



EUS guided FNAC: Experience at SKMCH

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Endoscopic Ultrasound-Guided Fine Needle Aspiration (EUS-FNA)

Minimally invasive procedure used to obtain definite tissue diagnosis from the lesions outlined by endosonography

- ***Reported yield is 90 – 95 %***
- ***Highly sensitive and specific test (90 – 100%)***
- ***Minute lesions (5mm) can be biopsied with this technique***

Reference

Journal of Gastroenterology and Hepatology

Endoscopic Ultrasound-Guided Fine Needle Aspiration Biopsy: Equipment and Technique



Advantage of EUS-FNA over other diagnostic modalities

Other alternatives:

- *TUS or CT-guided biopsy*
- *Trans bronchial needle aspiration for obstructing lung masses or large paratracheal lymph node*
- *ERCP with brushing, needle aspiration for pancreatic masses*
- *Mediastinoscopy or operative biopsy*



The primary limitation of TUS and CT-guided aspiration is difficulty in accurately targeting small lesions and finding a safe-skin-to-lesion route, especially for deep-seated retroperitoneal, mediastinal or perirectal lesions

EUS FNA is considered superior to others due to its ability to target and place a needle into suspicious lesions at the closest proximity between the tip of the echo endoscope and the targeted lesion



- Results of EUS-FNA cytology findings were compared with the gold standard of surgical histopathological findings or long-term clinical follow-up

	22-gauge needle	25-gauge needle
Sensitivity	84%	92%
Specificity	100%	97%
PPV	100%	98%
NPV	73%	87%

Conclusion

This retrospective comparative study showed that EUS-FNA with a 25-gauge needle system is a safe and reliable method for tissue sampling in pancreatic masses. The system is more sensitive and has a slightly higher NPV than the standard 22-gauge needle

Endoscopy. 2009 Jun;41(6):509
Yusuf TE1, Ho S, Pavey DA, Michael H, Gress FG



Experience at SKMCH&RC



Common Sites Sampled

- ***Pancreatic masses***
- ***Mediastinal masses***
- ***Lymph nodes (mediastinal, retroperitoneal)***
- ***Liver (Abdominal)***
- ***Retroperitoneal masses (Abdominal)***
- ***Gastric or perigastric masses (Abdominal)***
- ***Rectal/Perirectal (Pelvic) masses***



- **Diagnostic utility of endoscopic ultrasound guided aspiration cytology in evaluation of pancreatic masses.**
Qureshi A, Hassan U, Loya A, Akhter N, Najam-ud-Din, Yusuf A
J Coll Physicians Surg Pak. 2013 Jul;23(7):484-6
- **Clinical utility of endoscopic ultrasound-guided fine-needle aspiration in the diagnosis of mediastinal and intra-abdominal lymphadenopathy**
Mehmood S, Loya A, Yusuf MA
Acta Cytol. 2013;57(5):436-42
- **Endoscopic ultrasound - fine needle aspiration of 2-deoxy-2-[18F] fluoro-D-glucose avid lymph nodes seen on positron emission tomography- computed tomography -what looks like cancer may not always be so.**
Malik, AI, Akhtar N, Loya A, Yusuf MA
[Cancer Imaging](#). 2014 Jul 31;14:27
- **Fine-Needle Aspiration Cytology in the Diagnosis of Pancreatic Neuroendocrine Tumors: A Single-Center Experience of 25 Cases**
Jahan A, Yusuf MA, Loya A
Acta Cytol 2015



- **Accuracy of diagnosis of solid pseudopapillary tumor of the pancreas on fine needle aspiration: A multi-institution experience of ten cases.**

Jahangir S, Loya A , Momin T. Siddiqui, Akhter N, Yusuf MA

Cytojournal.2015; 12: 29

- **Role of endoscopic ultrasound-guided-fine needle aspiration biopsy in the diagnosis of lymphoma of the pancreas: A clinicopathological study of nine cases.**

Sadaf S, Loya A, Akhter N, Yusuf MA

[Cytopathology](#). 2017 Dec;28(6):536-541

- **Diagnostic Reliability Of Endoscopic Ultrasound-Guided Fine Needle Aspiration (EUS-FNA) Biopsy In Evaluating Primary And Metastatic Gastrointestinal Stromal Tumors (GIST)**

Omer Waqas, Muhammed Aasim Yusuf, Muhammad Asghar, Noreen Akhter, Asif Loya

Acta Cyto, Submitted for Publication



EUS guided FNA at SKMCH 2005-2017

- *Total Number of Subjects Enrolled* - *n = 999*
- *Gender*
 - *Male* - *n = 582 (58.2%)*
 - *Female* - *n = 417 (41.7%)*
- *Mean Age* - *50.8 years*
 - *Males*
 - *Mean Age* - *50.2 Years*
 - *Range* - *4-94 years*
 - *Females*
 - *Mean age* - *51.6 years*
 - *Range* - *2-83 years*



- *Average No. of passes = 2.26 ± 0.41*
- *ROSE*
 - *Adequate*
 - *Yes* *n= 915 (91.6%)*
 - *No* *n= 84 (8.4%)*
 - *Sensitivity: 93.3 %*
 - *Specificity: 79.2 %*



EUS FNAC SITES

- *Pancreatic* 367 (36.7%)
 - *Sensitivity 93.3% Specificity 96.6%*
- *Mediastinal* 363 (36.3%)
 - *Sensitivity 95% Specificity 100%*
- *Abdominal* 249 (24.9 %)
 - *Sensitivity 95% Specificity 100%*
- *Pelvic (mainly rectal/peri-rectal)* 20 (2%)
 - *Sensicvity 95% Specificity 100%*
- *Follow Ups*
 - *Available - 772*
 - *Not Available - 227*



CASE NO. 1

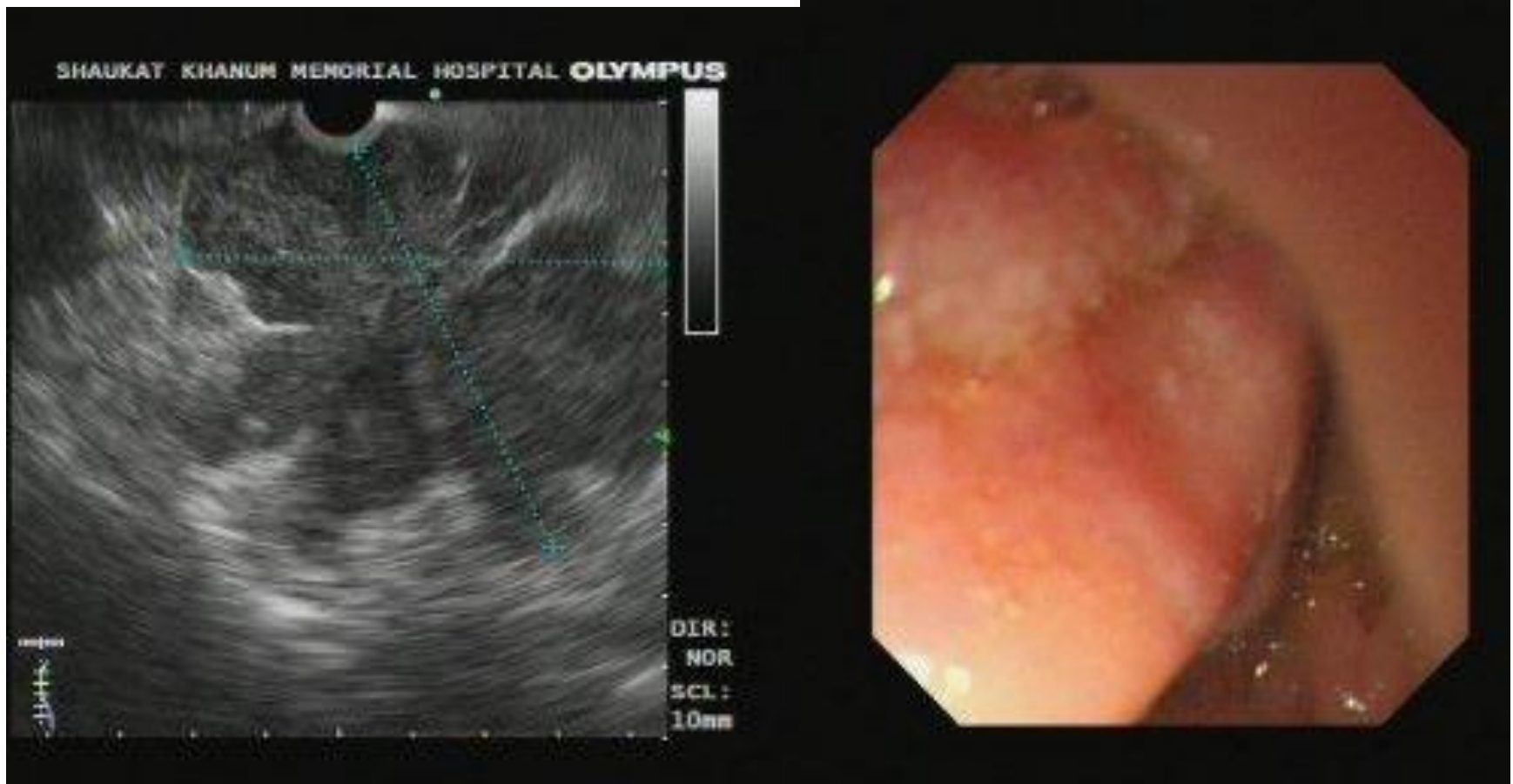
40 year female

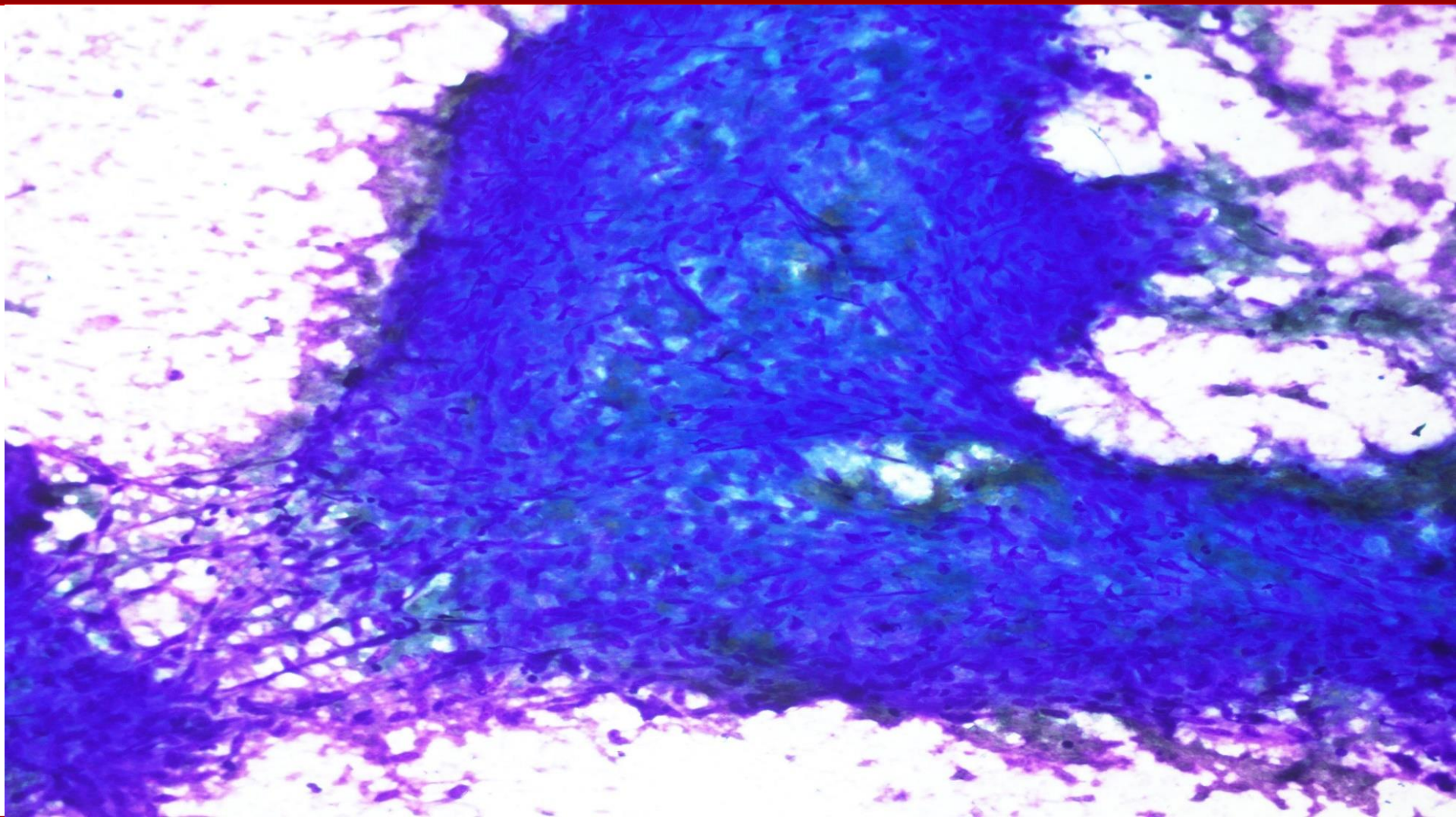
Gastric Mass, Presented with Epigastric Burning
and Melena

