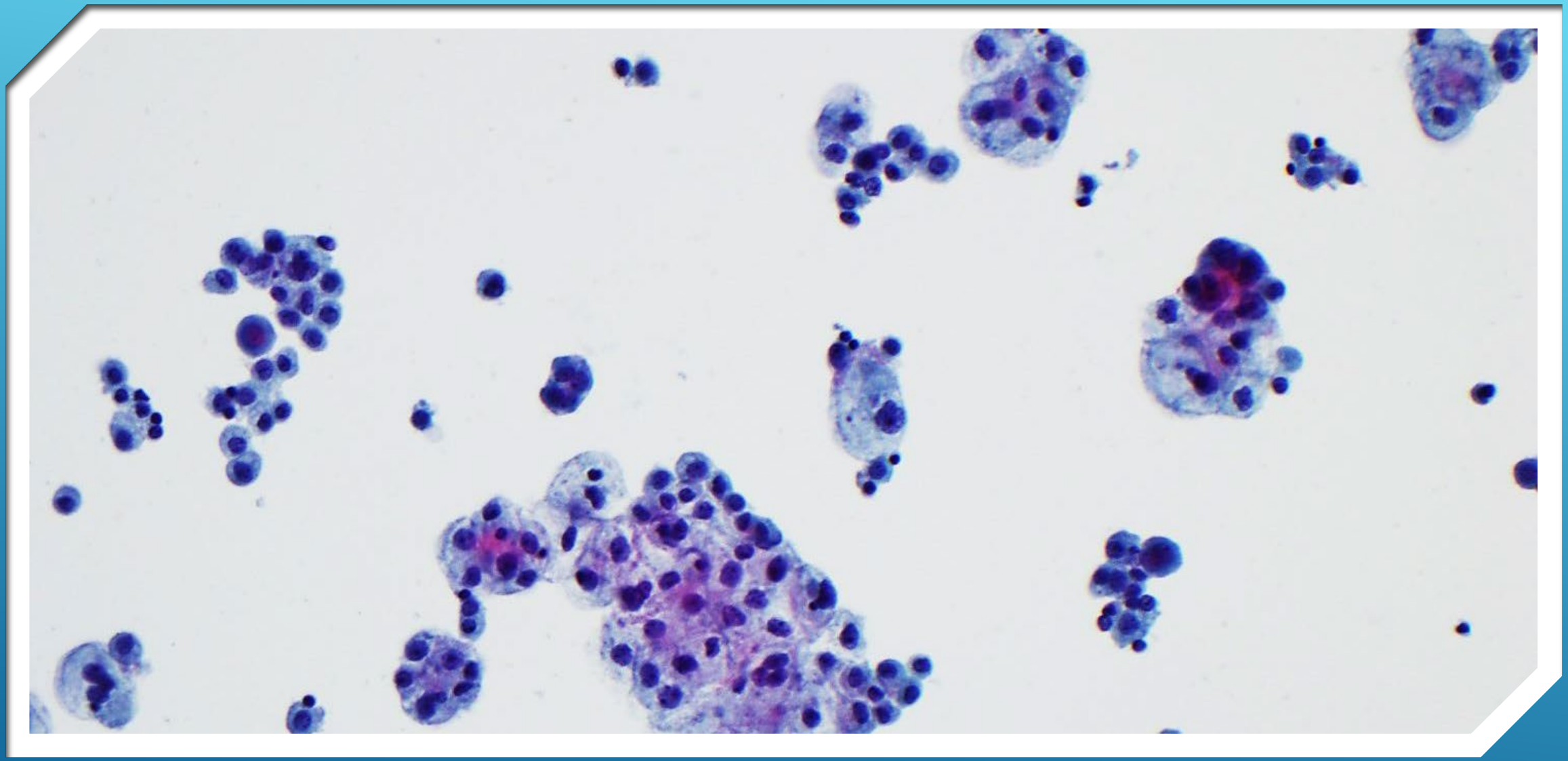


CASE 3: WHAT IS YOUR INTERPRETATION?

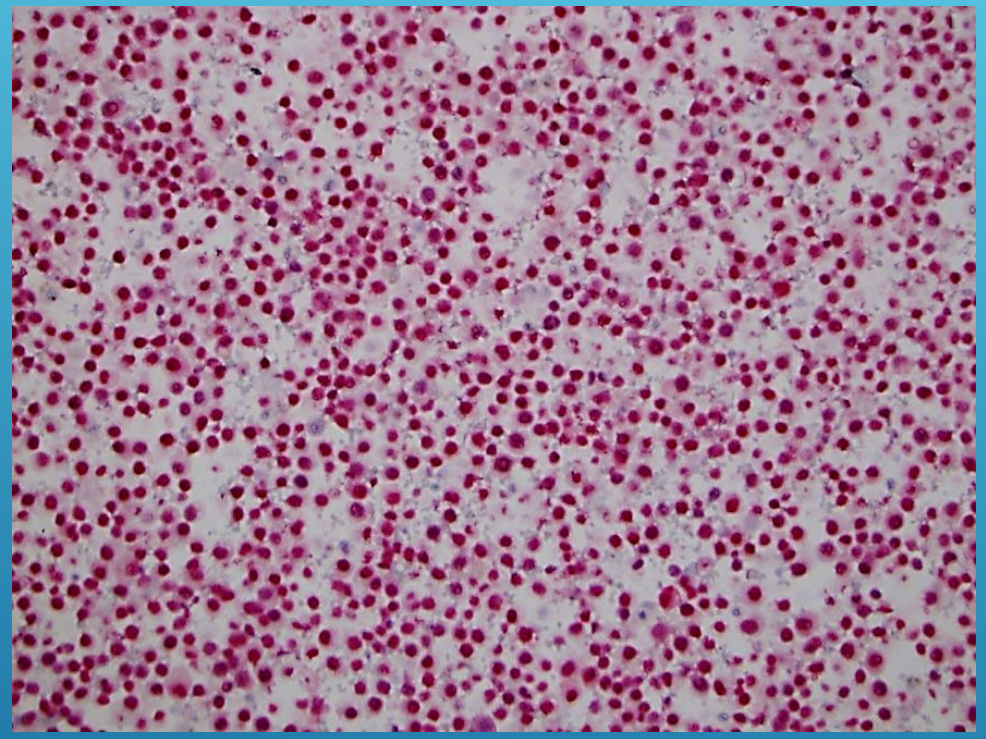
1. Adenocarcinoma, GYN primary
2. Adenocarcinoma, lung primary
3. Metastatic melanoma
4. Metastatic renal cell carcinoma



