



Rad Path Case Presentation:

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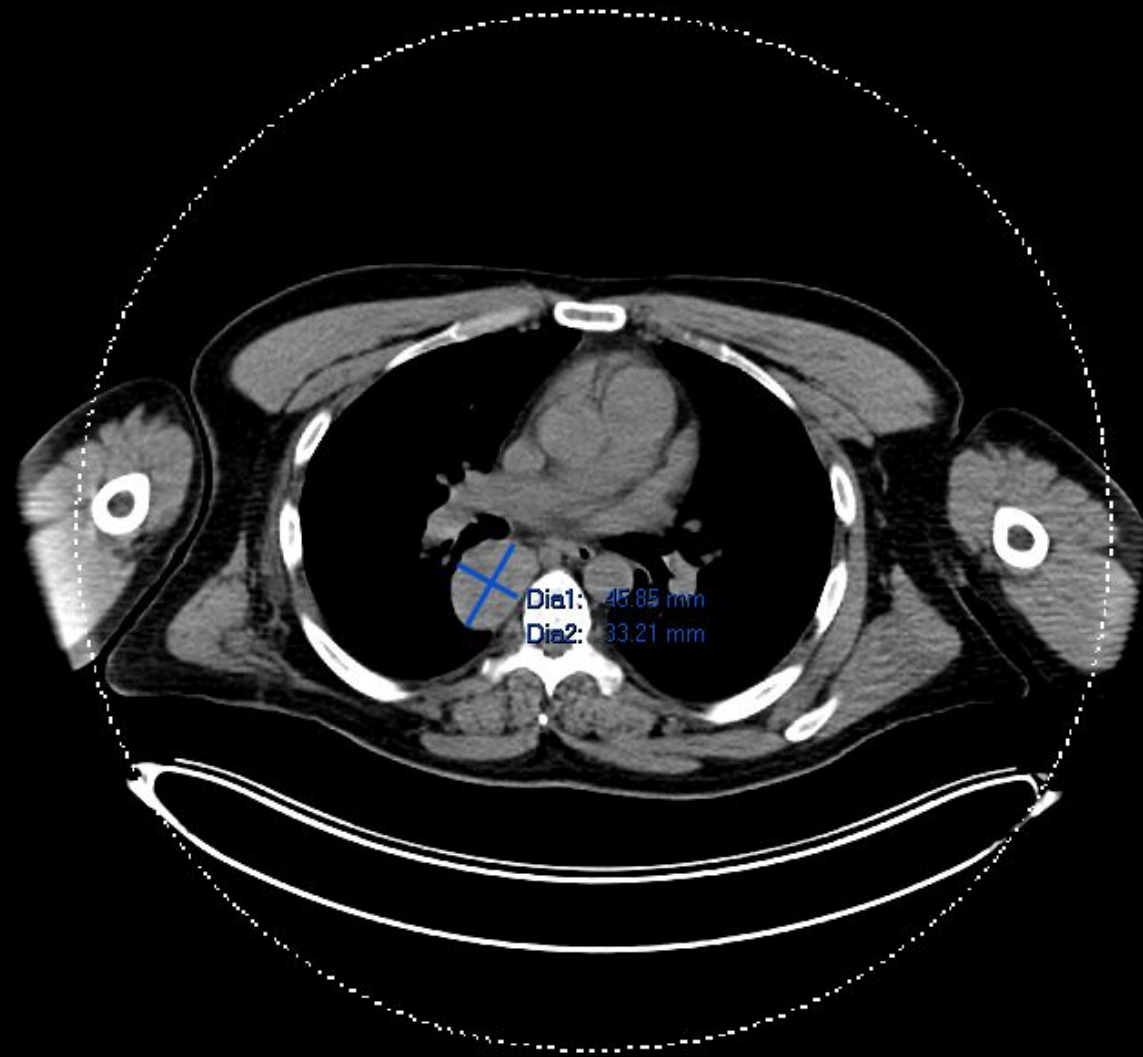
Case:

- ▶ 36 yo male with PMHx non-metastatic Ewing Sarcoma right tibia (dx 2011) s/p limb-sparing resection and 14 cycles chemo, right scapular recurrence s/p CTX and resection (negative margins), lytic skull lesion 2017 s/p resection, RTX, and CTX, and brain recurrence s/p gamma knife radiation.
- ▶ He had negative PET-CT in July 2019 and September & December 2019 Brain MRI showed shrinking size of skull lesion.
- ▶ Diagnosed with therapy-related MDS in October 2019. His counts are worsening and is being worked up for allogeneic SCT. Is currently receiving Vidaza.

Discovery of Mass:

- ▶ PET-CT for cancer re-staging performed 1/28/20:
 - ▶ **“...soft tissue mass in the right paravertebral space, approximately at the level of T6-T7, measuring 4.6 x 3.3 cm (series 3, image 117)...[and] that demonstrates mildly increased FDG activity, highly suspicious for metastatic disease.”**
 - ▶ No abnormalities were seen of the aorta, heart, pericardium. “No mediastinal, hilar, or axillary lymphadenopathy...No pleural effusion. No pneumothorax. No lung consolidation...no suspicious lung mass or nodule.”