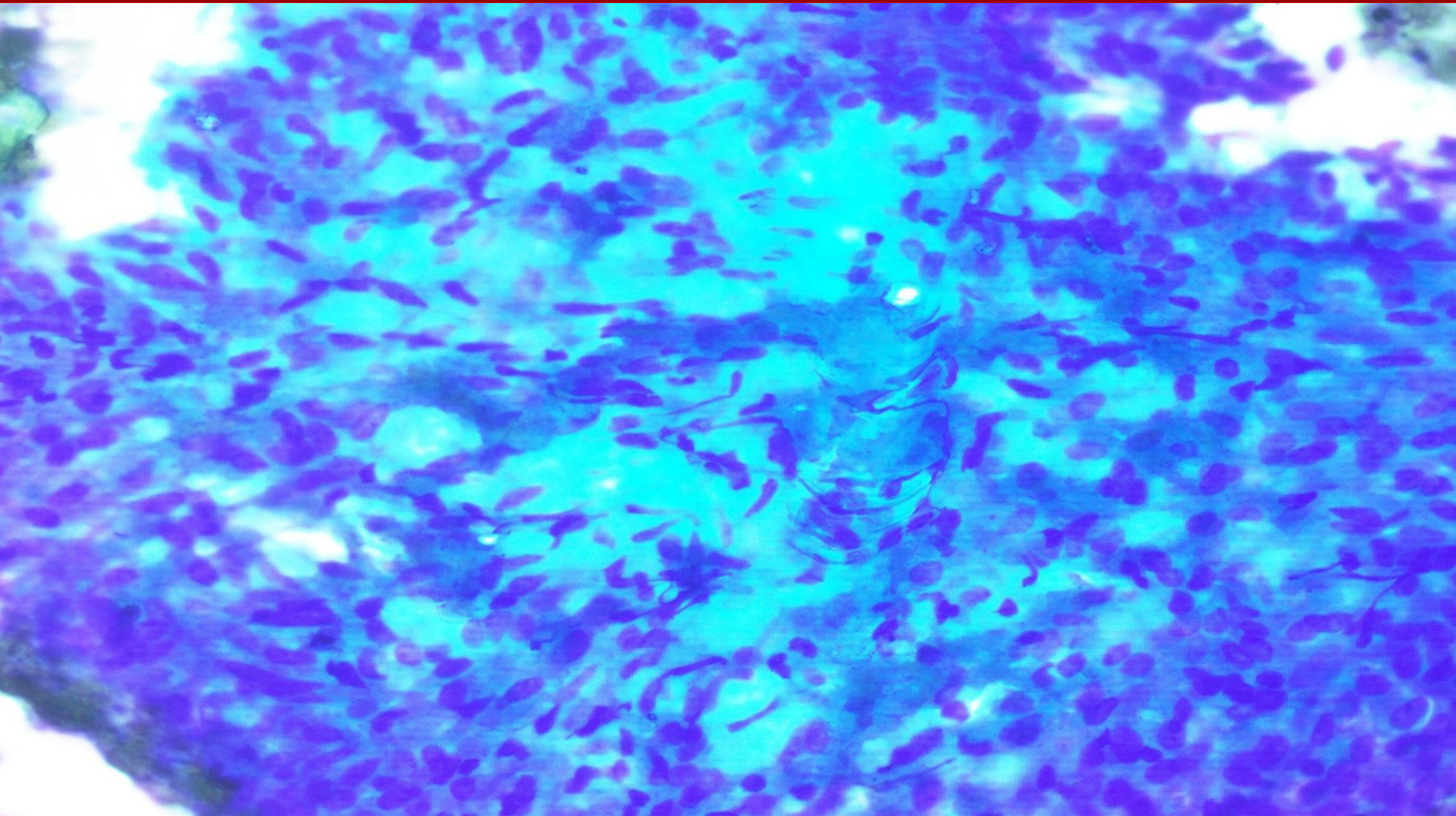
EUS guided FNA

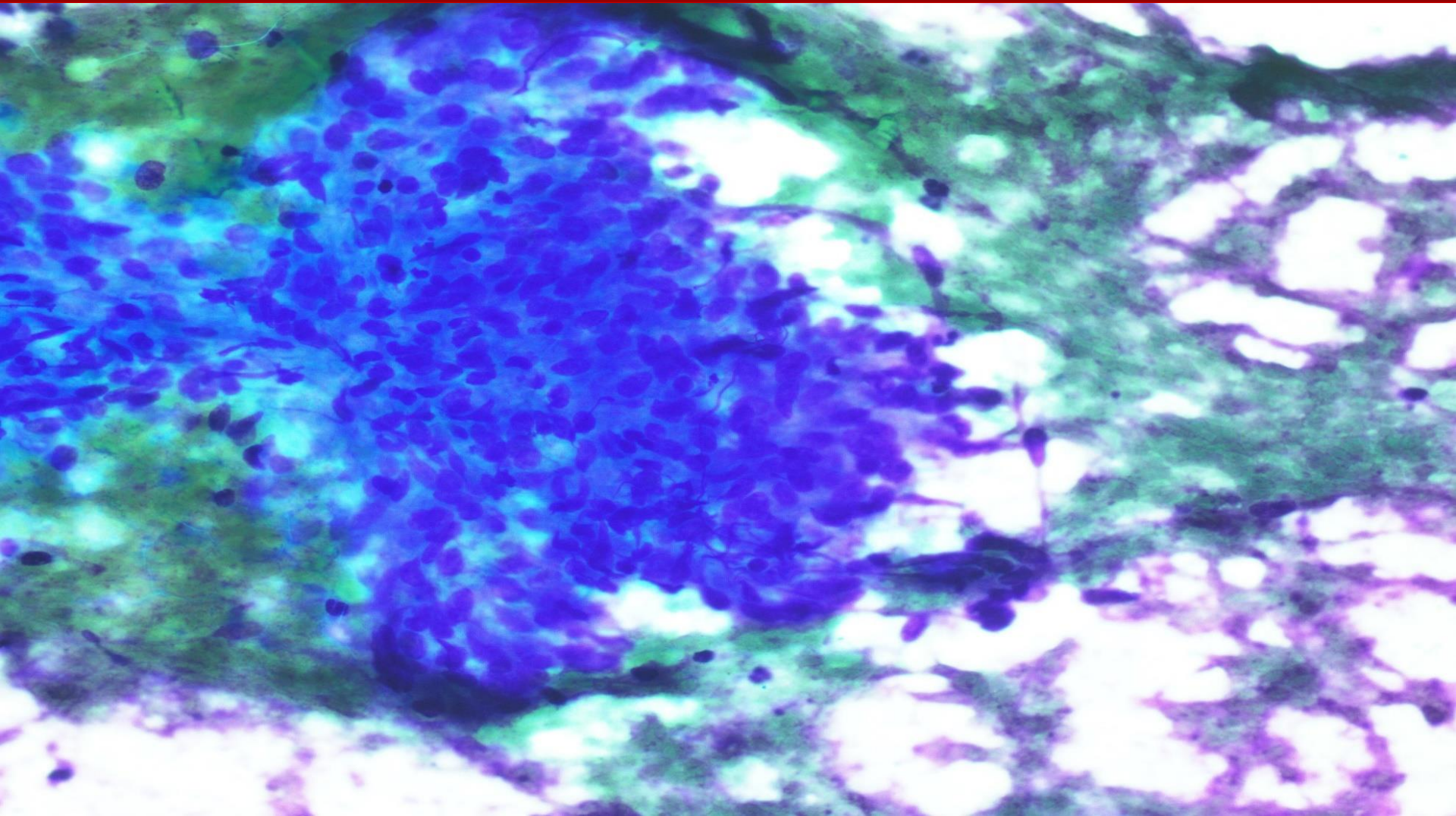


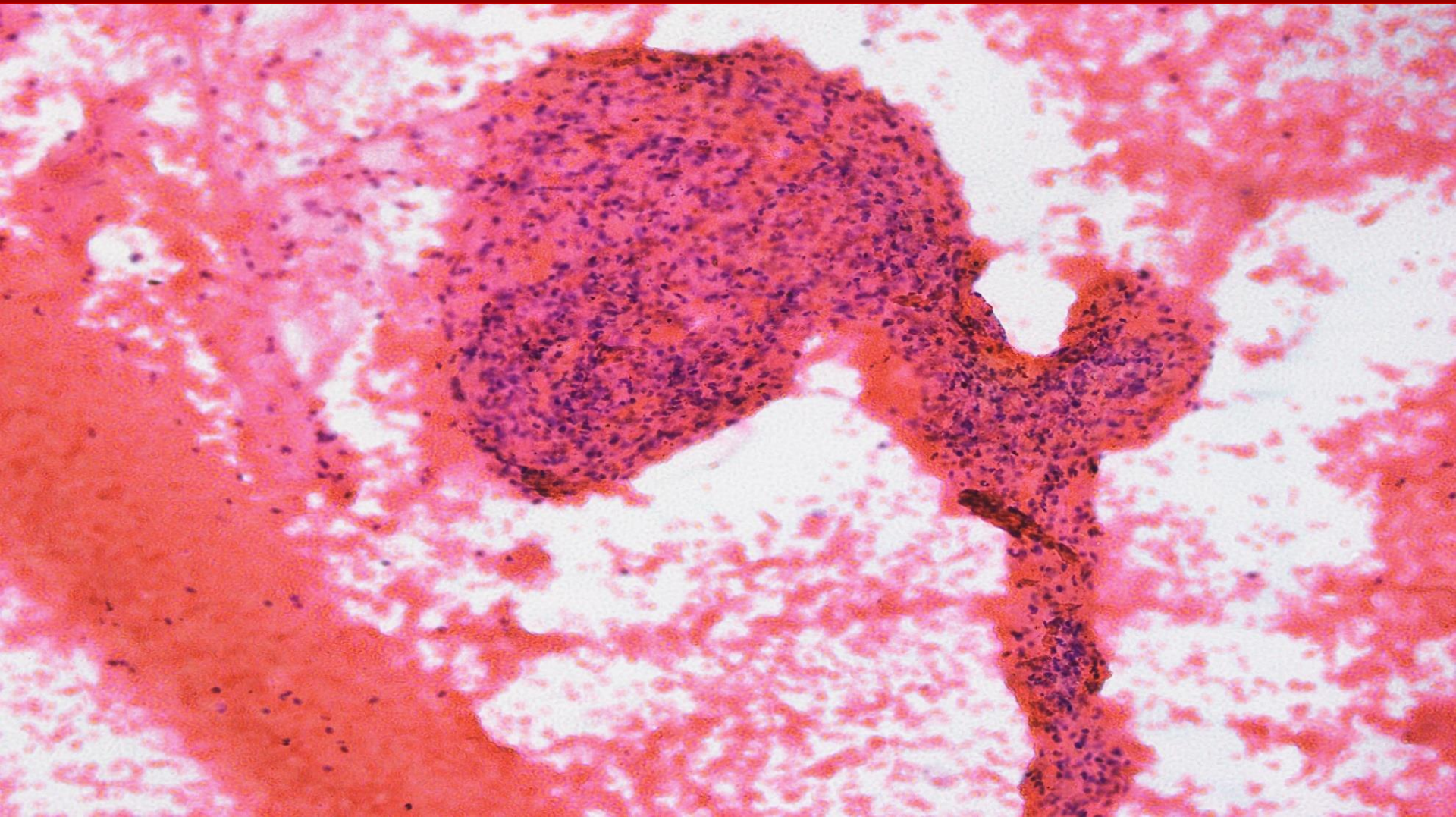
Gastric Submucosal Lesion

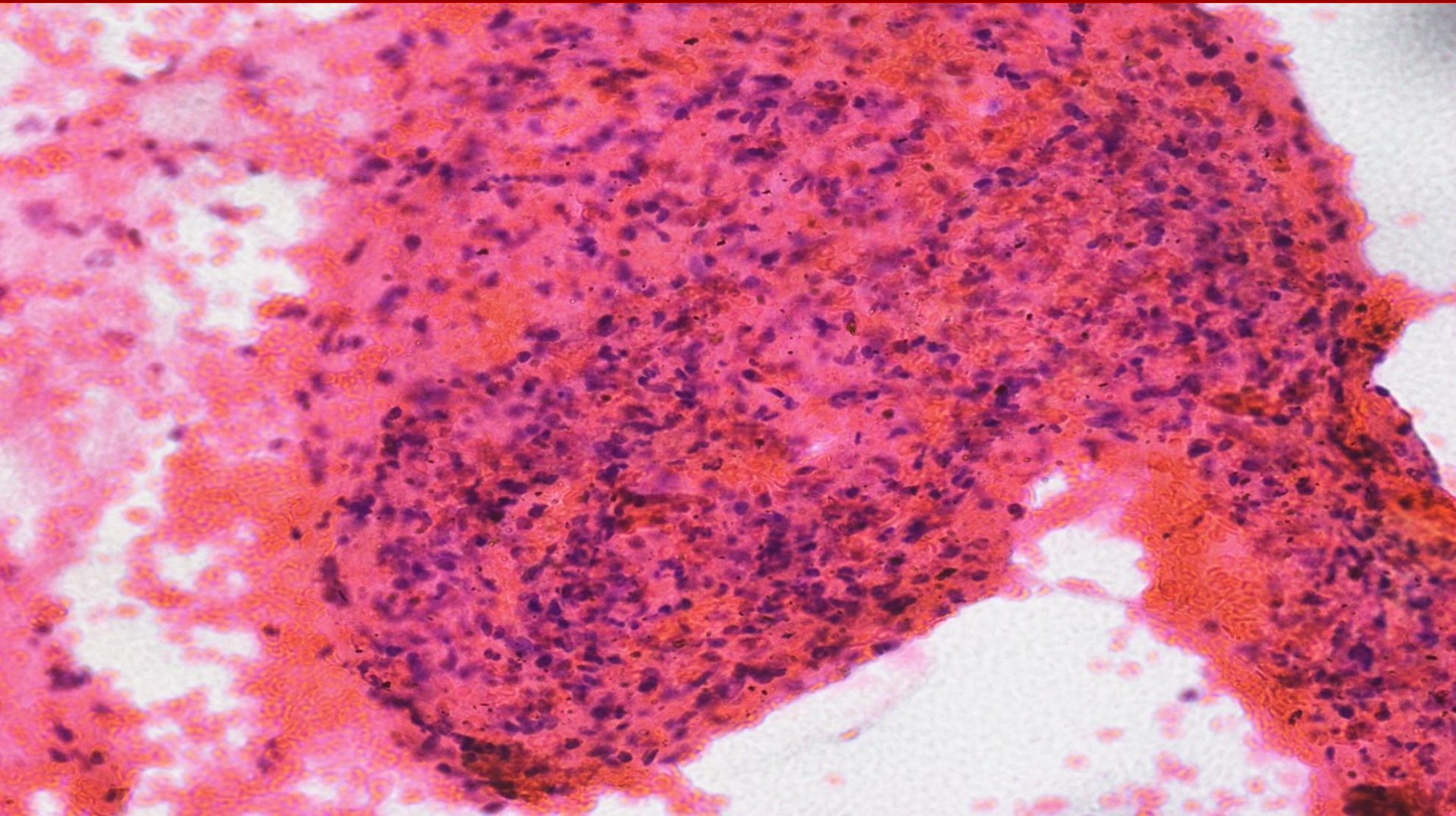


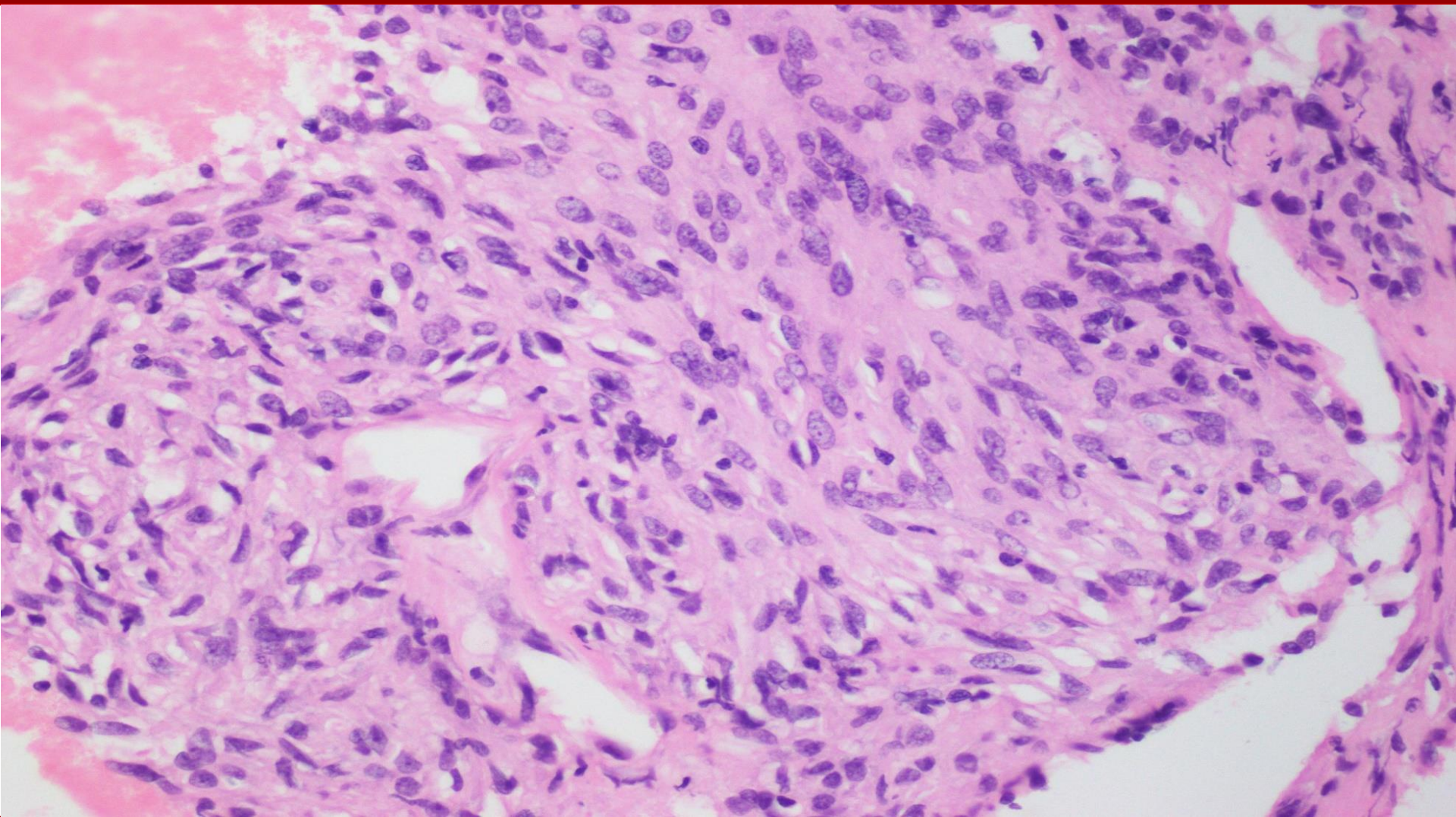




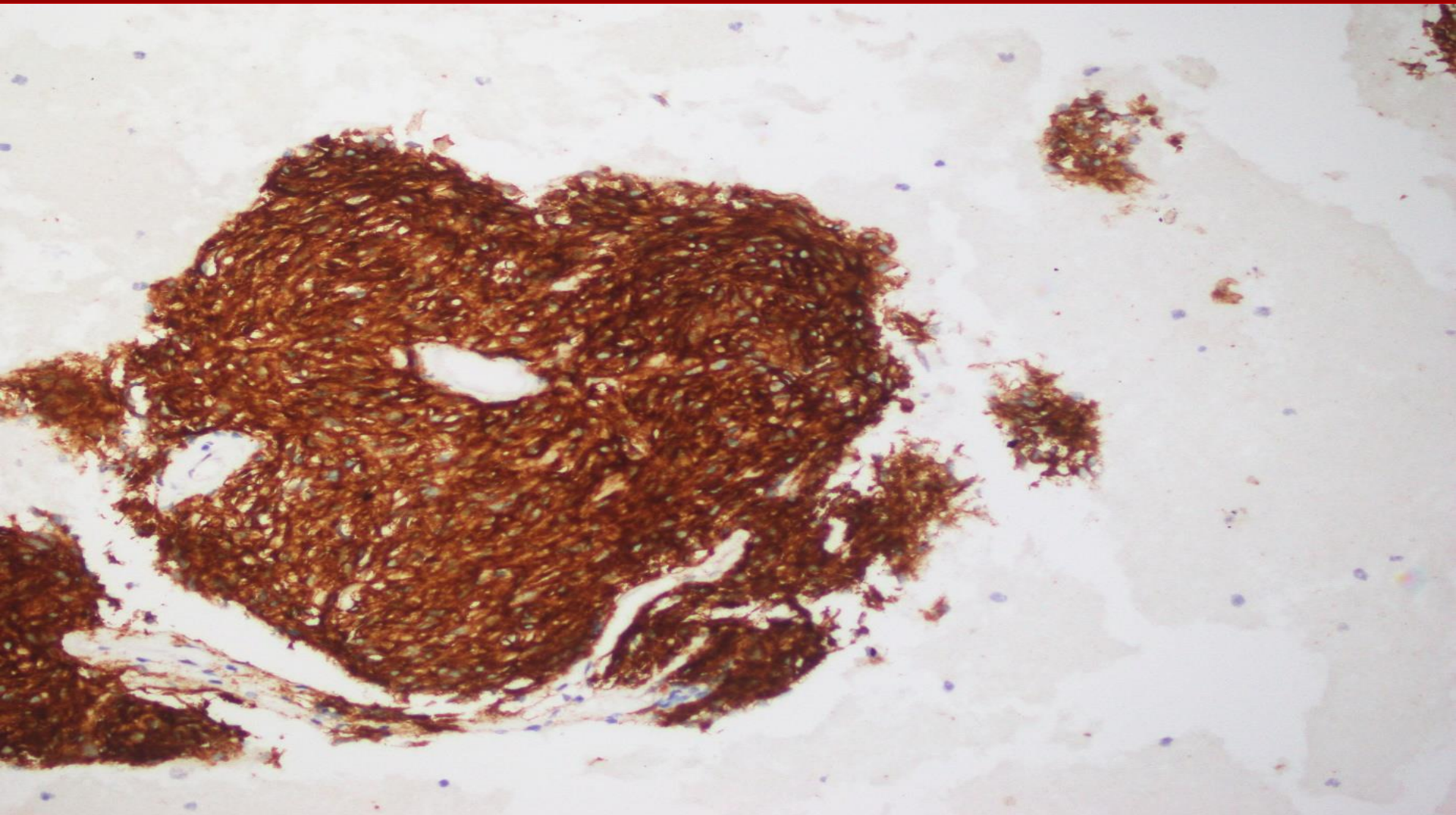




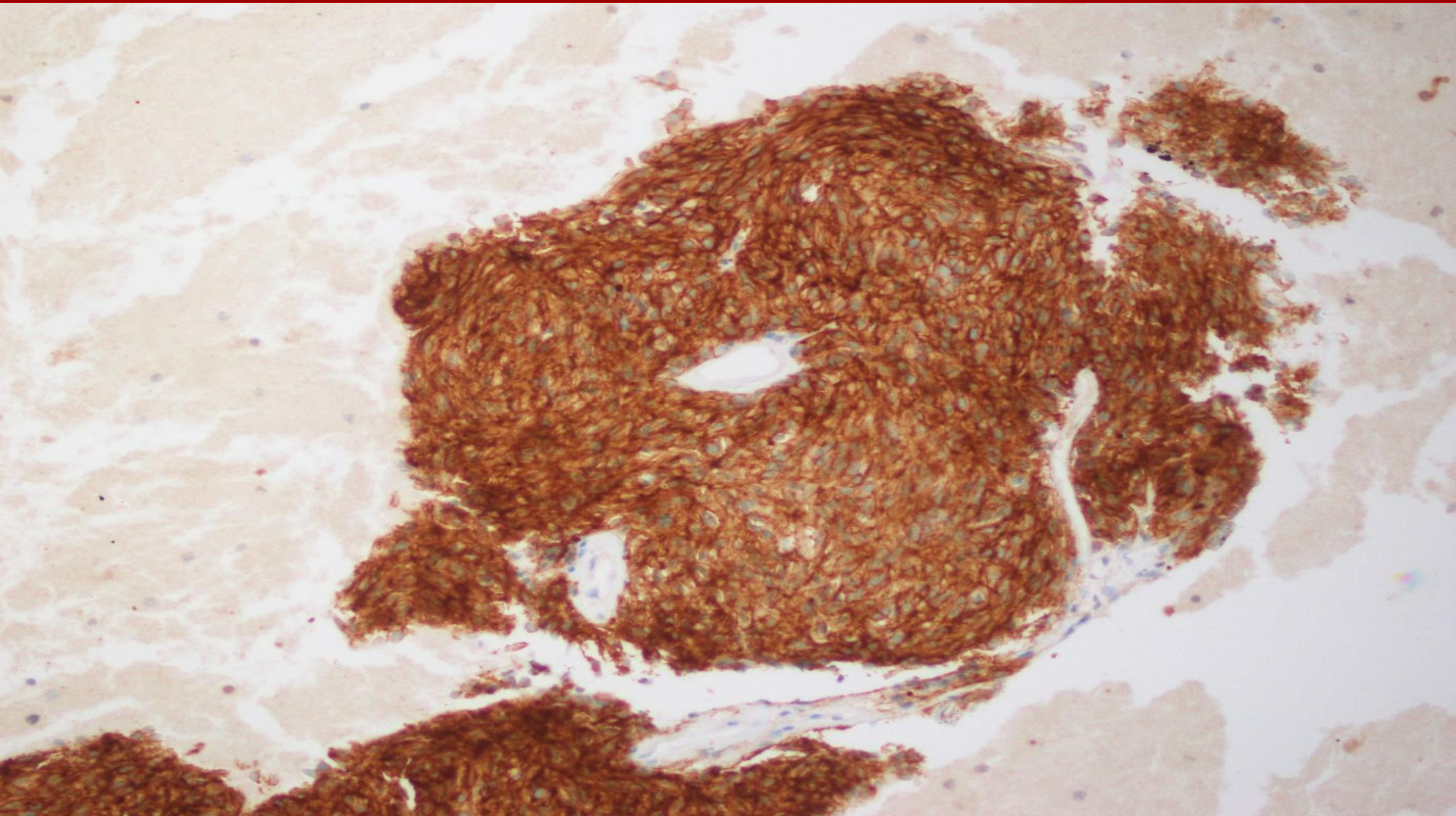