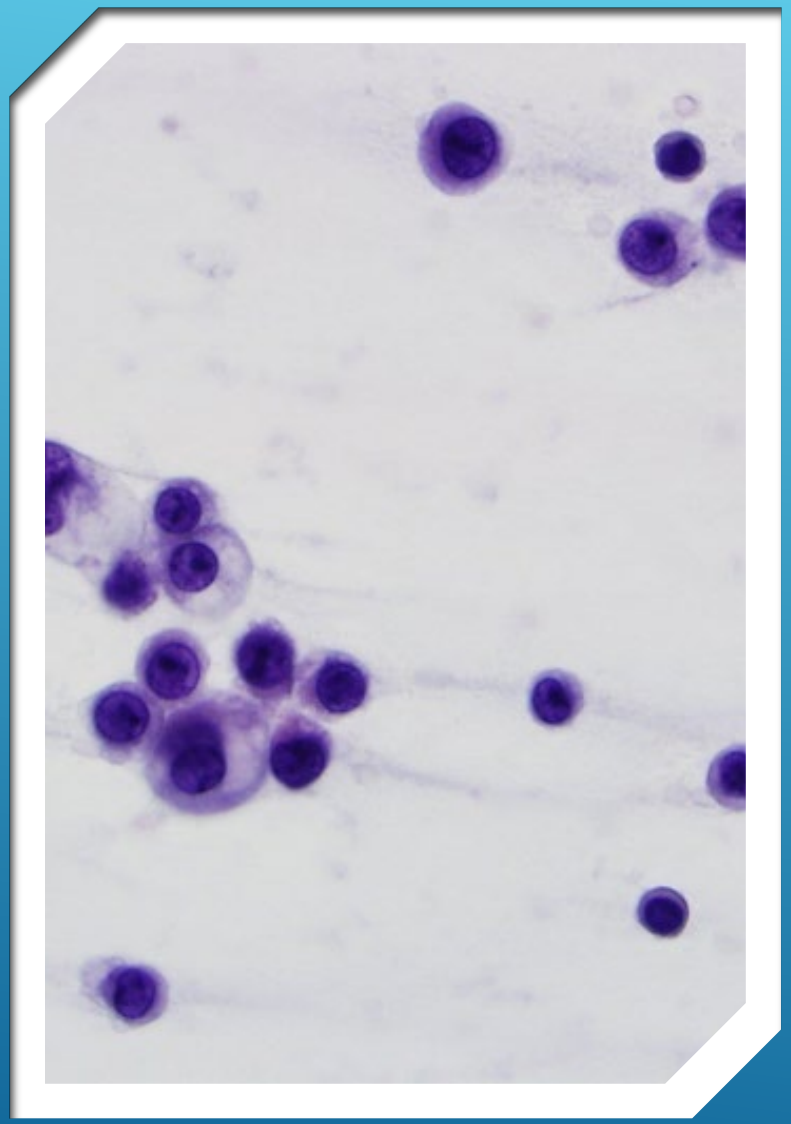




Melan A, SOX 10, S100 +



SOX 10 IMUNOHISTOCHEMISTRY



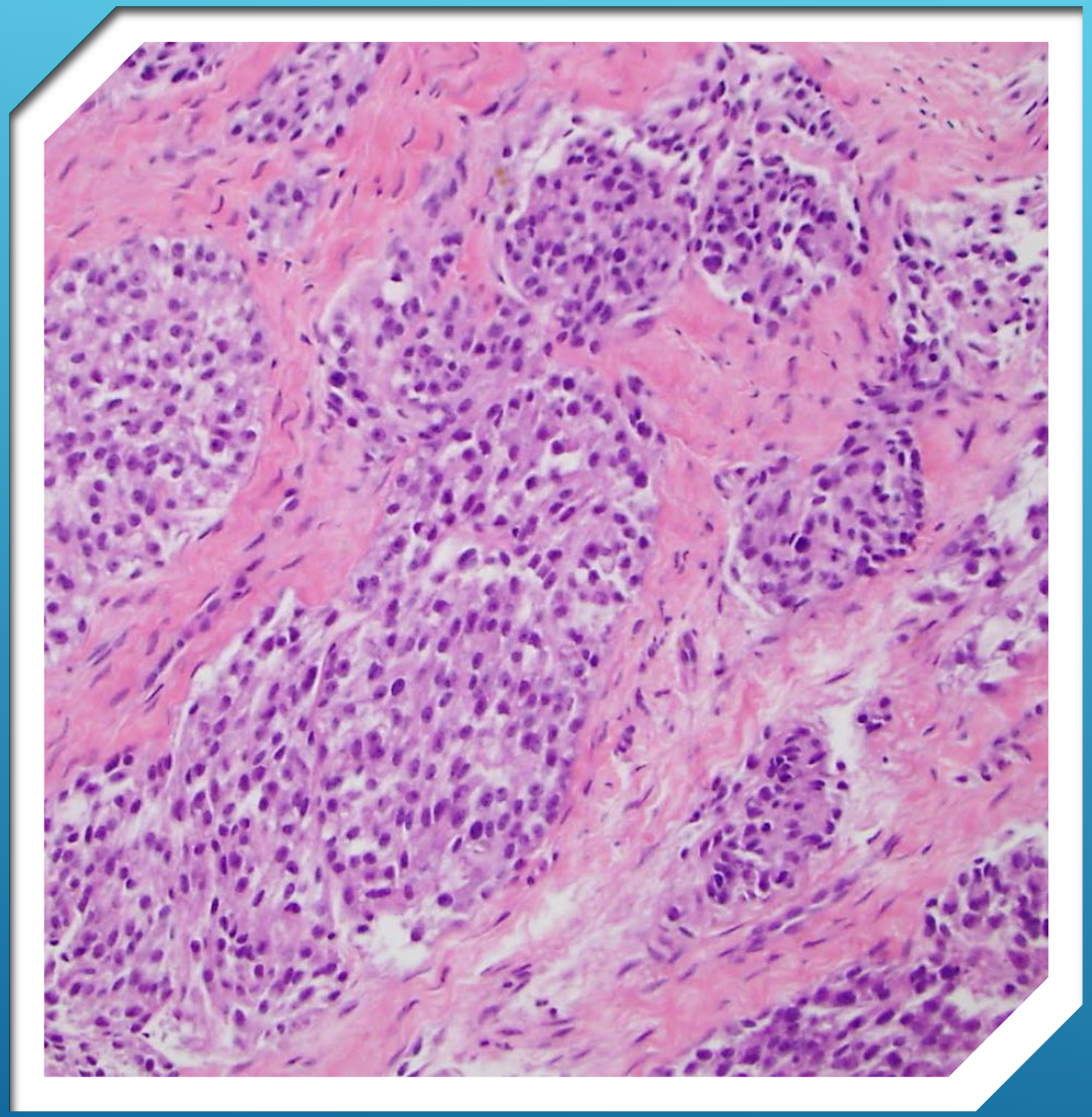
Ascitic fluid:

Positive for malignancy consistent with history of clear cell sarcoma (malignant melanoma of soft parts).

Cell block and cytologic preparations examined.

Immunohistochemical stains performed on the cell block with appropriate controls show the cells of interest mark with S-100, Melan A and SOX 10. These staining results support melanocytic differentiation. Positive controls for IHC stains and negative tissue elements were both evaluated and are adequate for diagnosis.

CYTOPATHOLOGIC INTERPRETATION:



Soft tissue, medial aspect of left foot, biopsy: Malignant melanoma (clear cell sarcoma) of soft parts

SURGICAL PATHOLOGY:

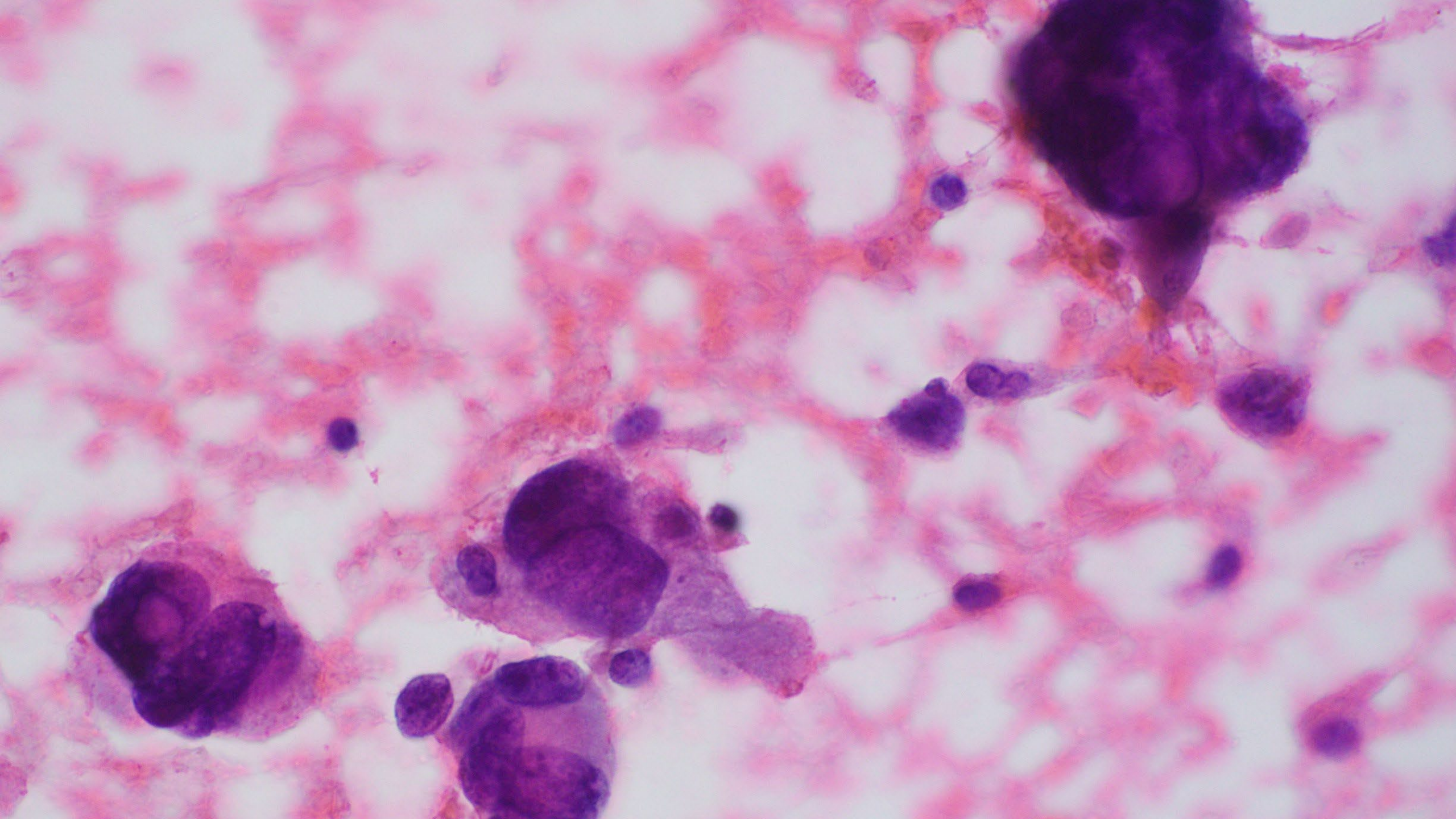
CLEAR CELL SARCOMA – MALIGNANT MELANOMA OF SOFT PARTS

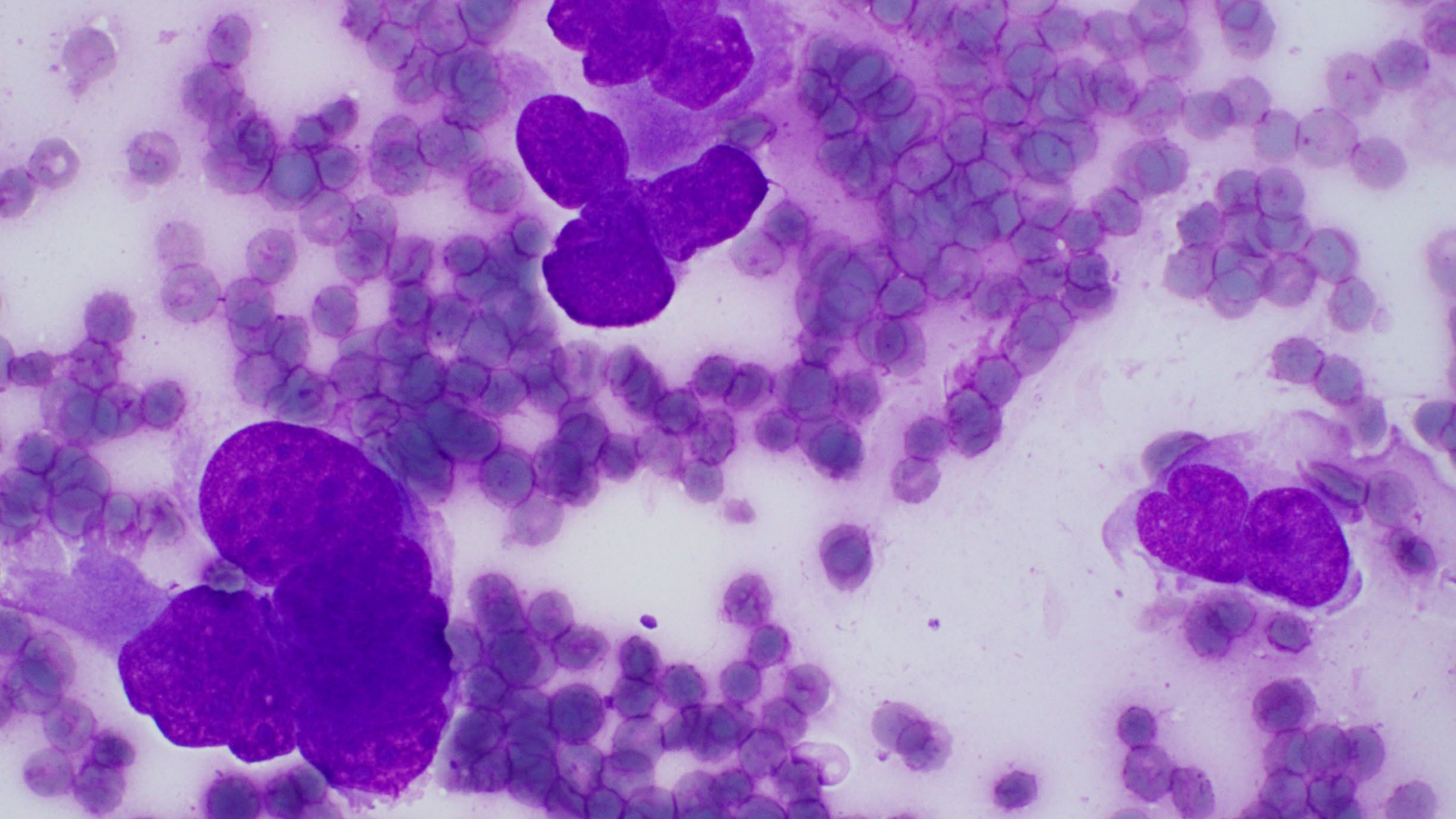
- Rare, but very aggressive tumor of adolescence/young adults
- Deep soft tissue tumors of extremities, trunk or limb (particularly of foot)
- Gross: Firm, well-circumscribed lesions
- Prognosis: Size of tumor most important factor. Local recurrence and metastatic disease to lymph nodes and lung
- IHC: Melan A, Sox 10, S-100, HMB-45
- Molecular: t(12;22)(q13;q12)
- Survival – one study 60% in five years