Pre-Op Imaging:



Pre-Op Imaging:

- Low FDG uptake at tumor site
- Positive result



Mass Differential:

- ▶ Neoplasm
 - ▶ Neurogenic tumors – nerve sheath, parasympathetic ganglion, sympathetic chain
 - ▶ Non-Neurogenic tumors - Lymphoma, MDS, Ewing Sarcoma recurrence, invasive thymoma, chordoma, chondrosarcoma
- ▶ Trauma (Para-spinal Hematoma)
- ▶ Lymphadenopathy
- ▶ Infection (paraspinal abscess)
- ▶ Inflammation (mediastinitis, sarcoidosis, lymphoid hyperplasia, pancreatic pseudocyst)
- ▶ Vascular (lymphangioma, varices, descending thoracic aortic aneurysm)
- ▶ Synovial Cyst
- ▶ Foregut duplication cysts (neurenteric cyst, esophageal duplication cyst, bronchogenic cyst)

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Procedure Indication:

- ▶ Biopsy of a new, large, solid-appearing mass in a patient with known malignancy who has undergone numerous cycles chemotherapy and is currently being worked up for allogeneic SCT.

- ▶ Contraindications?

Pertinent Pre-procedural History:

- ▶ Normal mentation, cooperative patient
- ▶ No severe lung disease, use of PPV
- ▶ No PAH
- ▶ No acute or chronic kidney disease
- ▶ Vascular Access: PIV
- ▶ No coagulopathy/AC meds
- ▶ No anesthetic reactions
- ▶ No contrast allergy
- ▶ No sleep apnea
- ▶ NPO: yes
- ▶ No apparent airway problems
- ▶ ASA-2 (patient with mild systemic disease and no functional limitations)

Procedure Modality:

- ▶ US vs CT
 - ▶ Need real time visualization to guide biopsy
 - ▶ **CT** guidance is indicated for mediastinal masses
- ▶ Other modalities? - transbronchial/EUS/EBUS/mediastinoscopy
 - ▶ Transbronchial, EBUS, mediastinoscopy - Unable to access the posterior mediastinum
 - ▶ EUS – best for middle and posterior mediastinal lesions surrounding the esophagus
- ▶ **Planned CT guided right lower chest mediastinal/paravertebral biopsy**

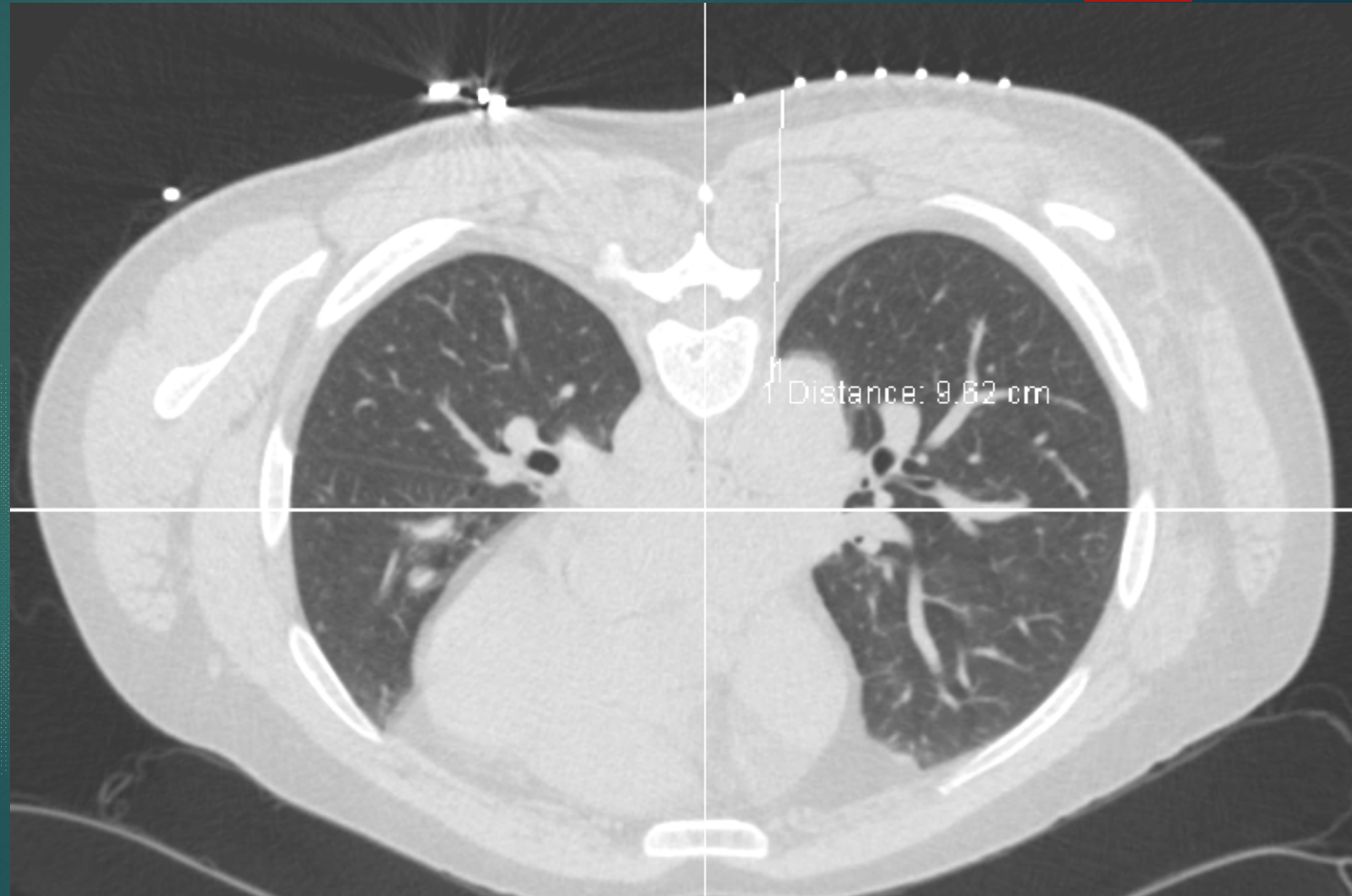
Target Access:

- ▶ Patient prone
 - ▶ Best for paravertebral location
 - ▶ On prone positioning...
 - ▶ posterior ribs move less than the anterior ribs
 - ▶ the posterior intercostal spaces are wider
 - ▶ prone positioning prevents the patient from visualizing the needle during the procedure
 - ▶ The oblique and decubitus positions are less stable than supine or prone positions but can be considered as an approach into a subpleural lesion in the lateral aspect of the lungs.

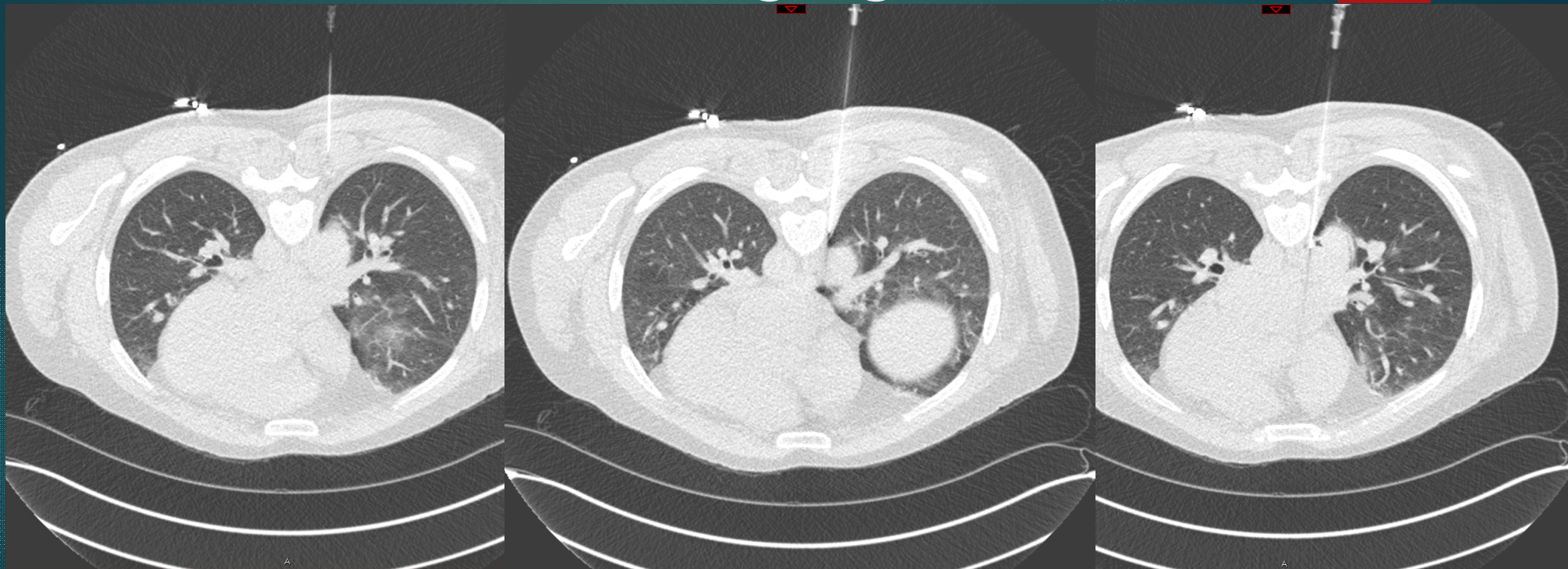
Target Access:

- ▶ **Percutaneous posterior paravertebral approach** from the right side.
 - ▶ **direct mediastinal approach** superior to transpulmonary approach b/c it minimizes risk of iatrogenic pneumothorax.
 - ▶ Biopsy needle angled medial → lateral to minimize pleural trauma, while remaining lateral to spinal transverse processes
 - ▶ Must avoid injury to paravertebral vessels, chest wall vessels/nerves (internal mammary, axillary, subclavian, intercostals, vagus, azygos) central vessels, important structures
- ▶ Other approaches? – parasternal, transsternal, suprasternal, subxiphoid, transpulmonary
- ▶ Saline solution (10-20mL) often injected for mediastinal widening to move pleura, azygos vein, esophagus, nerves, and vertebral vessels from needle path