CD-117



DOG-1



DIAGNOSIS



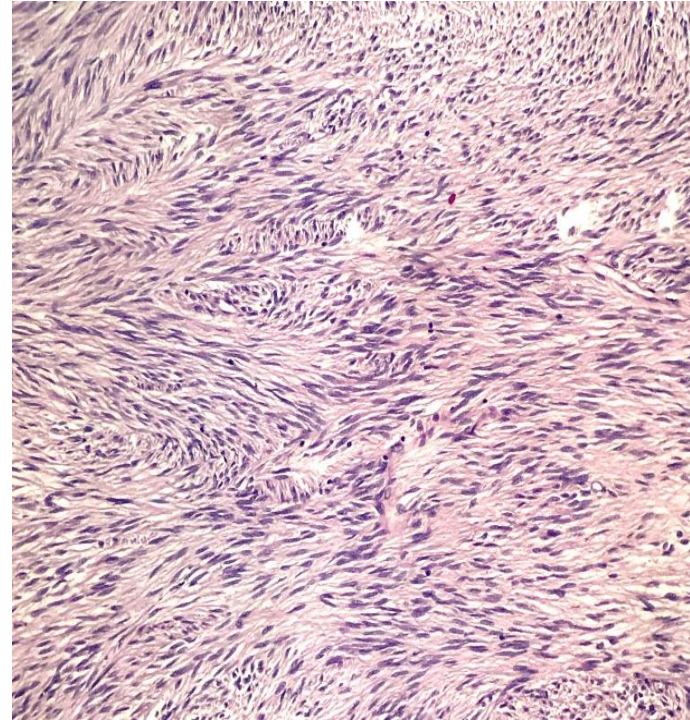
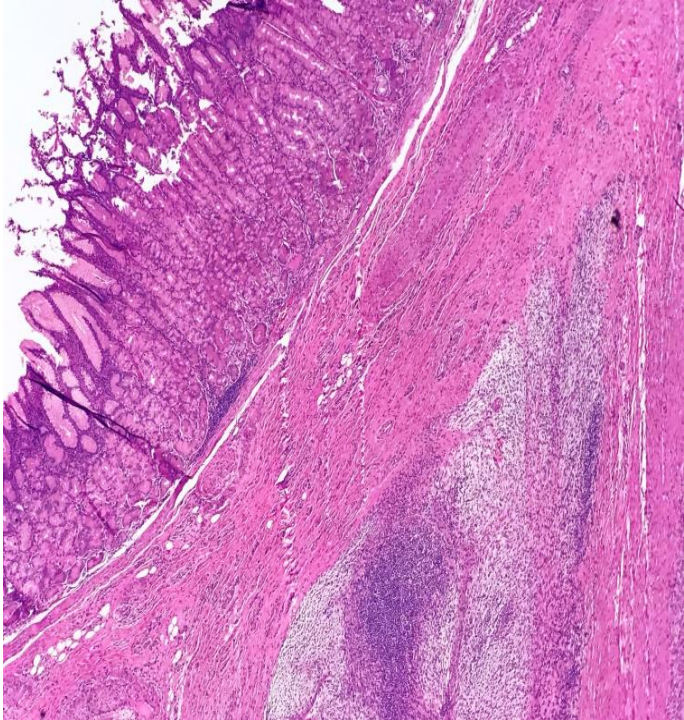
GASTROINTESTINAL STROMAL TUMOR



Gross, Gastric Submucosal Lesion



Excision Specimen, Histology



Gastrointestinal Stromal Tumor

Diagnosed in 2017.

Currently on follow up and doing well.