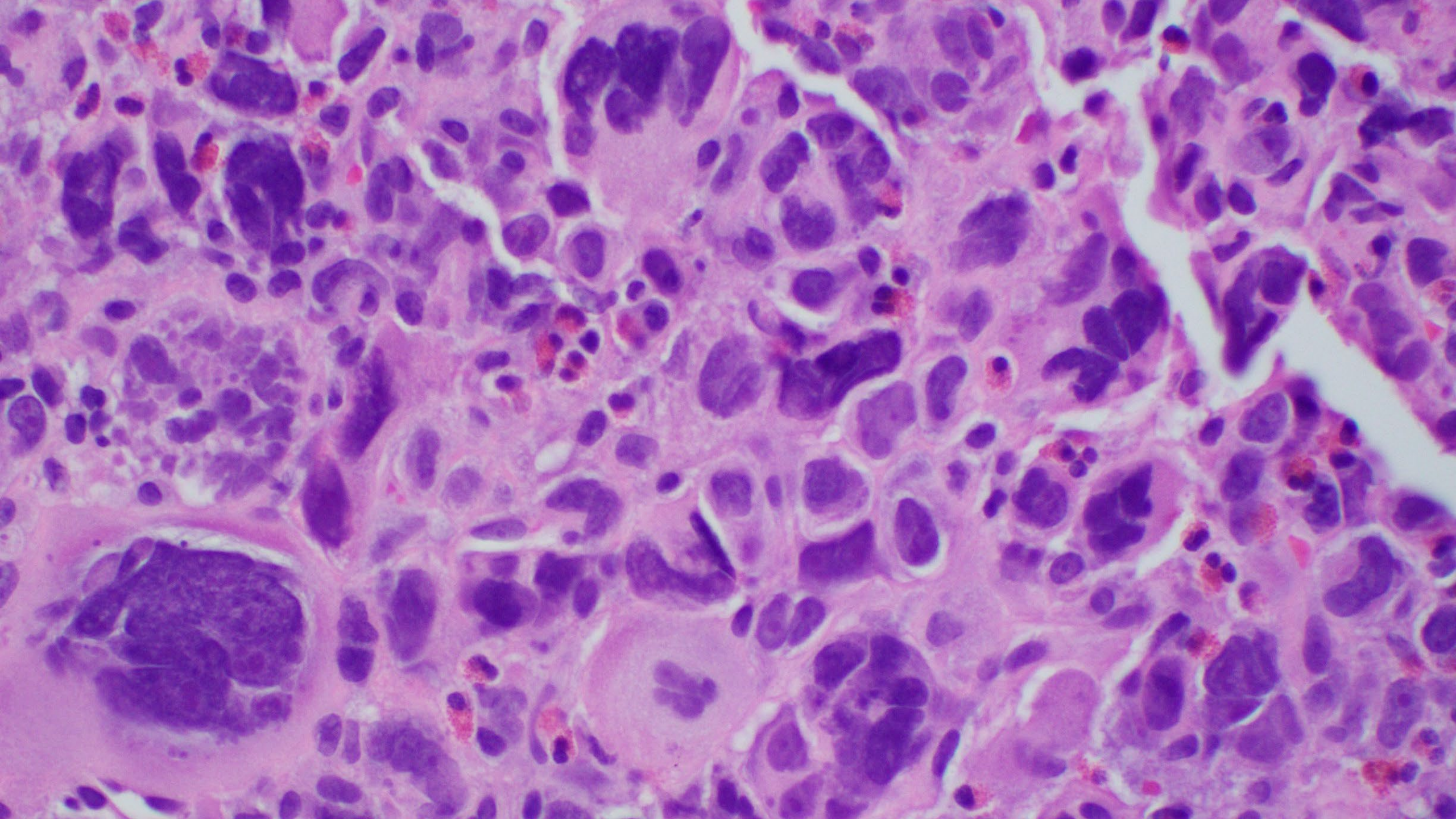
CASE 4:

- 74-year-old man
- History of GERD/hypertension
- Former smoker, quit 5 years ago
- Abdominal pain, pancreatitis
- Pancreas; endoscopic ultrasound-guided fine needle aspiration

IMAGING
CT SCAN
4.3 CM PANCREATIC HEAD LESION

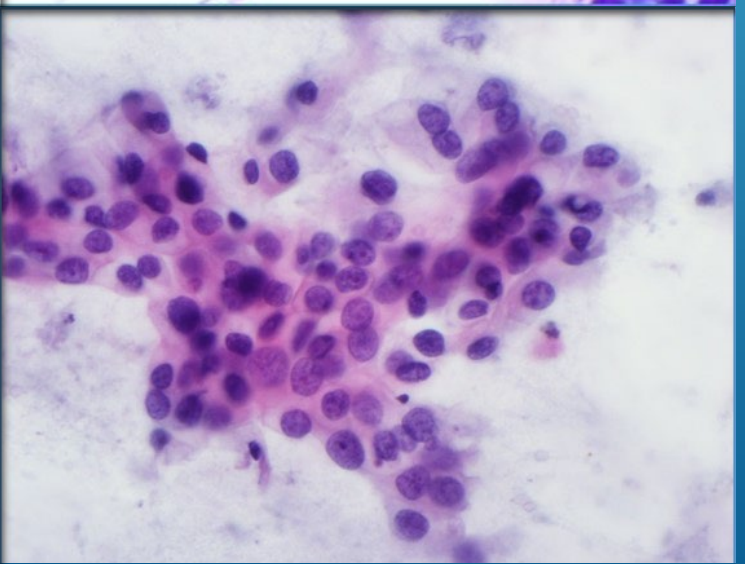






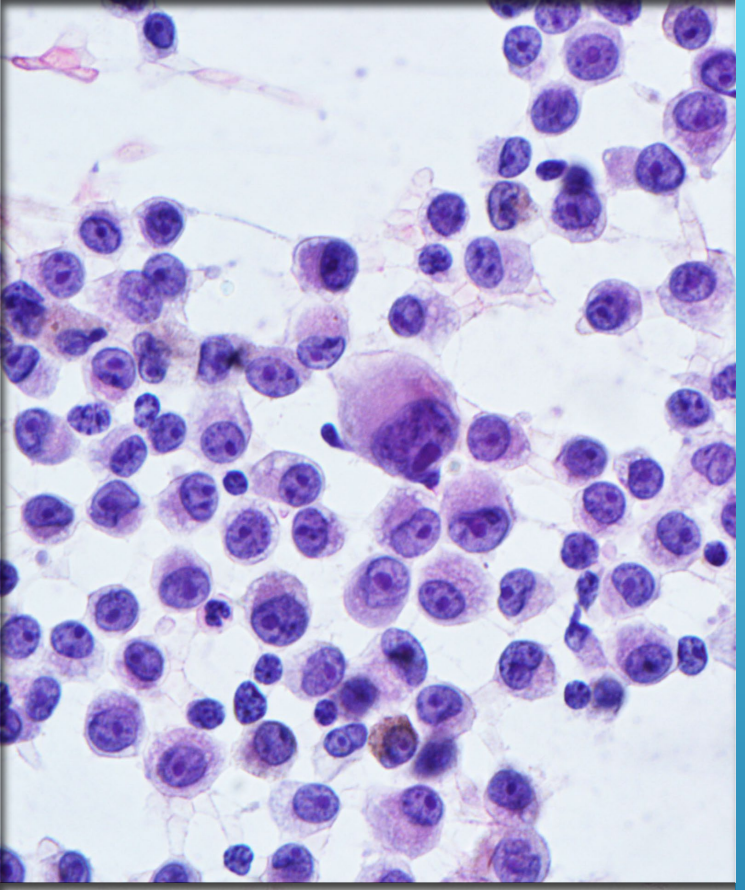
CASE 4: WHAT IS YOUR INTERPRETATION?

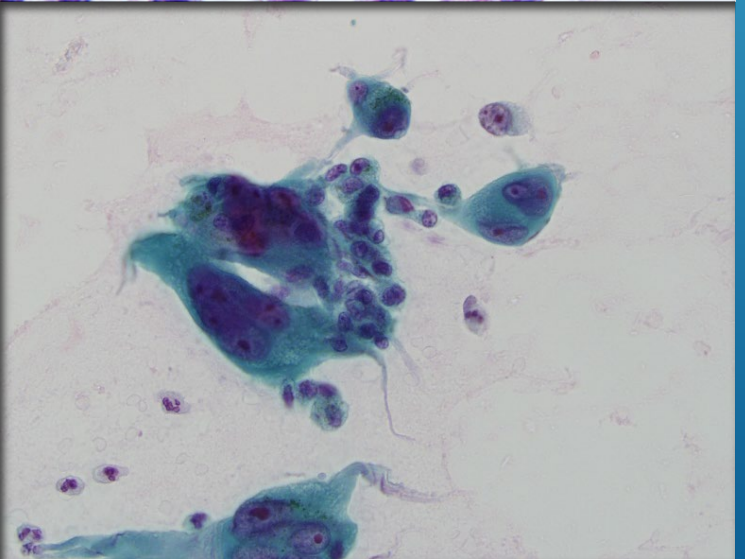
1. Metastatic Sarcoma
2. Metastatic Melanoma
3. Ductal adenocarcinoma, pancreas
4. Undifferentiated (anaplastic) carcinoma, pancreas



- Most common tumor of the pancreas (80-90% of all tumors)
- Often occurs in the head of the pancreas
- **Cytology**:
  - Moderate to high cellularity
  - Crowded sheets (drunken honeycomb)
  - Nuclear enlargement
  - Isolated malignant cells
  - Irregular nuclear contours
  - Irregular chromatin distribution