Biopsy Trajectory:



Intra-Procedural Imaging:



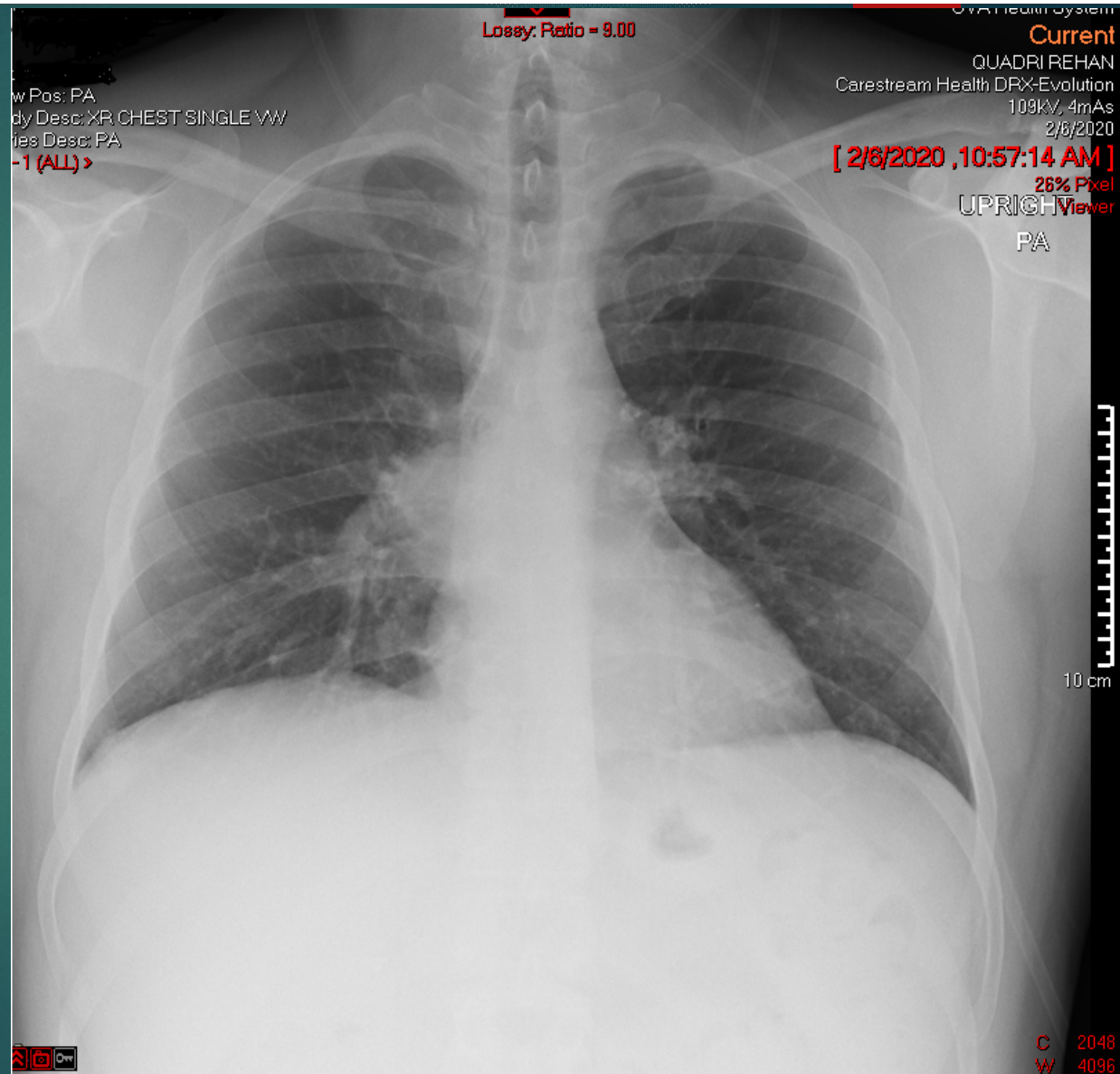
Specimen Collection

- ▶ FNA x2 performed
 - ▶ cytology confirmed high cellularity, indicating good location for tissue collection.
- ▶ Core biopsies X7 performed
 - ▶ On gross inspection more blood than tissue
- ▶ Core biopsies allow for architecture. Also better for immunohistochemical staining (if needed).