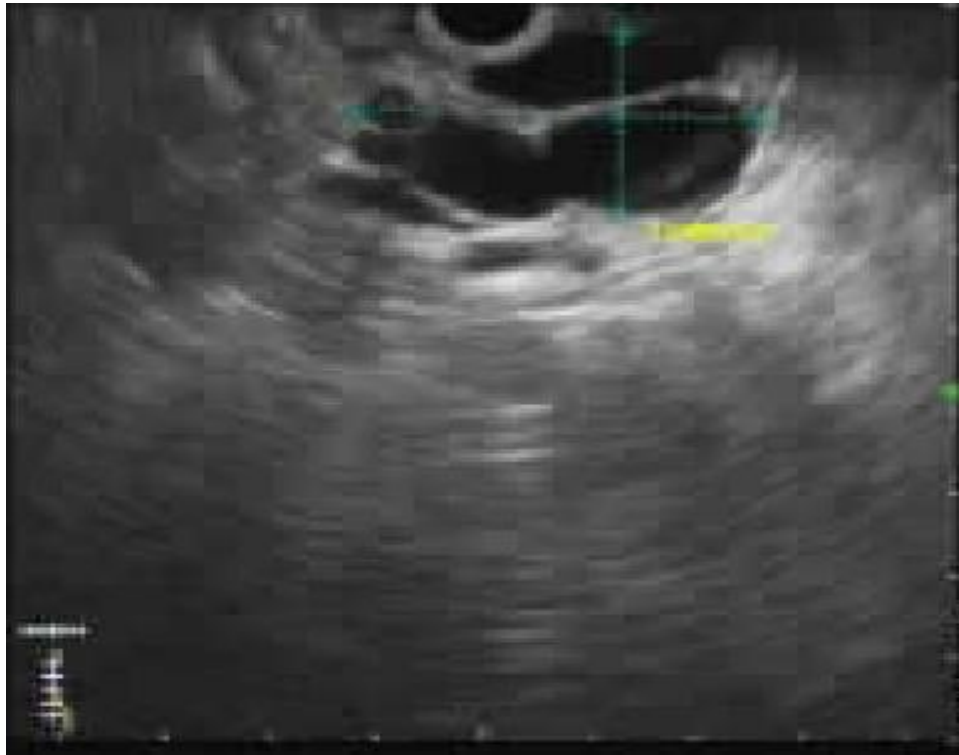


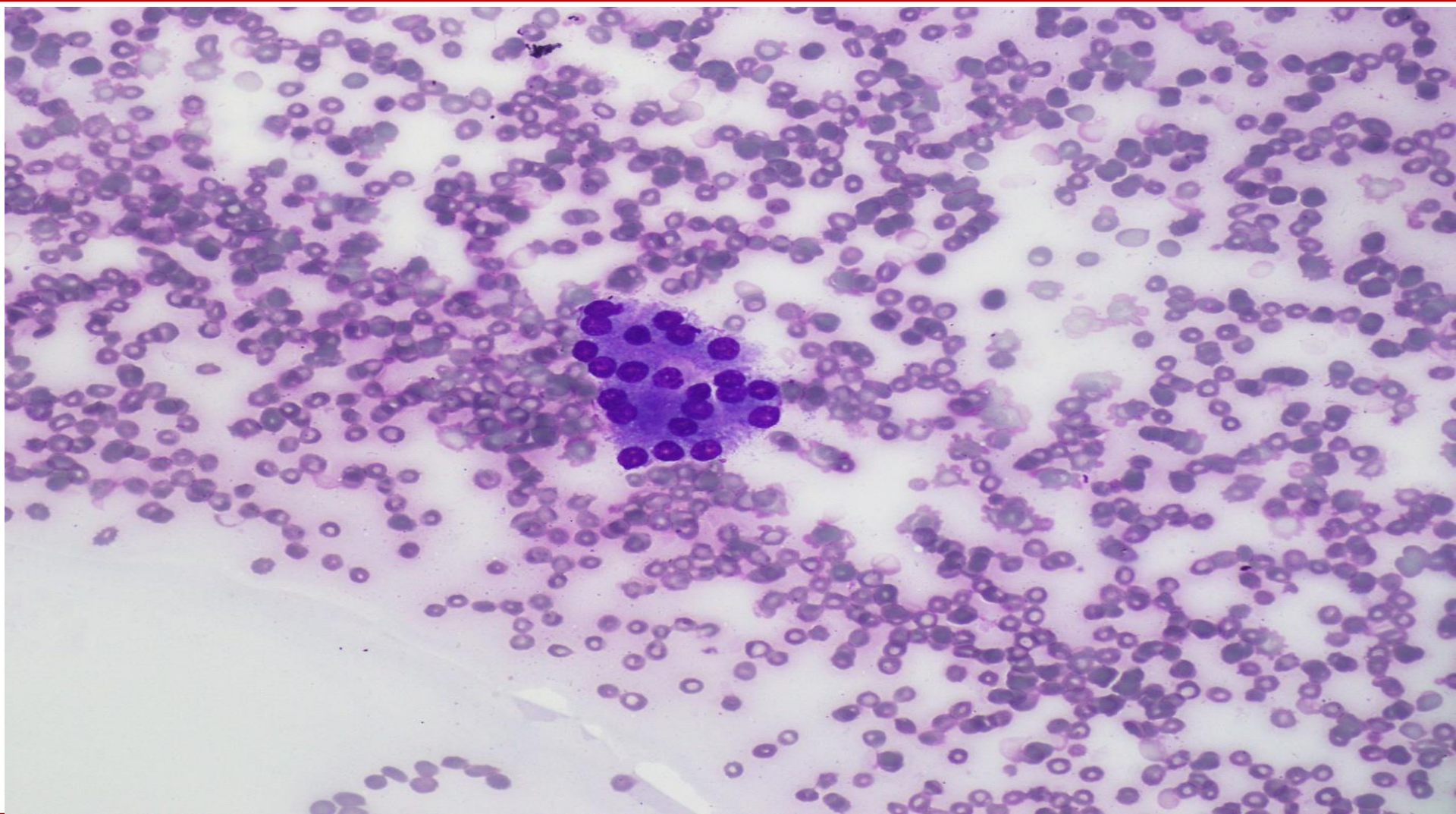
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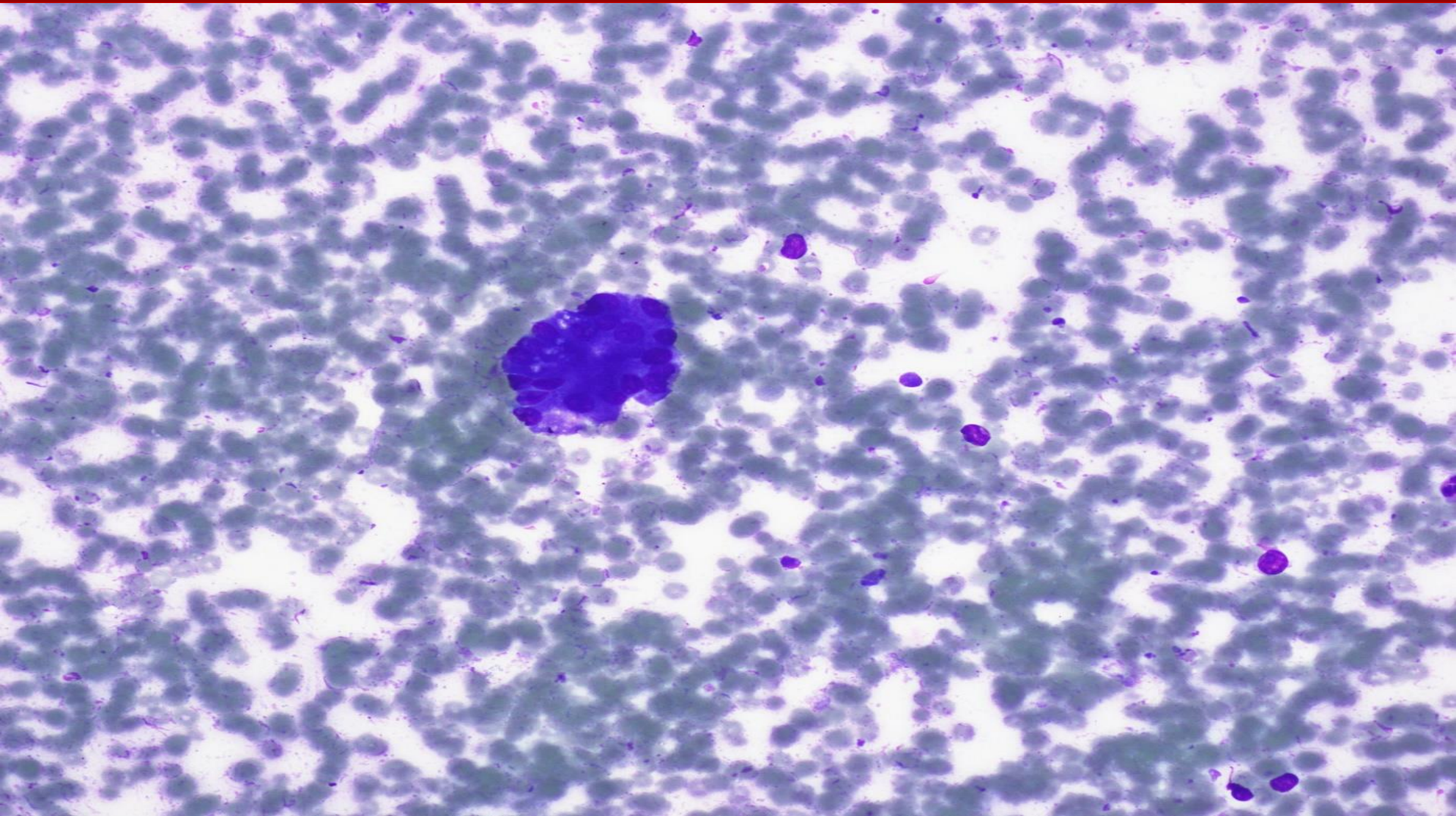
56 year male with an enlarged pancreatic tail cyst showing heterogeneous appearance. Patient was a known case of VHL syndrome

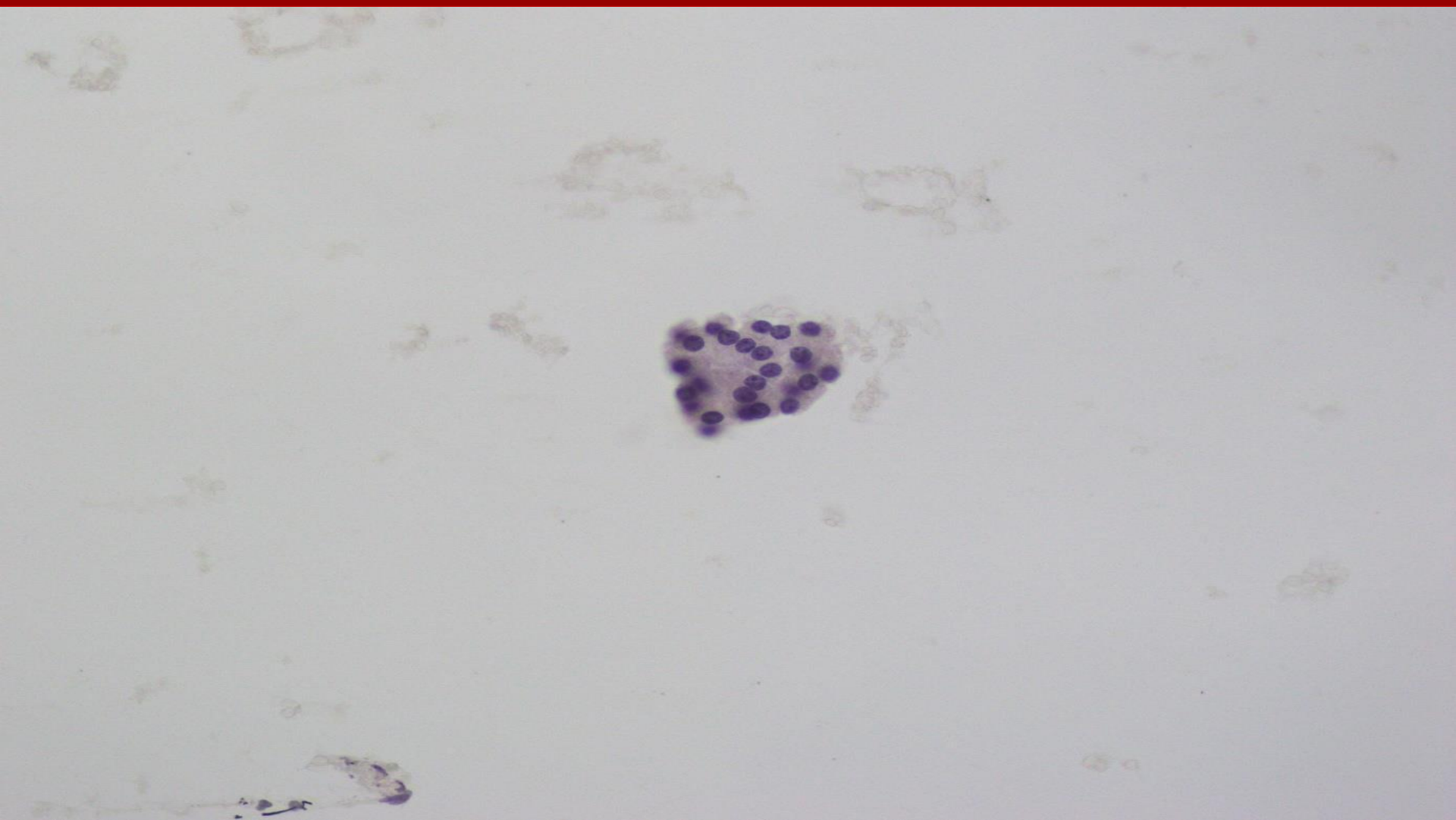
EUS guided FNA was performed which showed clear serous fluid with haemorrhage in the background