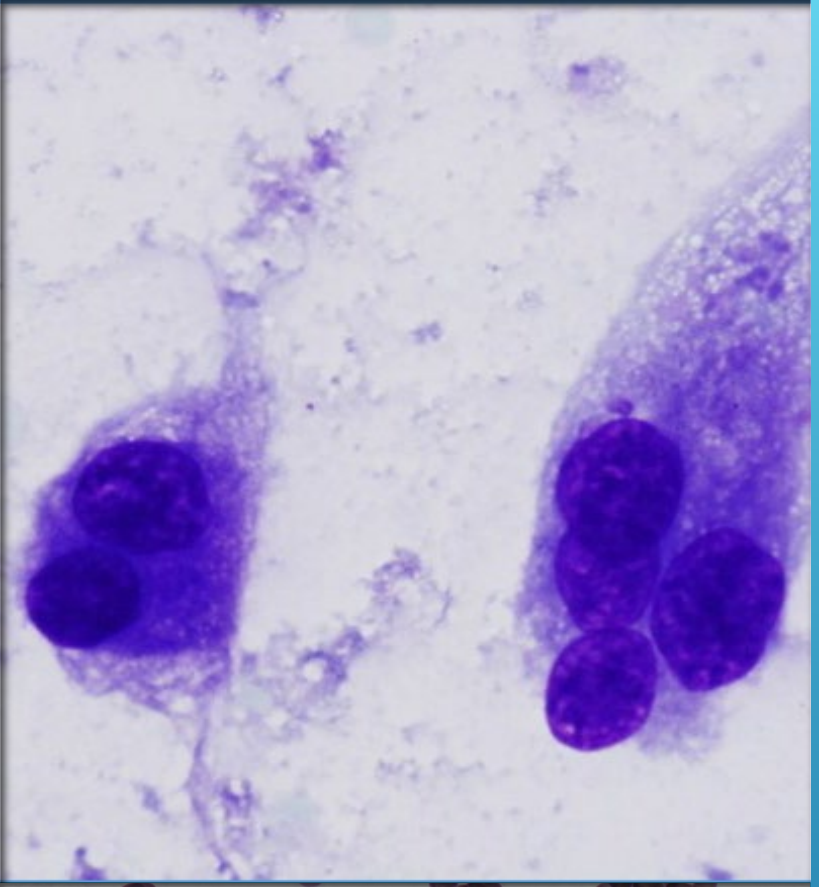
PANCREATIC DUCTAL ADENOCARCINOMA

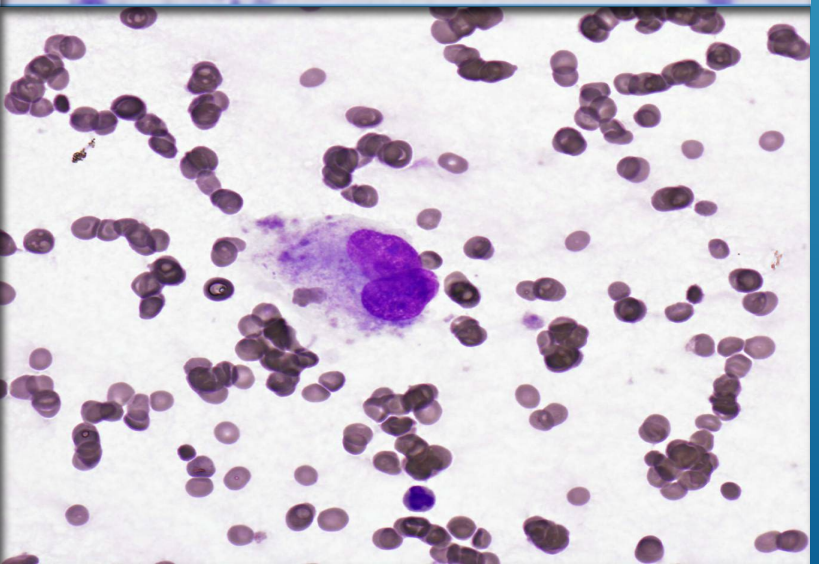




- The "great mimicker"
- **Cytology**:
  - Big, ugly, bizarre tumor cells
  - Binucleation is common
  - Eccentric nuclei
  - Macronucleoli
  - Melanin pigment may be present
  - Predominantly single cells
  - May form small, loose aggregates
  - Fine, pale chromatin
  - Cytoplasm can be dense or vacuolated

METASTATIC MELANOMA



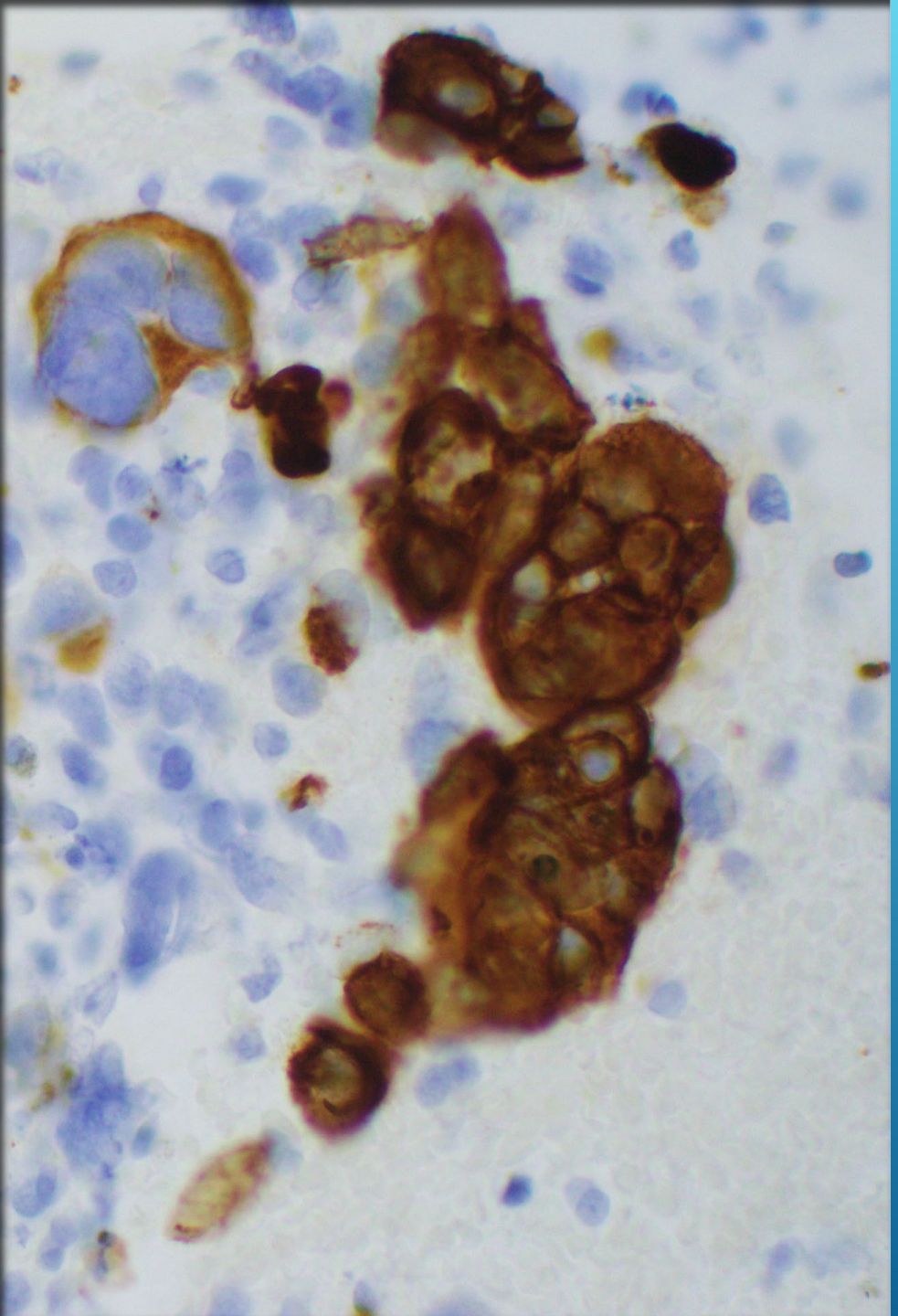


- 9,500 new cases per year in US
- Easy to recognize as malignant but difficult to classify
- **Cytology**:
  - Mostly single cells, "ugly"
  - Abnormal nuclei
  - Pleomorphic
  - Glassy/granular/fibrillar cytoplasm
  - Poorly defined cell borders