Post-procedural Imaging:

- ▶ Air pocket in connection with pleura was seen intra-procedurally on imaging
- ▶ CXR 1 hour s/p procedure to rule out pathologic pneumothorax
- ▶ Other potential post-procedural complications: alveolar hemorrhage, air embolism

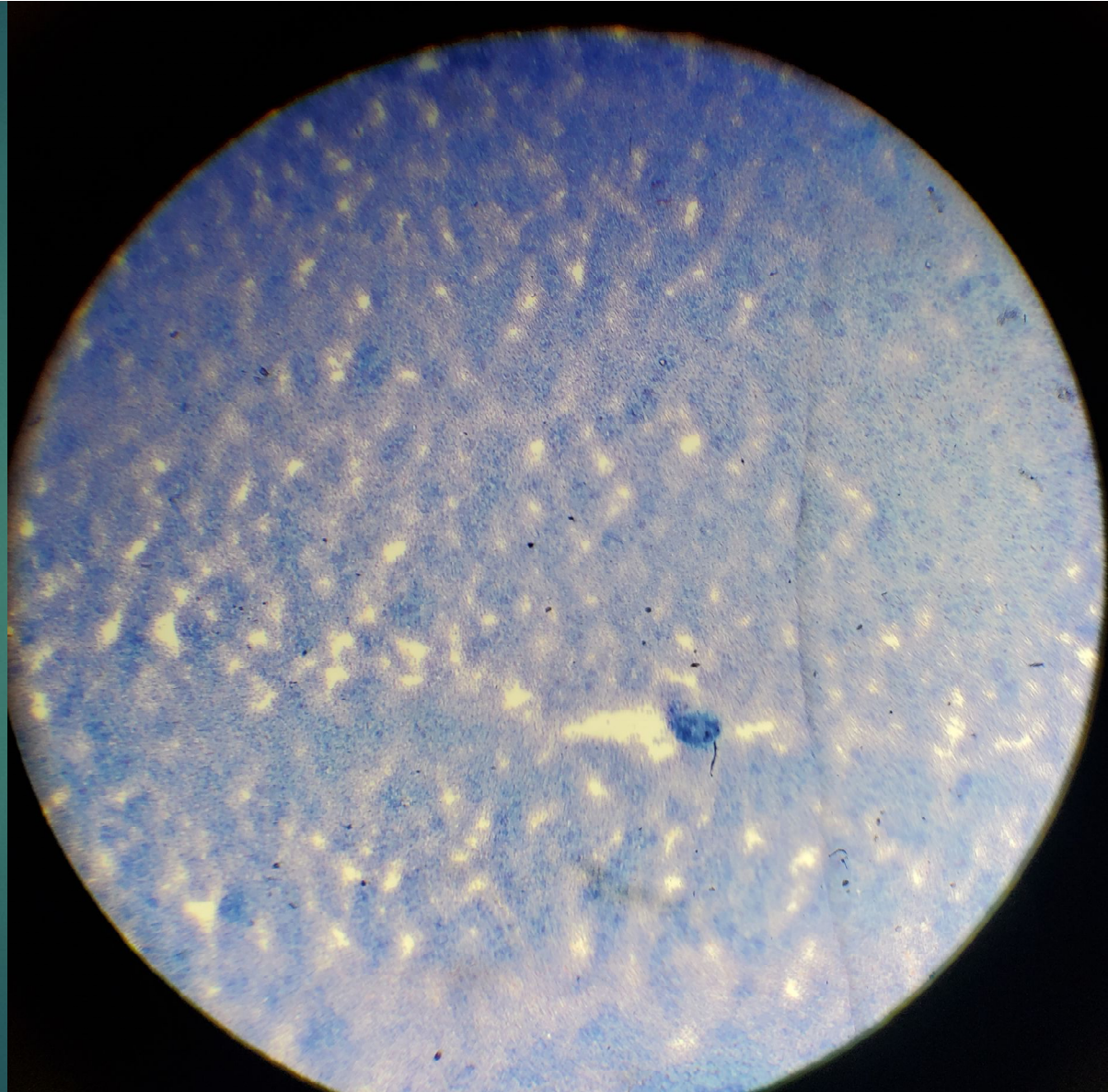
CXR



Pathology:

FNA Diff-Quick Stain at low power

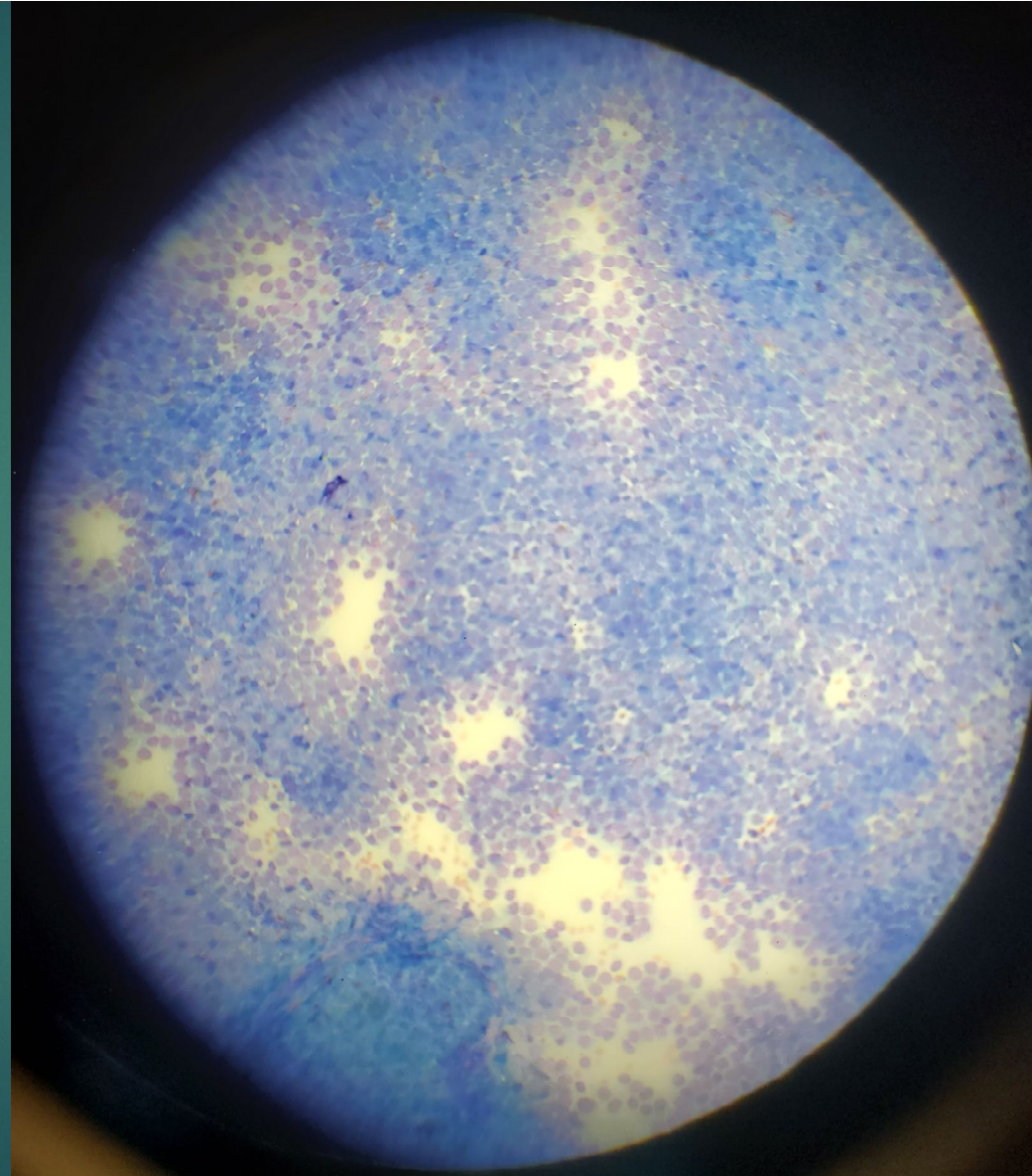
- ▶ Highly cellular
- ▶ Continuous sheet of cells
- ▶ Differential:
 - ▶ Lymphoma
 - ▶ EWS
 - ▶ Small cell (if in lung)
 - ▶ PNET (primitive neuroectodermal)



Pathology:

Diff-Quick Stain at a higher power

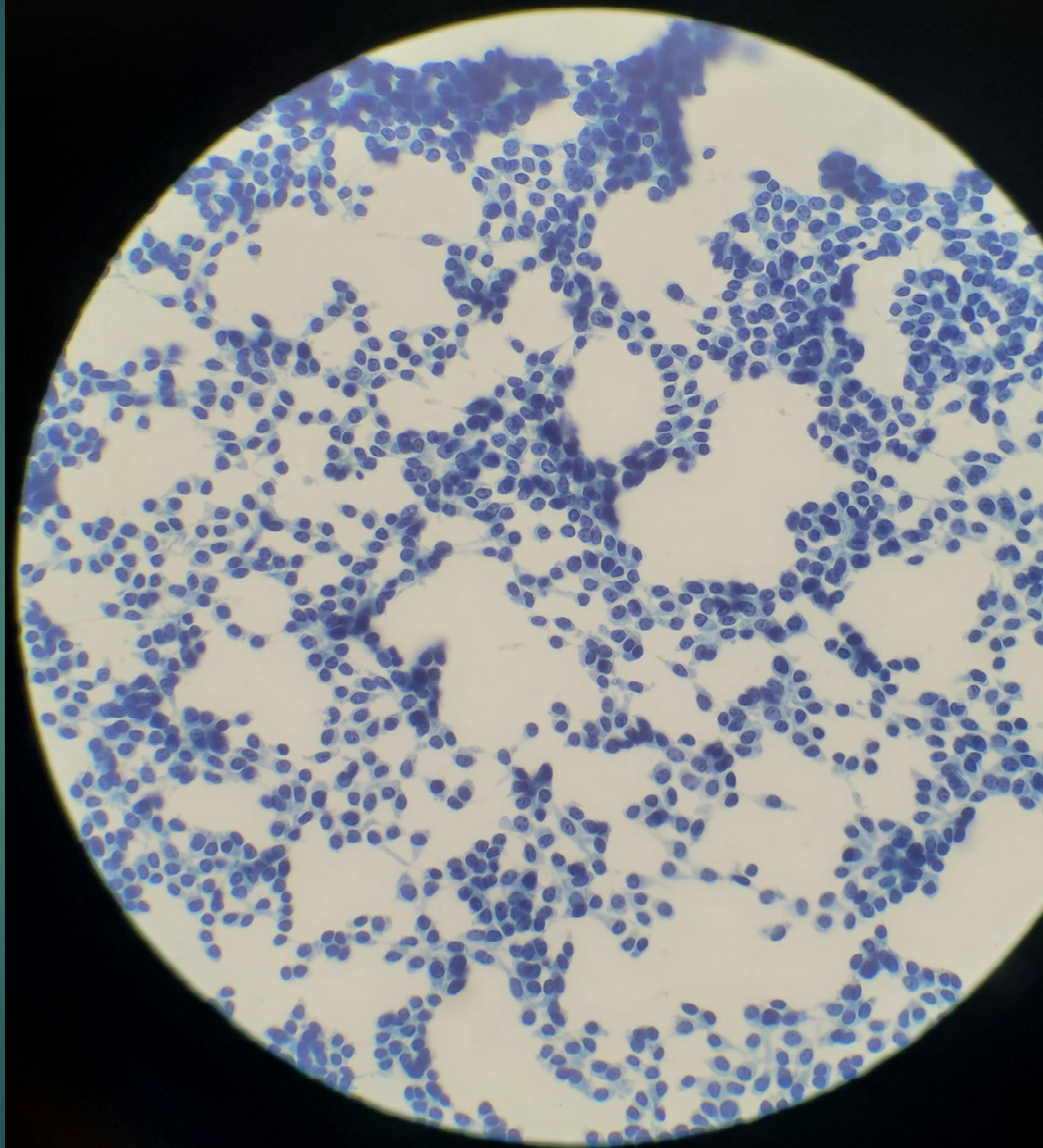
- Small blue cells
- Areas of lighter and darker cells ~ dying and living cells