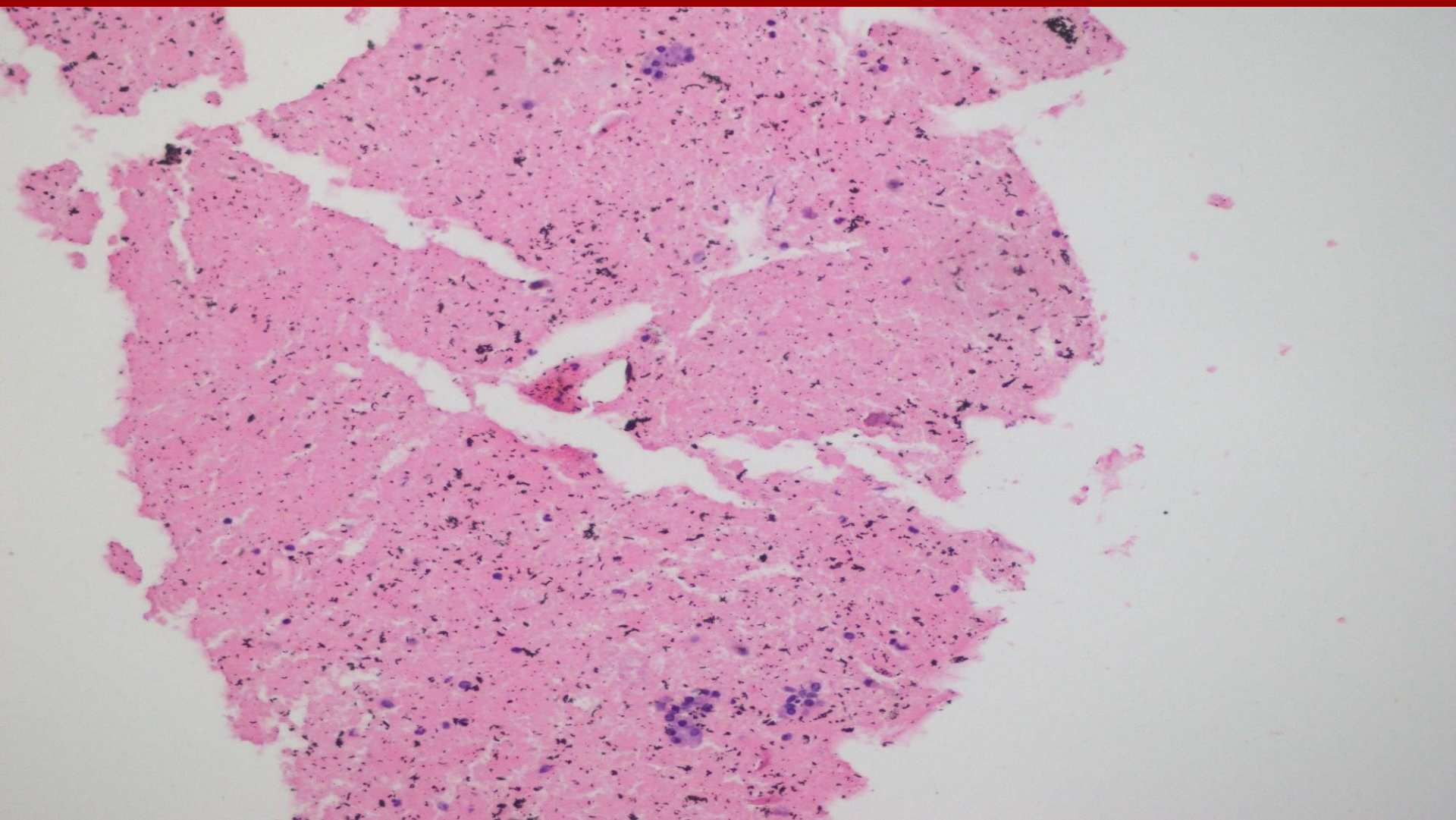


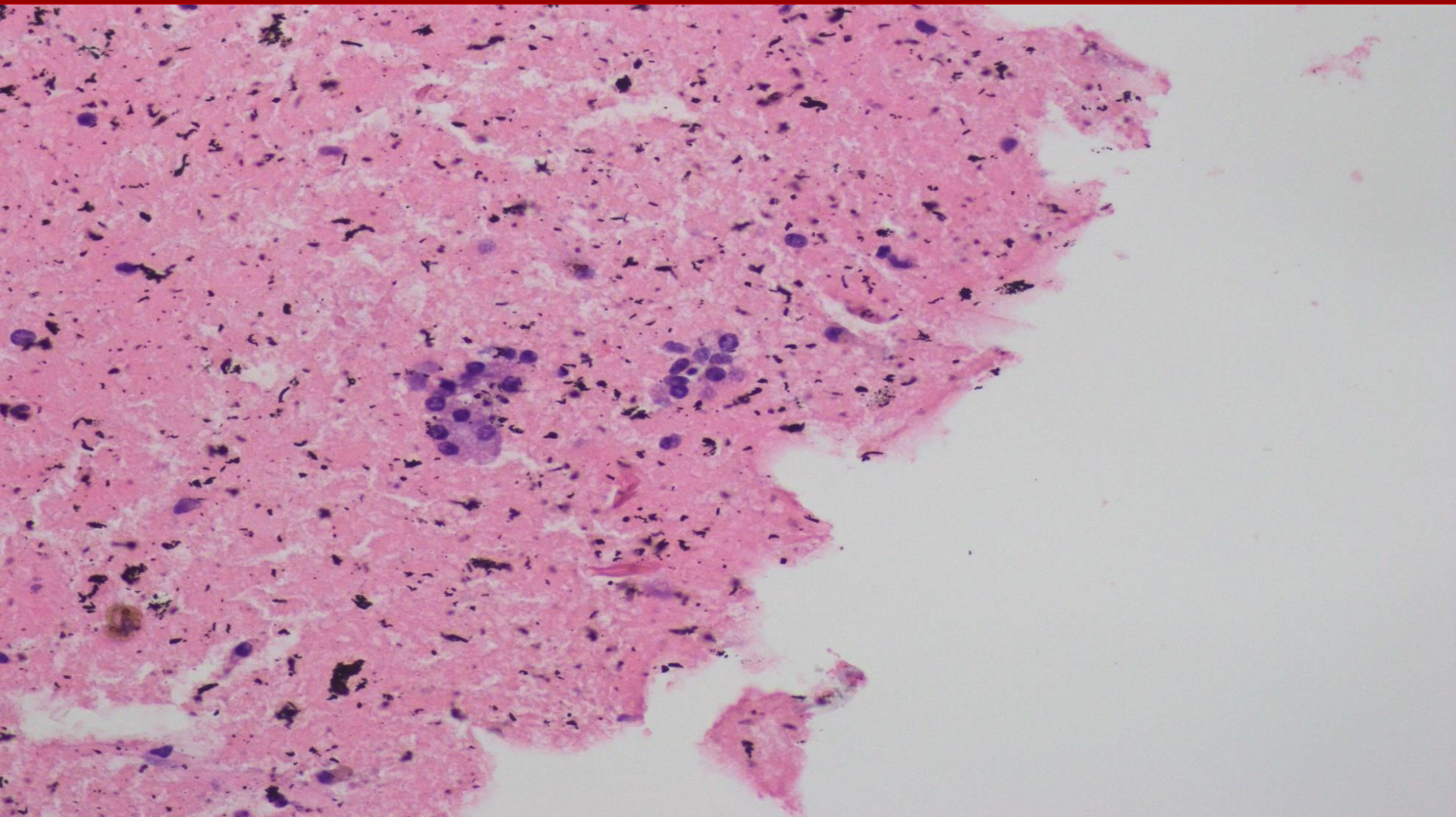












LABS

Tumor Markers		
SPECIMEN : FLUID		
TEST(s)	RESULT(s) UNITS	REFERENCE RANGE
CEA	5.09 ng/mL	Median 95%ile
		Smoker 2.1 6.2
		Non Smoker 1.1 3.4

Method:
Test performed on Immulite 2000 instrument, Chemiluminescent based.



LABS

Chemistry - II			001RCH13427609	001RCH13427135
TEST(s)	NORMAL	UNIT(s)	01-DEC-2013 06:21:36	30-NOV-2013 17:57:46
AMYLASE	30 - 110	U/L	51	39
LIPASE	<60	U/L	68.6	71
LACTATE	4.5 - 22.0	mg/dL	6.3	22.4

Note : Lab values should always be correlated with clinical picture.
Normal Range(s) and Unit(s) shown are for most recent results.



SEROUS CYSTADENOMA



- von Hippel-Lindau disease-associated solid microcystic serous adenomas masquerading as pancreatic neuroendocrine tumors

[Simon Turcotte](#), MD,¹ [Baris Turkbey](#), MD,² [Stephanie Barak](#), MD,³

Surgery 2012



Pancreatic Cysts

Feature	PP	IPMN	MCN	SCN	cPNET	SPN
Sex	M/F	M/F	F	F	M/F	F
Median age (y)	60	65	40	60	50	30
Localization	Entire pancreas	Head	Body and tail	Entire pancreas	Entire pancreas	Body and tail
Morphology	Unilocular	Unilocular, septated, dilated MPD	Unilocular	Microcystic	Associated mass	Mixed solid and cystic
Number of cysts	Multiple	Multiple (40%)	Solitary	Solitary	Solitary	Solitary
Epithelium type	No epithelial lining	Papillary mucinous	Mucinous	Serous (PAS+ for glycogen)	Endocrine	Endocrine-like
Communication with the MPD	Yes	Yes	No	No	No	No
Risk of malignant tumor	No risk	High	High	Low	Low	Low
Genetic sequence variations	No sequence variation	<i>KRAS</i> , <i>GNAS</i> <i>RNF43</i> <i>CTNNB1</i>	<i>KRAS</i> <i>RNF43</i>	<i>vHL</i>	Mostly sporadic ^b	<i>CTNNB1</i>
Cyst fluid viscosity	Low	High	High	Low	Low	Low
Cyst fluid amylase level	High	Variable, high	Variable, low	Low	Low	Low
Cyst fluid CEA level	Low	High	High	Low	Low	Low