METASTATIC SARCOMA

DIFFERENTIALS

- Pancreatic Ductal Adenocarcinoma
- Metastatic Melanoma
- Metastatic Sarcoma

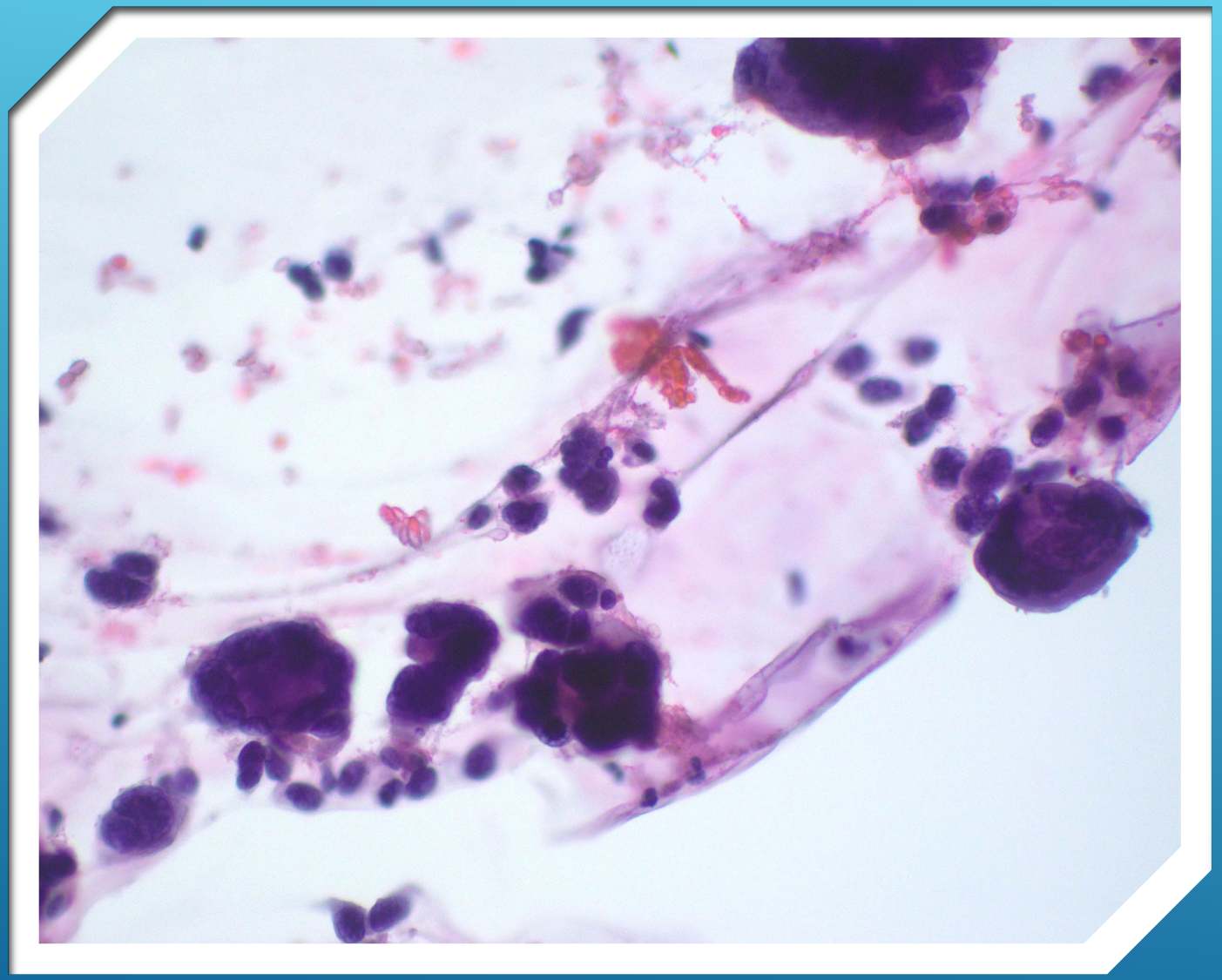


IMMUNOHISTOCHEMISTRY

AE1/AE3 IHC Stain, 40x

IMMUNOHISTOCHEMISTRY

	AE1	AE3	Ca19-9	CK19	CEA
Pancreatic Ductal Adenocarcinoma	-	-	+	+	+
Anaplastic Pancreatic Carcinoma	+	+	-	-	-
Metastatic Melanoma	-	-	-	-	-
Metastatic Sarcoma	-	-	-	-	-



CYTOLOGIC DIAGNOSIS

Anaplastic (Undifferentiated) Carcinoma

ANAPLASTIC PANCREATIC CARCINOMA

Rare, aggressive tumor → 2-7% of all pancreatic tumors

Male predominance

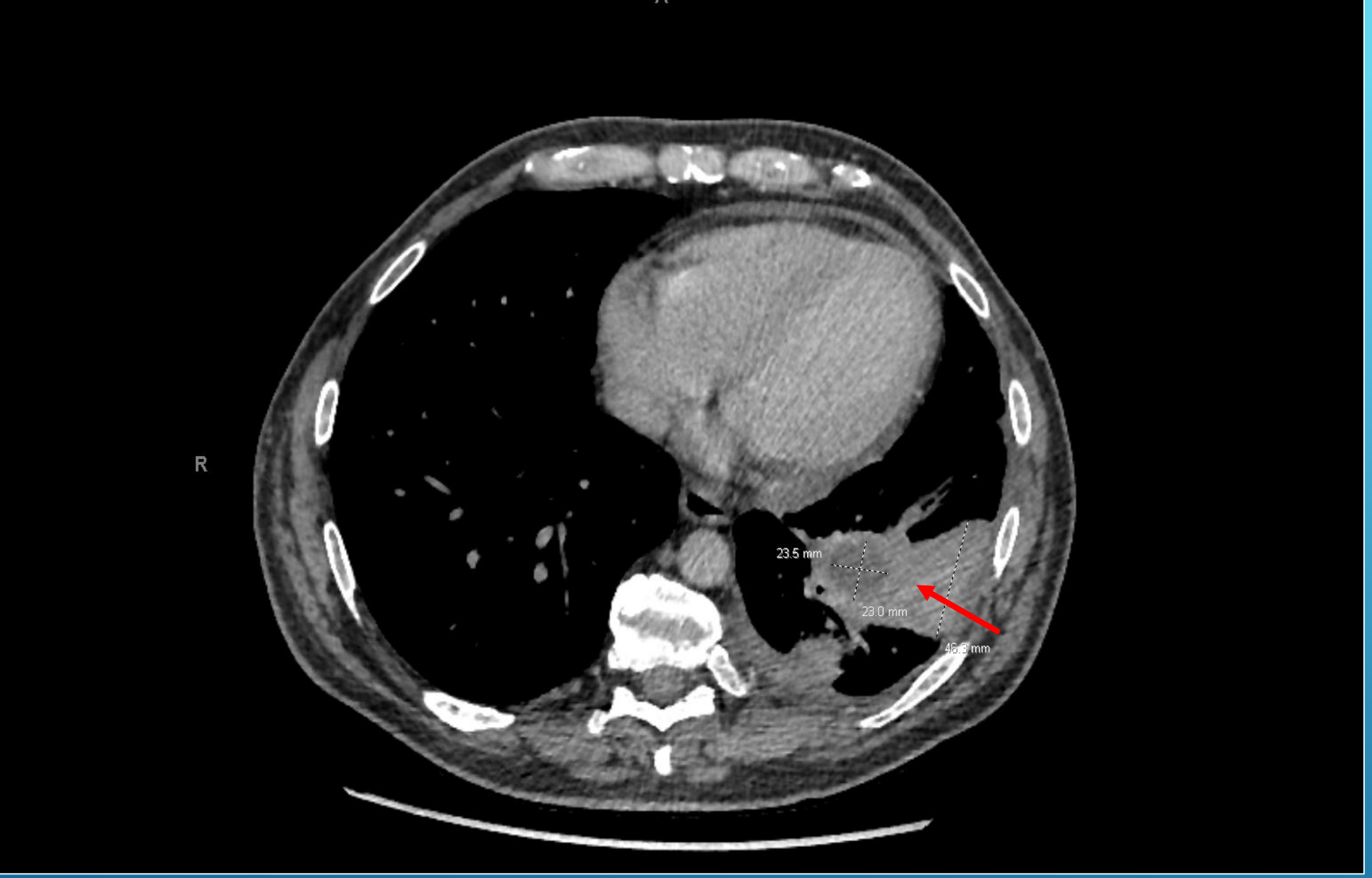
Most are located on the head of the pancreas

Poor prognosis → 3-year survival is 2%

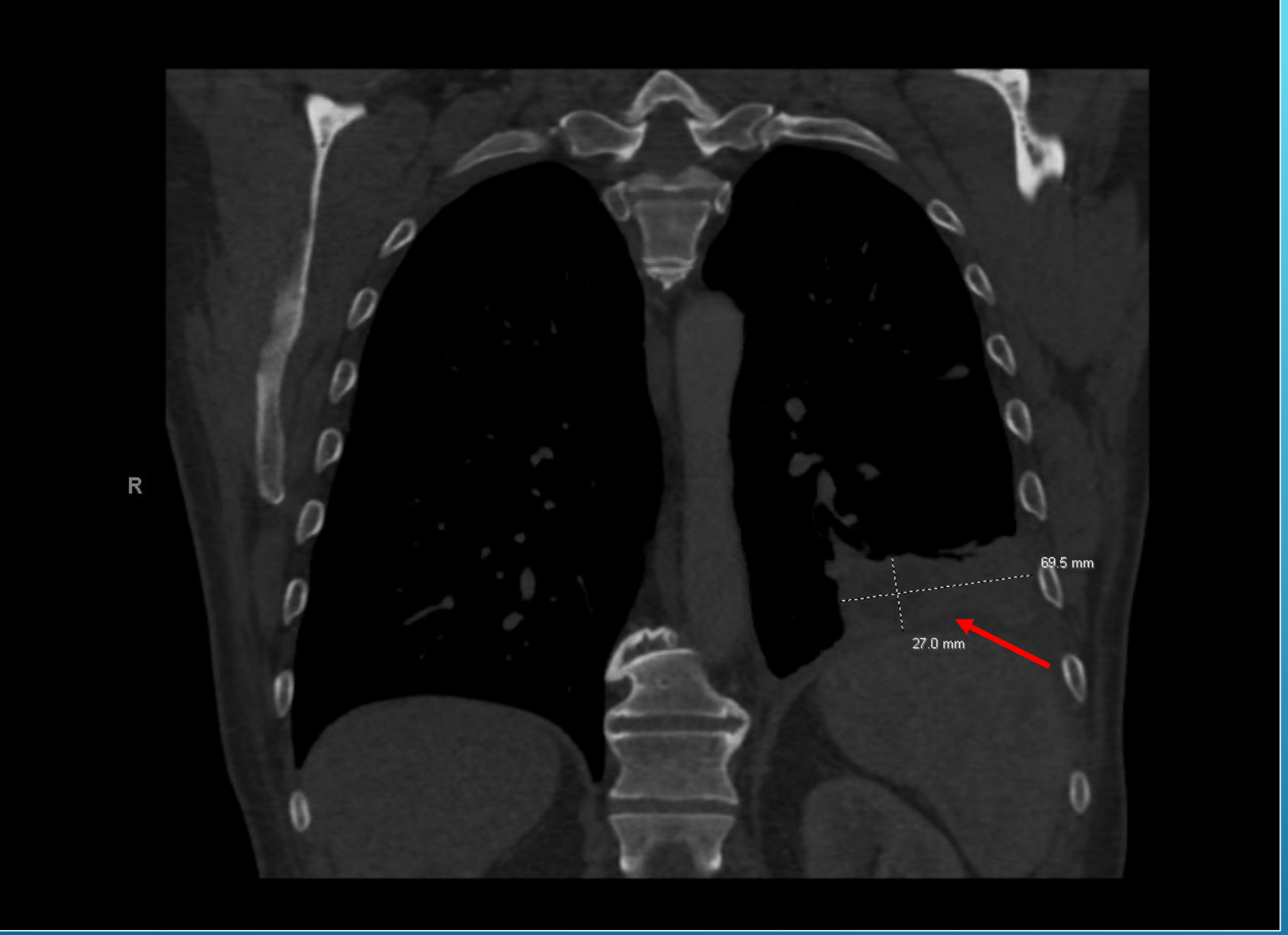
- Worse than that of ductal adenocarcinoma

CASE 5:

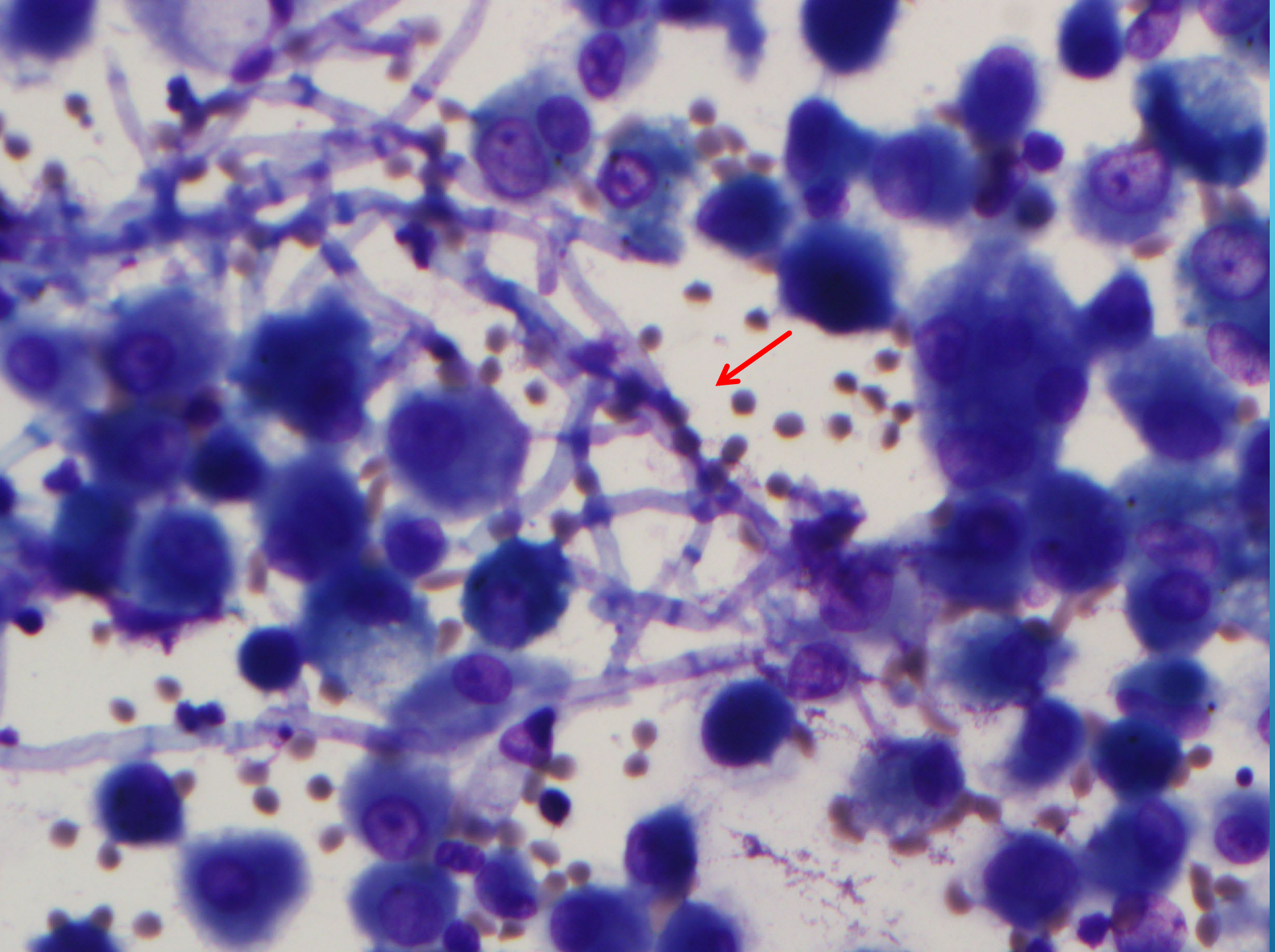
- 67-year-old man
- Right middle lobe lung lesion
- Rule out infection versus carcinoma
- Lung, left lower lobe, EBUS FNA
- Bronchial Brush and BAL; left lower lobe



Chest CT with contrast LLL lesion



Chest CT with contrast LLL lesion

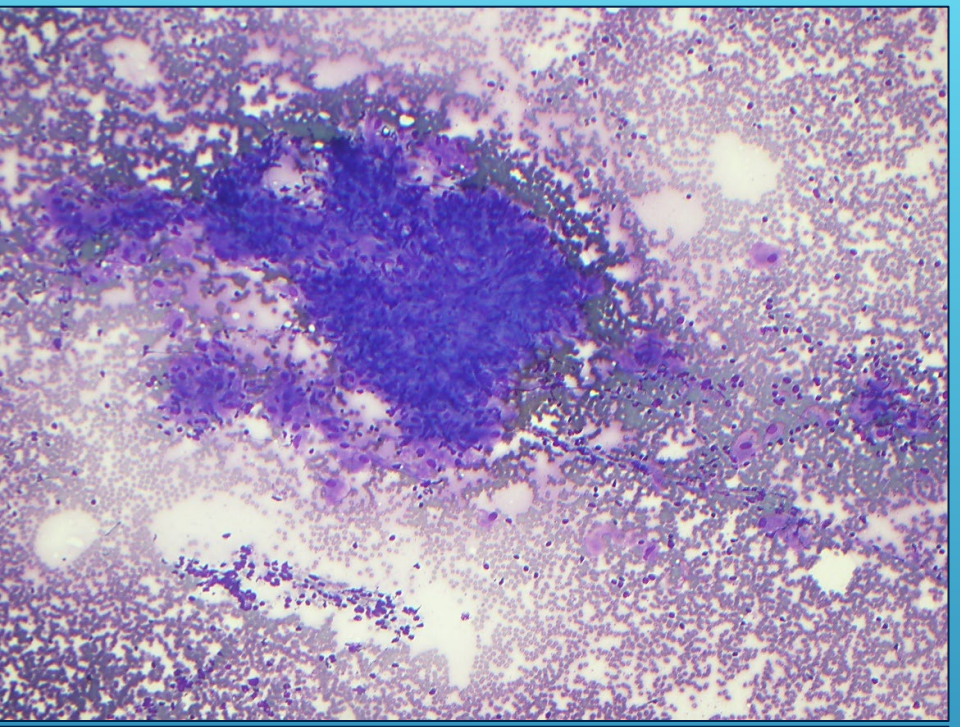


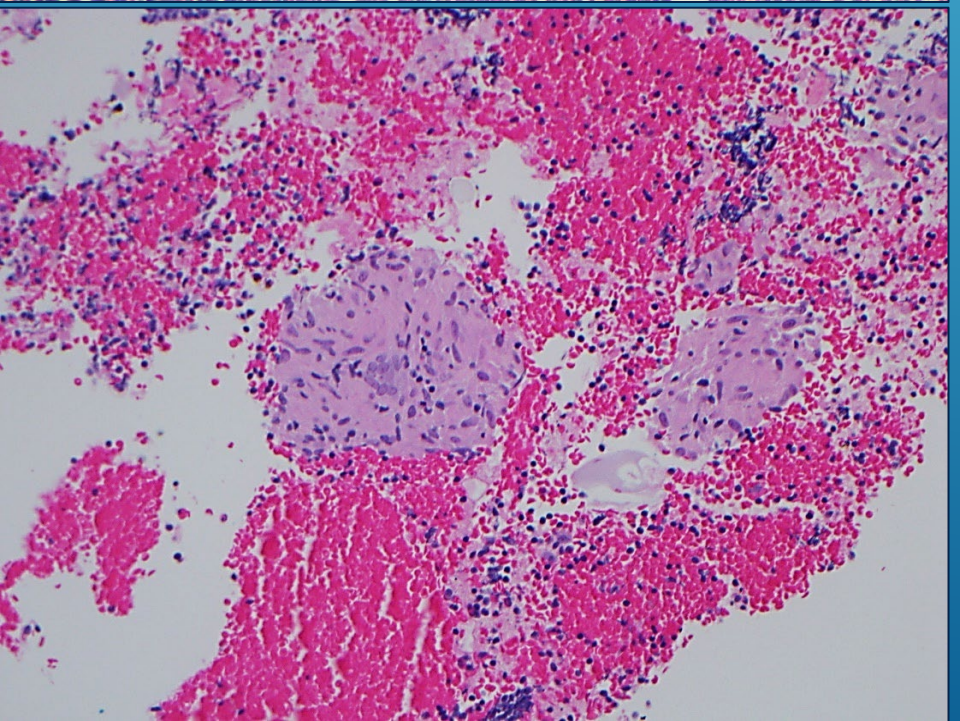
Bronchoalveolar Lavage; left lower lobe

- Papanicolaou stain

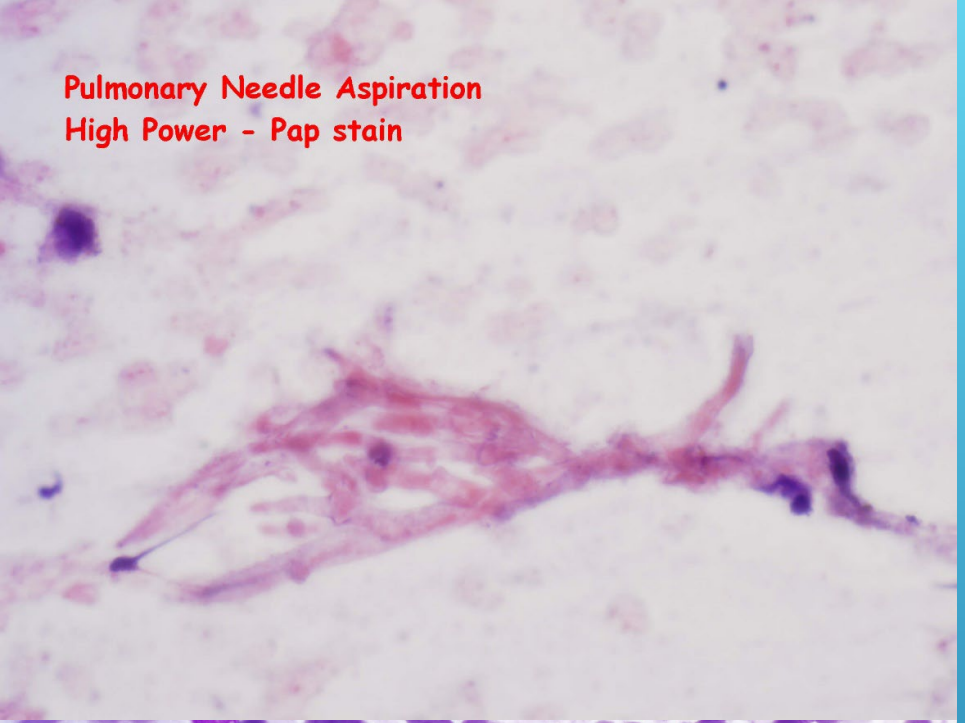
CASE 5: WHAT IS YOUR INTERPRETATION?