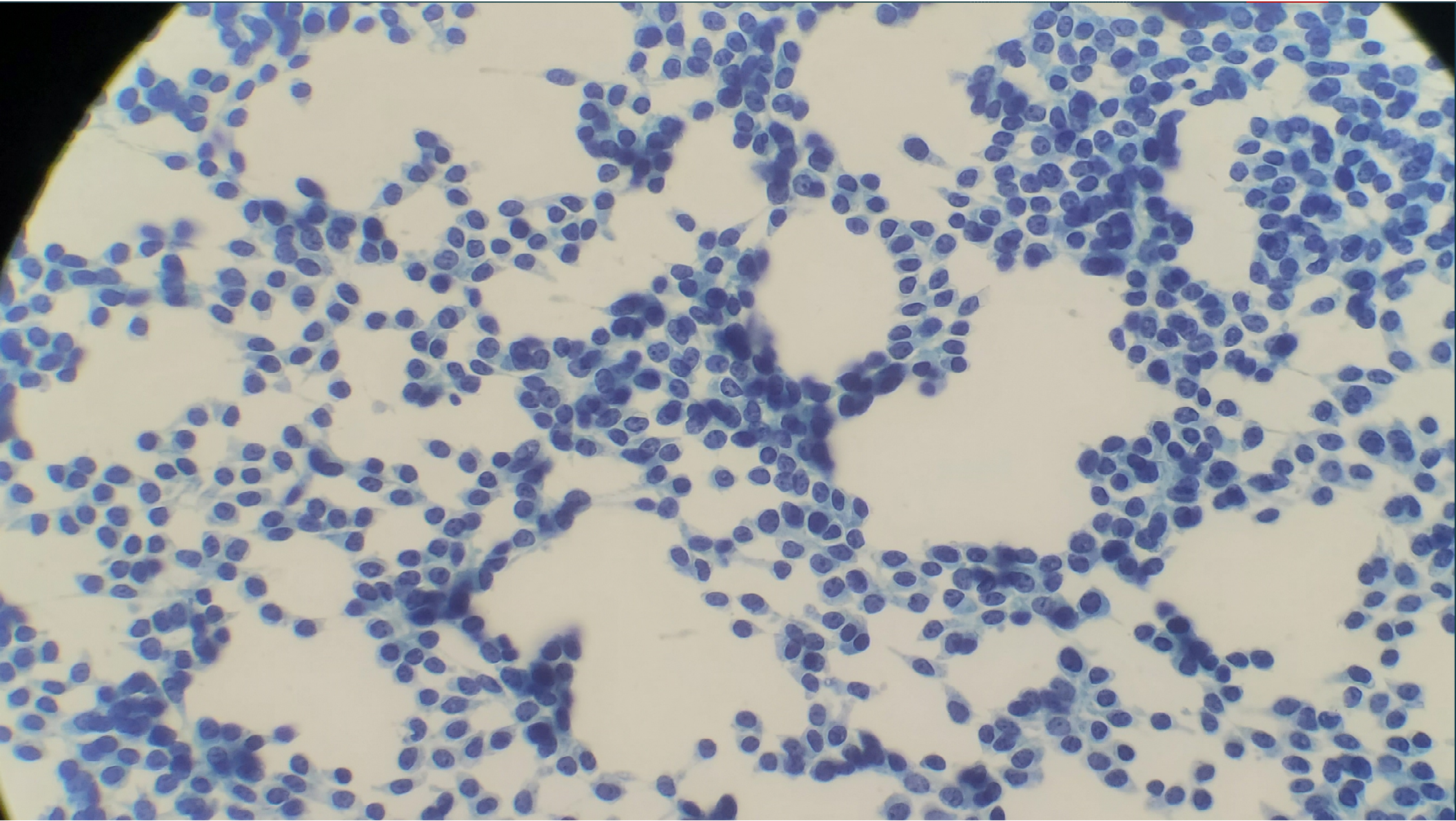


Pathology:

Papanicolaou Stain

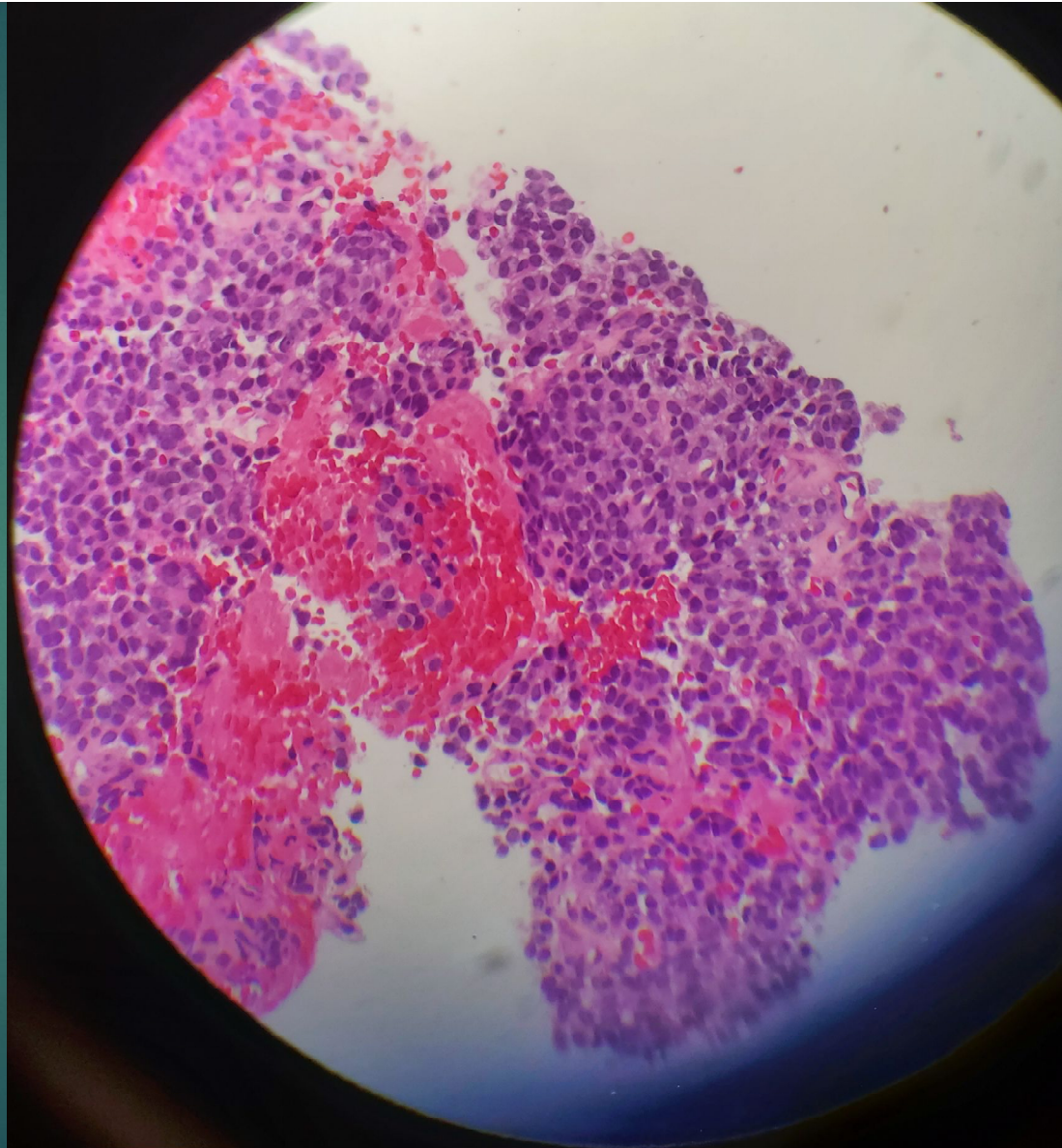
- Cytoplasmic vacuoles
- Scant cytoplasm (high N:C ratio)





Pathology:

Core Biopsy H&E Stain



Pathology:

- ▶ “The aspirate smears are abundantly cellular, demonstrating a population of monotonous round cells with high N:C ratios and cytoplasmic vacuolation. This same population is evident in the cores. Given the patient's history, the findings yield the **diagnosis Ewing sarcoma.**”

Pathology:

- ▶ No stains were performed given the patient's clinical history

Pathology:

- ▶ CD99 – positive in almost all cases. Typically is diffusely expressed in a membranous pattern.
- ▶ FLI1 – sensitive marker showing nuclear staining
- ▶ Vimentin – diffusely immunopositive
- ▶ Cytokeratin

Sources

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