Pancreatic Cysts, Mayo Clinic

Omer Basar, MD^{a,c},
William R. Brugge, MD^{a,b}



CASE NO. 3

40 year male

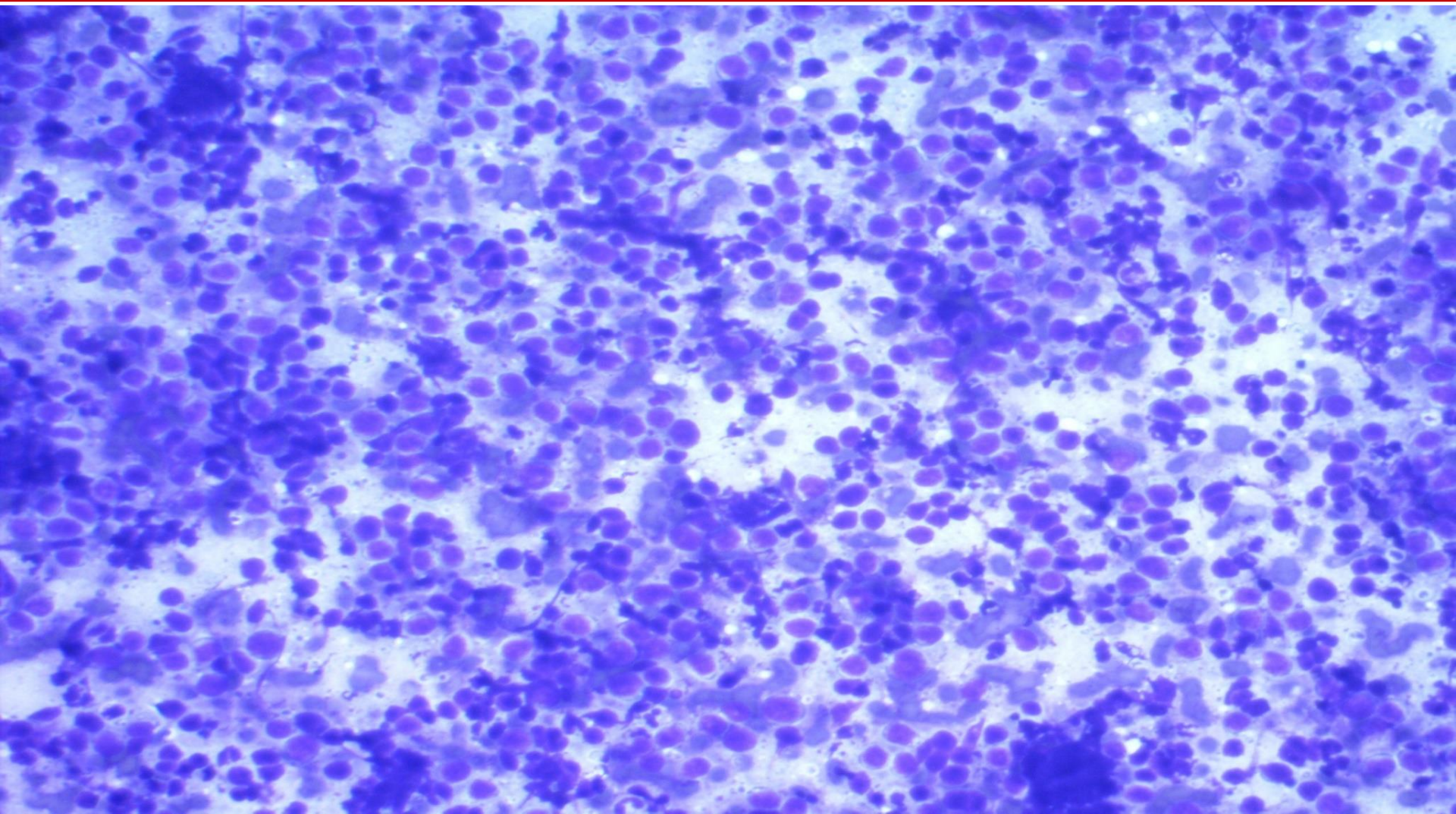
Left epigastric mass, involving body and tail of
pancreas