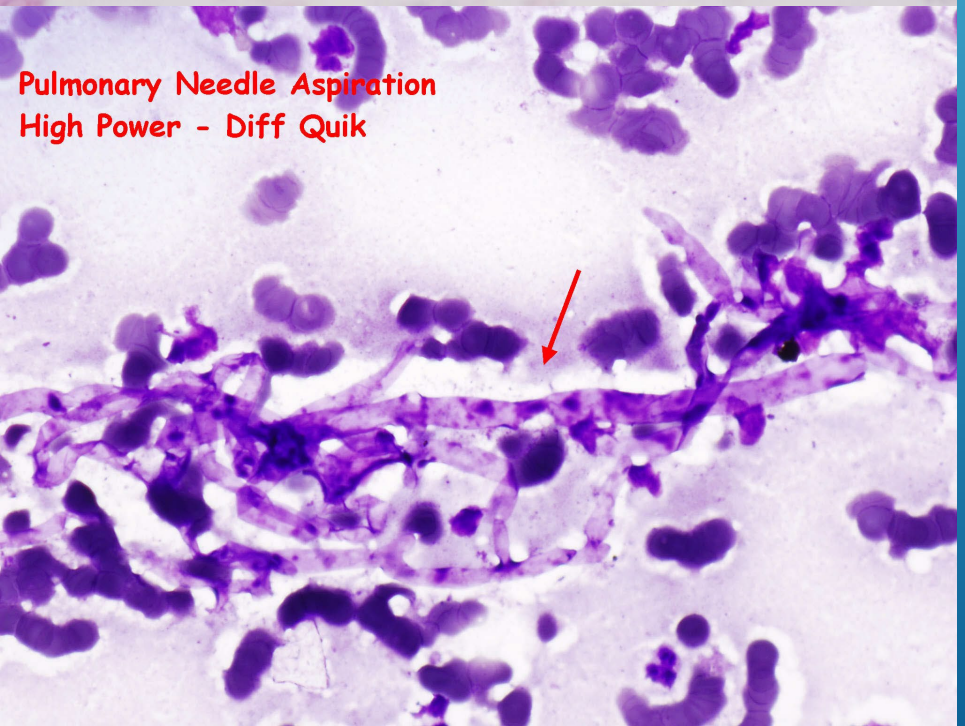
1. Negative for Malignancy
2. Granulomatous inflammation
3. Infectious organism; Mucor
4. Infectious organism, Aspergillus
5. Contaminant, vegetable cells