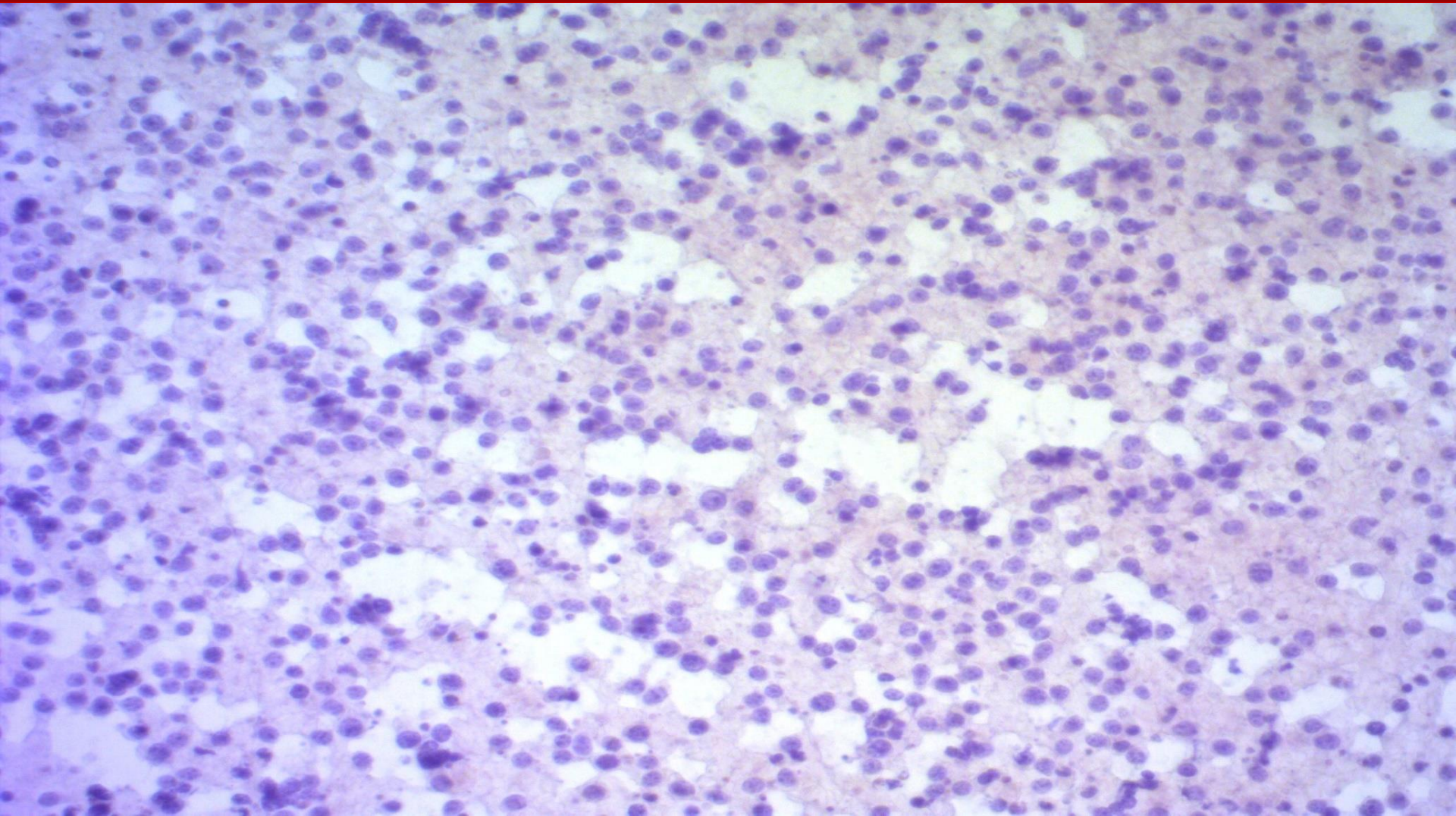
EUS guided FNA performed

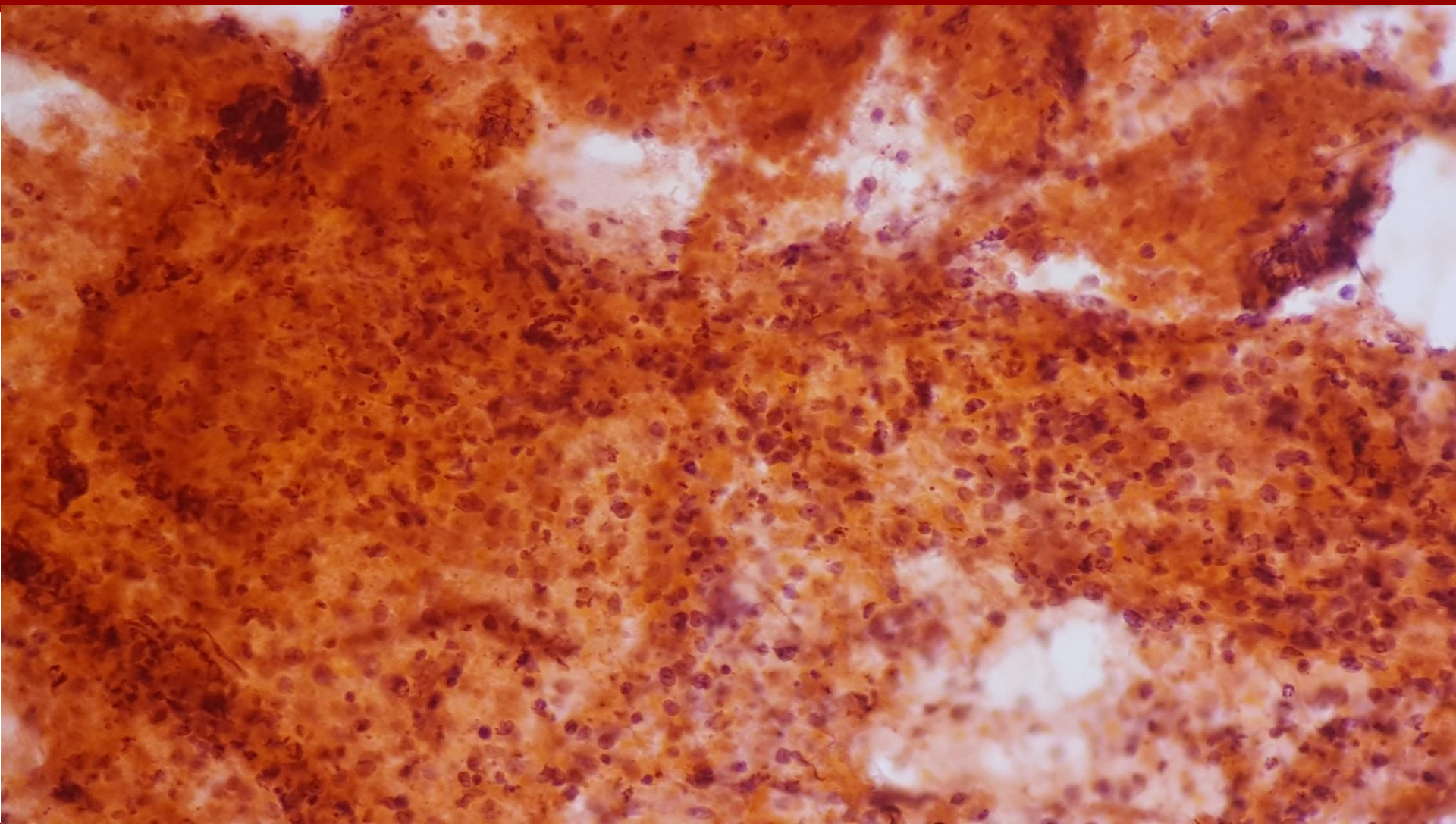


SHAUKAT KHANUM MEMORIAL HOSPITAL OLYMPUS