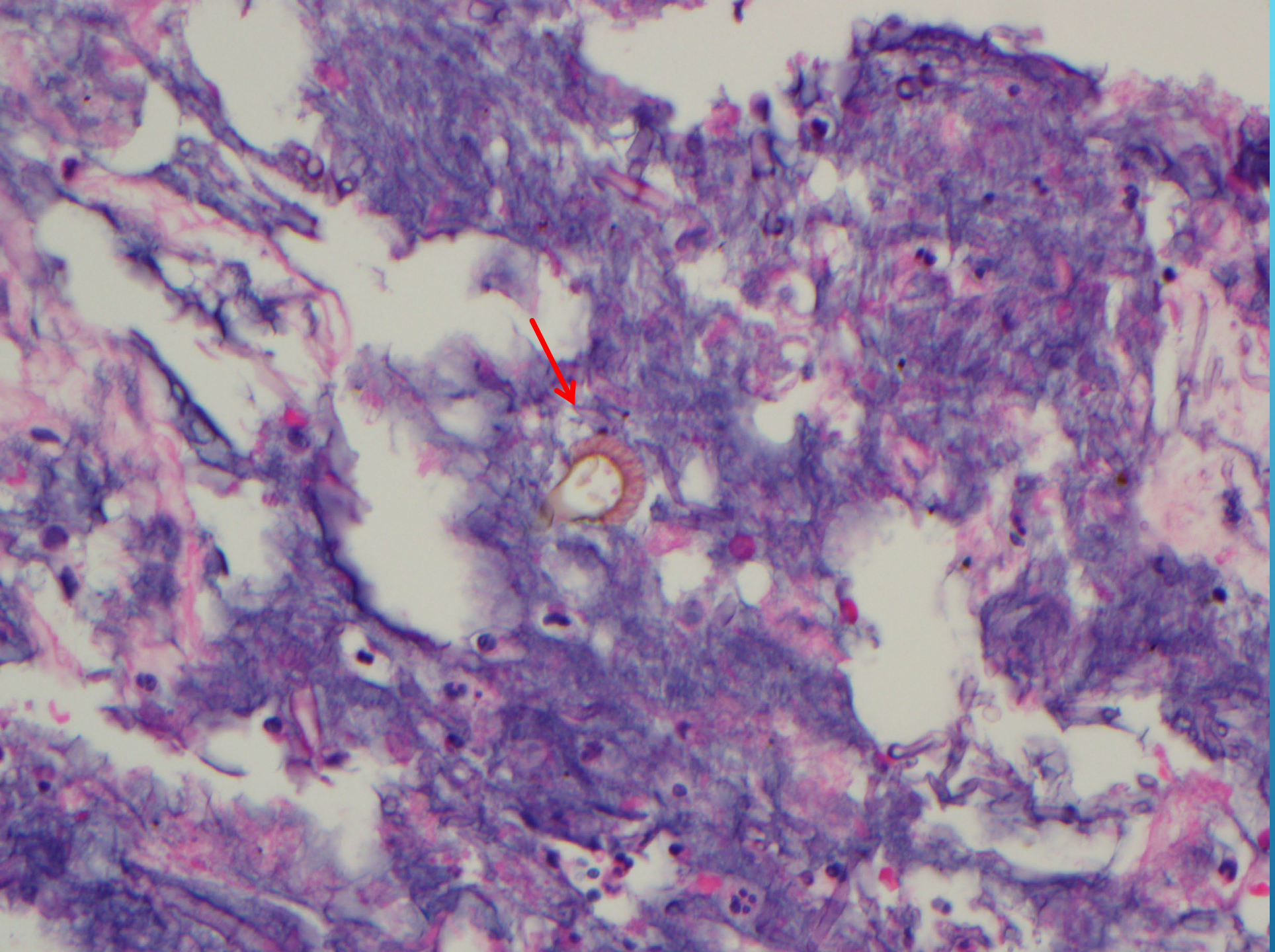


Granulomatous Inflammation

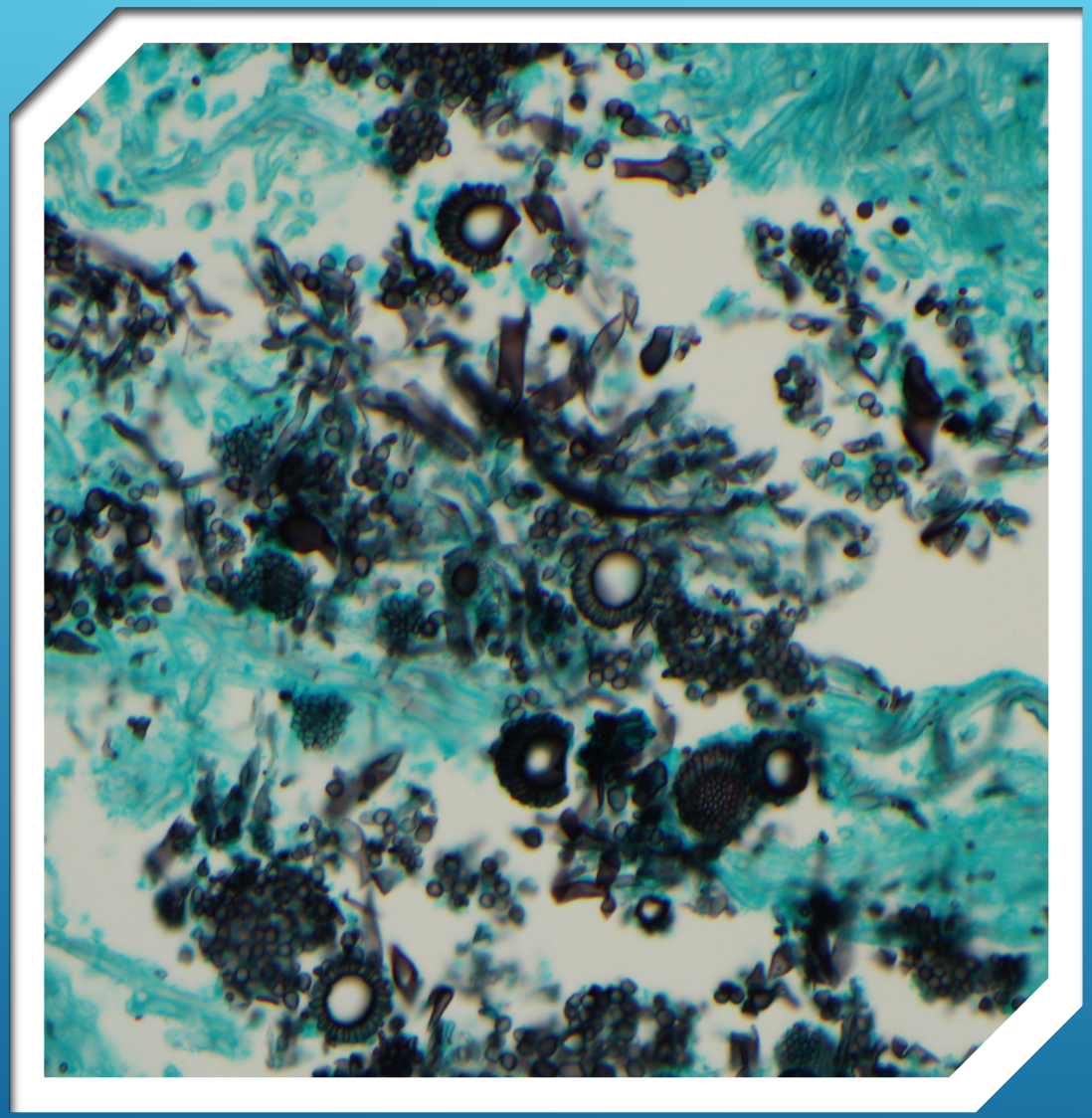




Mucor species

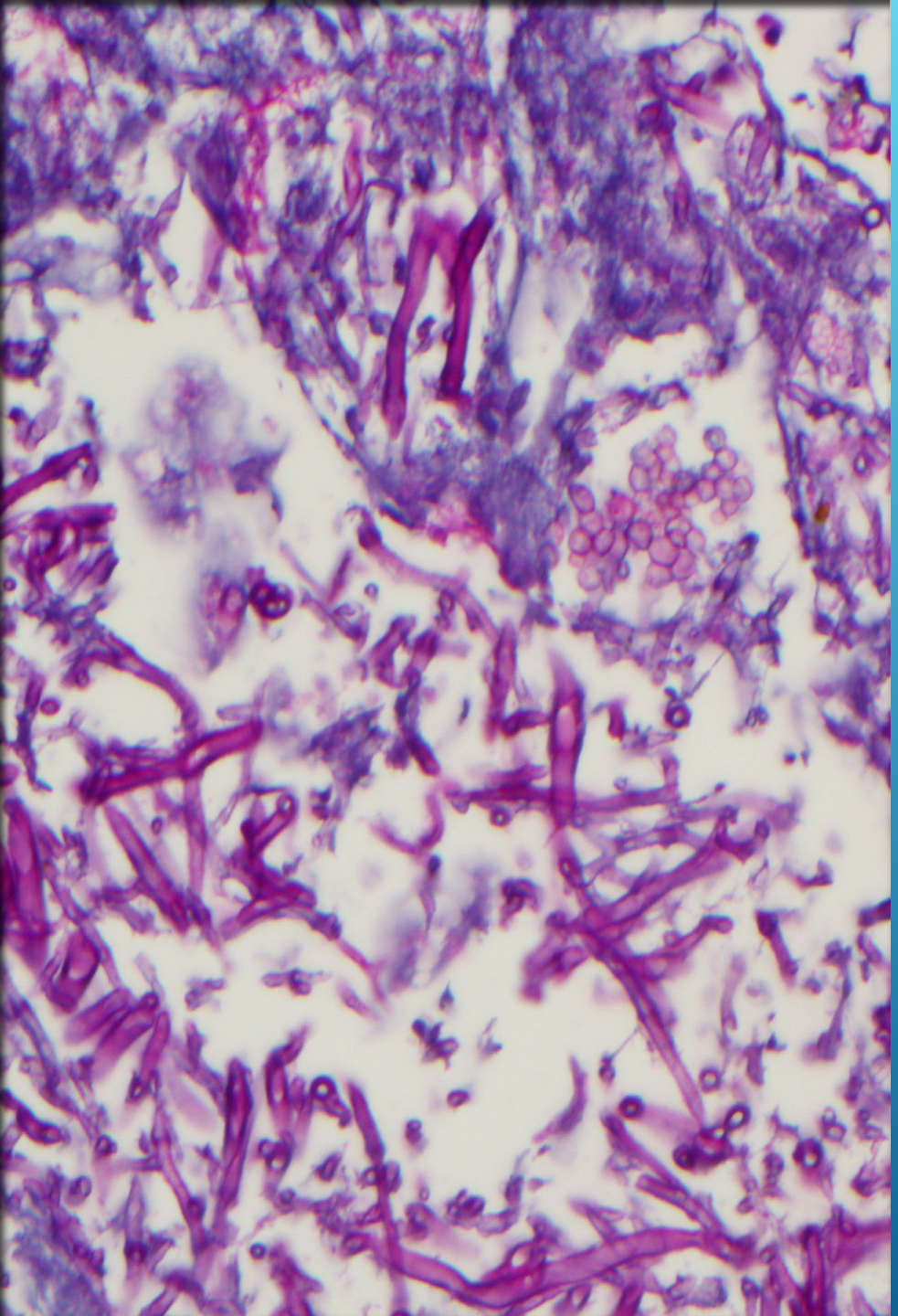


Cell Block, Bronchial Brush, left lower lobe: Hematoxylin & Eosin stain



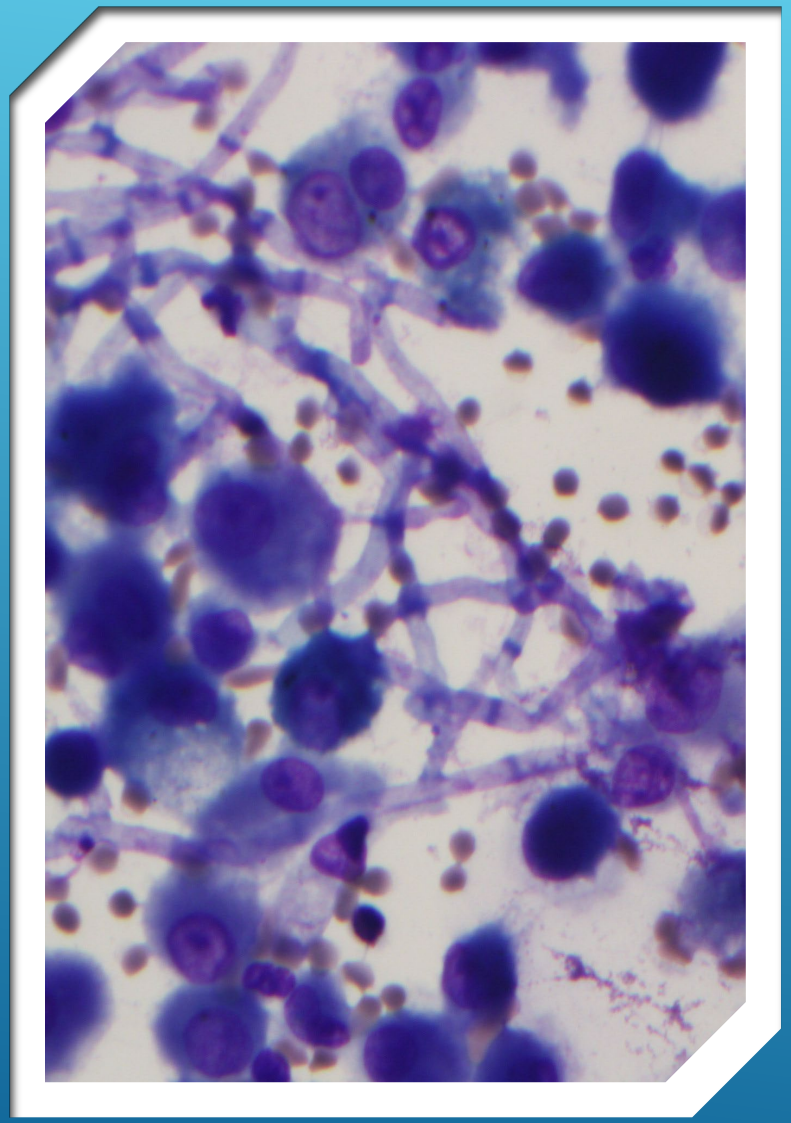
Cell Block, Bronchial Brushing; left lower lobe

- GMS histochemical stain



Cell Block, Bronchial Brushing; left lower lobe

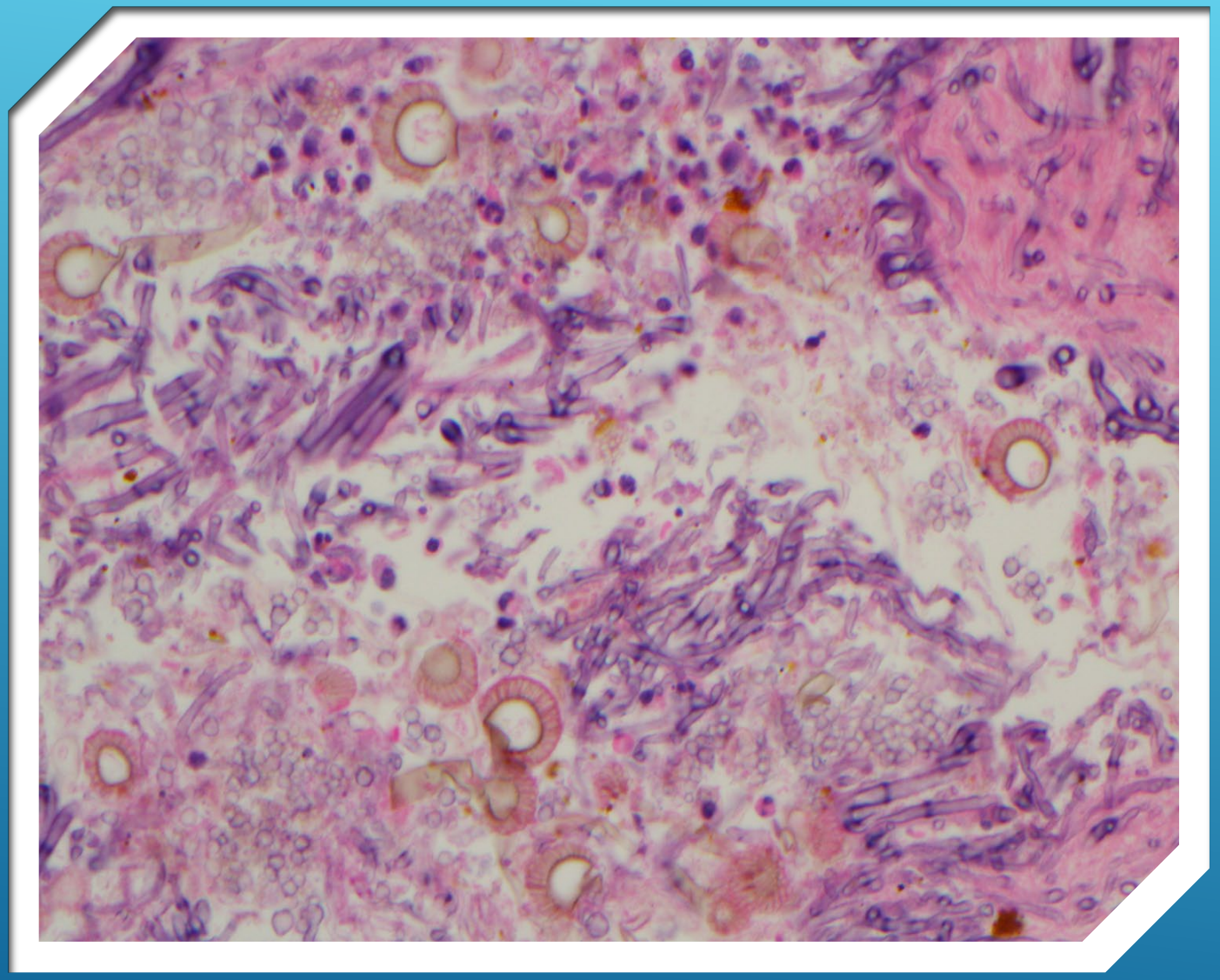
- PAS histochemical stain



CYTOPATHOLOGIC INTERPRETATION:

BAL AND BRONCHIAL BRUSH;
MALIGNANT TUMOR CELLS ARE NOT IDENTIFIED.
CELLULAR EVIDENCE OF CHRONIC INFLAMMATION.
SILVER STAIN (GMS) AND PERIODIC ACID SHIFF (PAS) STAIN ARE POSITIVE FOR FUNGAL ORGANISMS CONSISTENT WITH ASPERGILLUS SPECIES. POSITIVE AND NEGATIVE CONTROLS STAINED APPROPRIATELY.

CULTURE WAS SENT TO MICROBIOLOGY AND CONFIRMED *ASPERGILLUS FUMIGATUS*



SURGICAL PATHOLOGY

ASPERGILLUS SPECIES

- Thick, uniform septate hyphae 3-6 microns in width with branching at 45° angles
- Rarely associated with the presence of fruiting heads
- Culture findings alone may be + in absence of true infection
- Intracavitary fungus balls of lung can cause marked cellular atypia that can be mistaken for squamous cell carcinoma

THANK YOU!