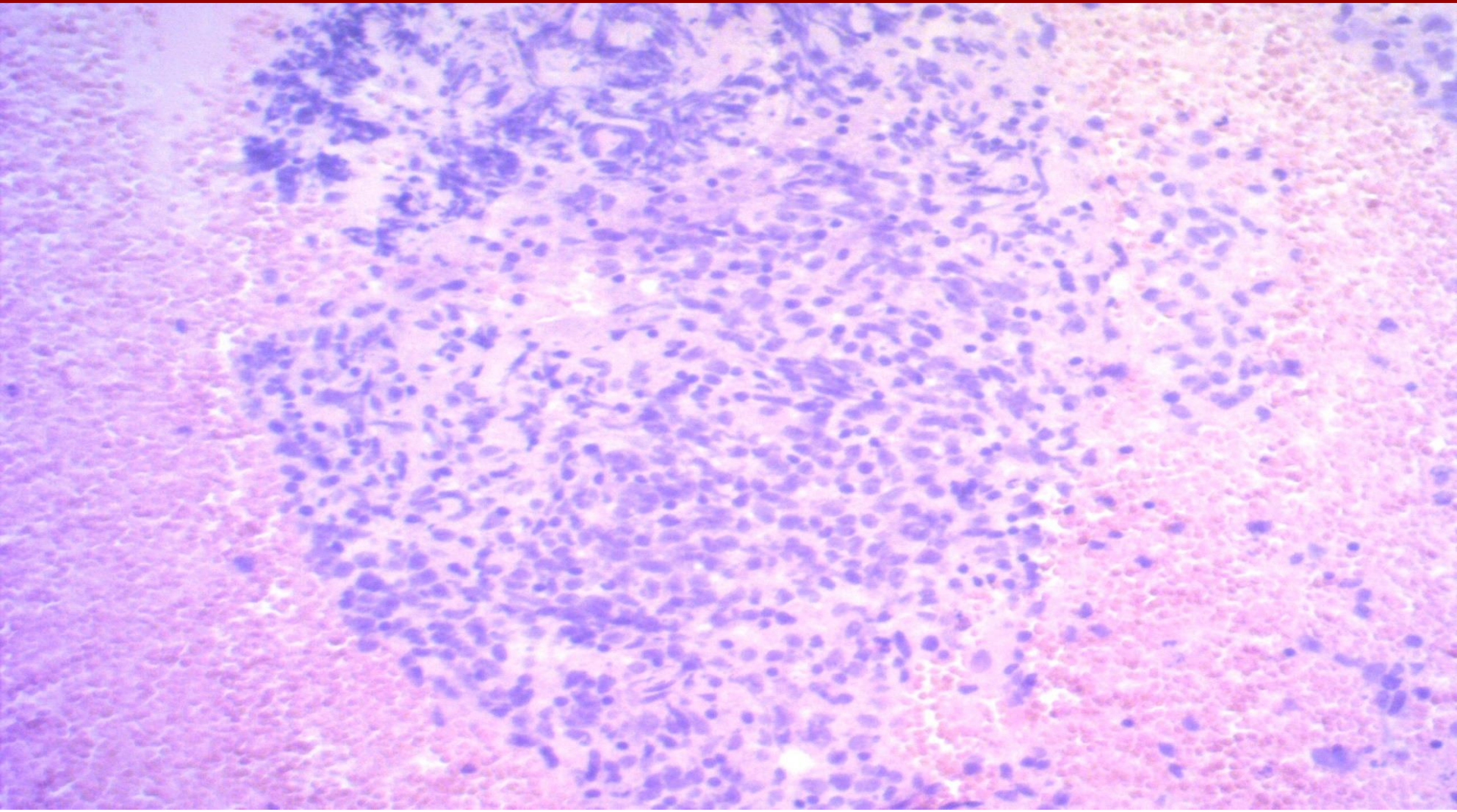




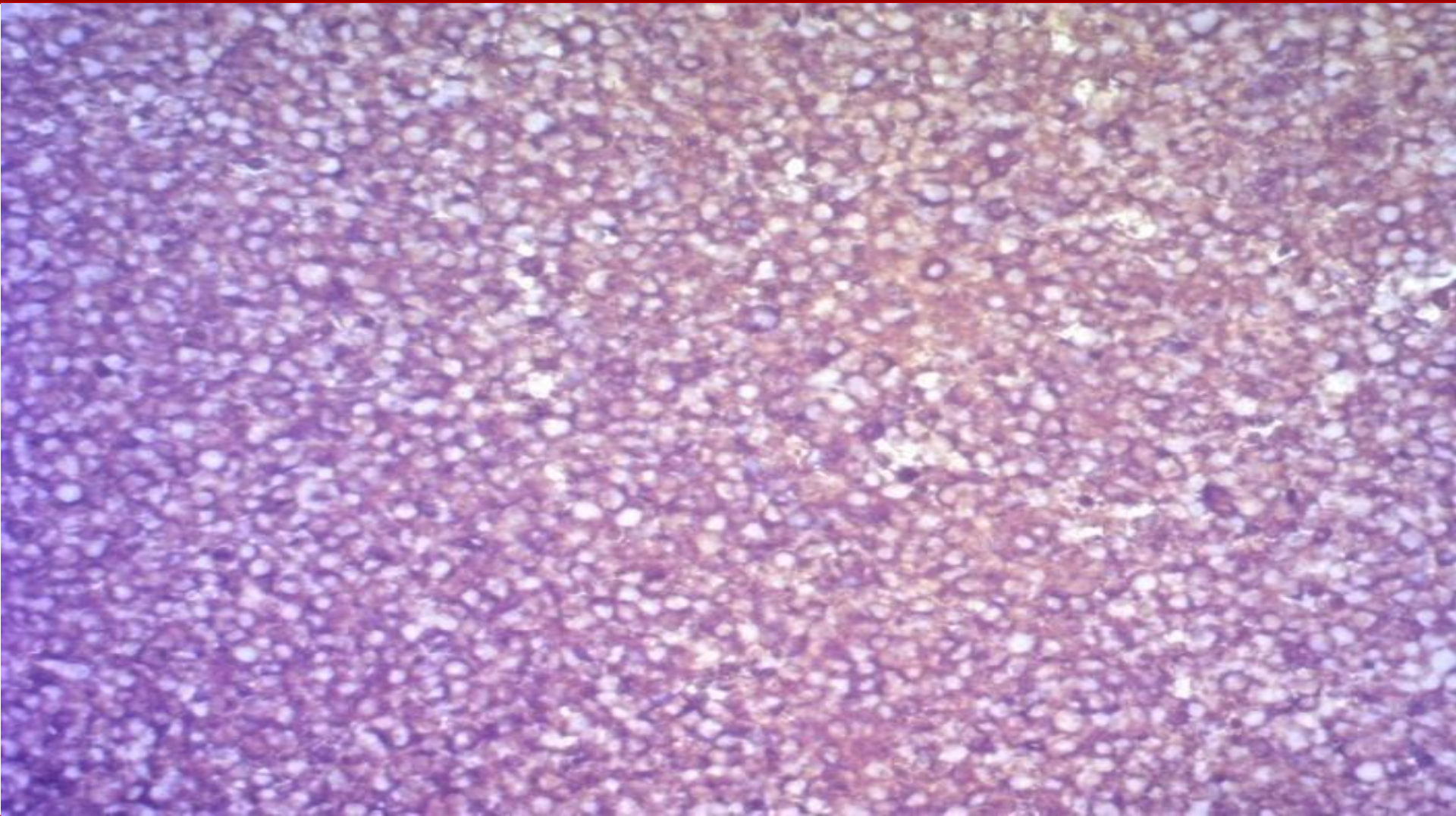




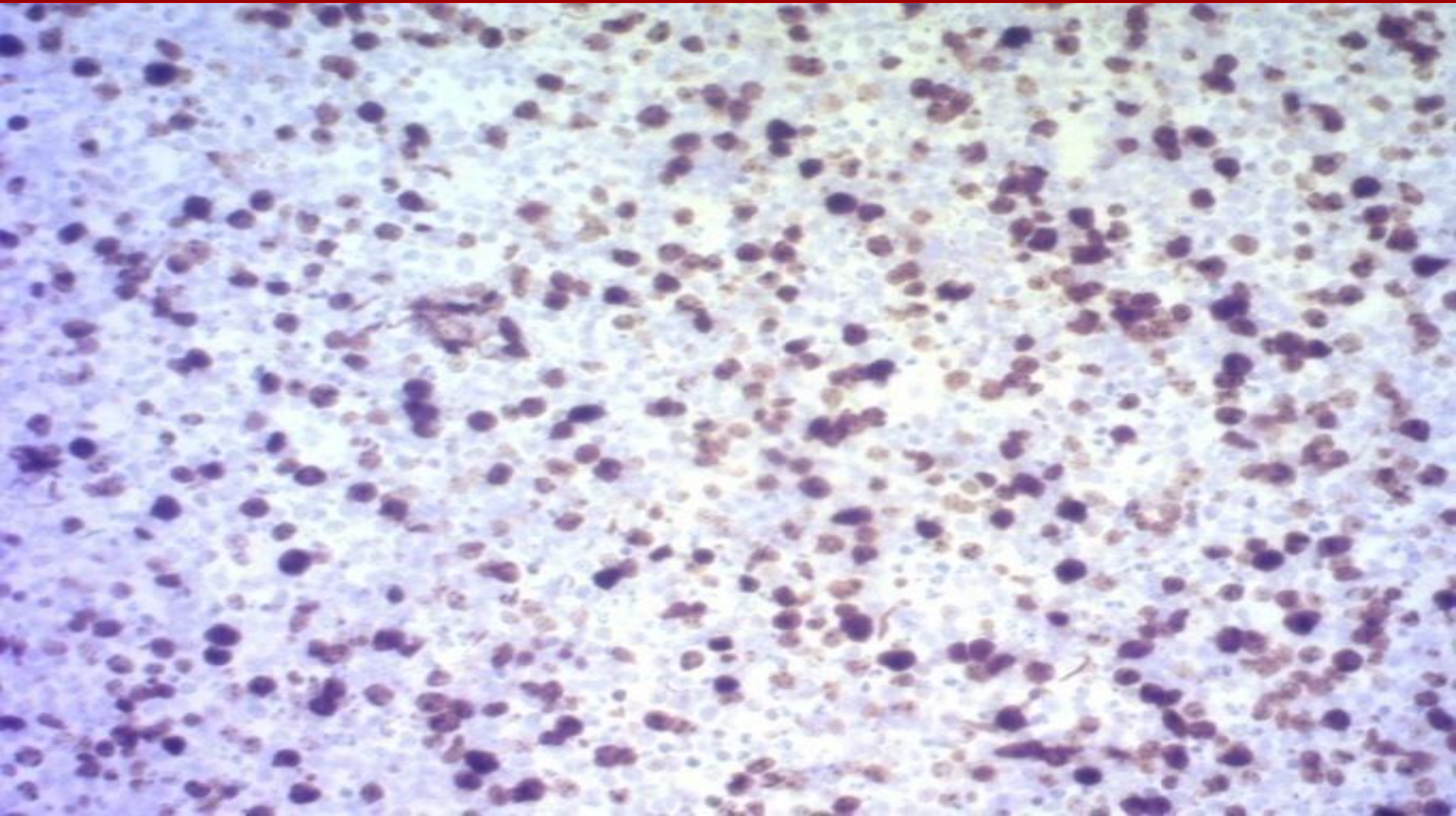
CELL BLOCK



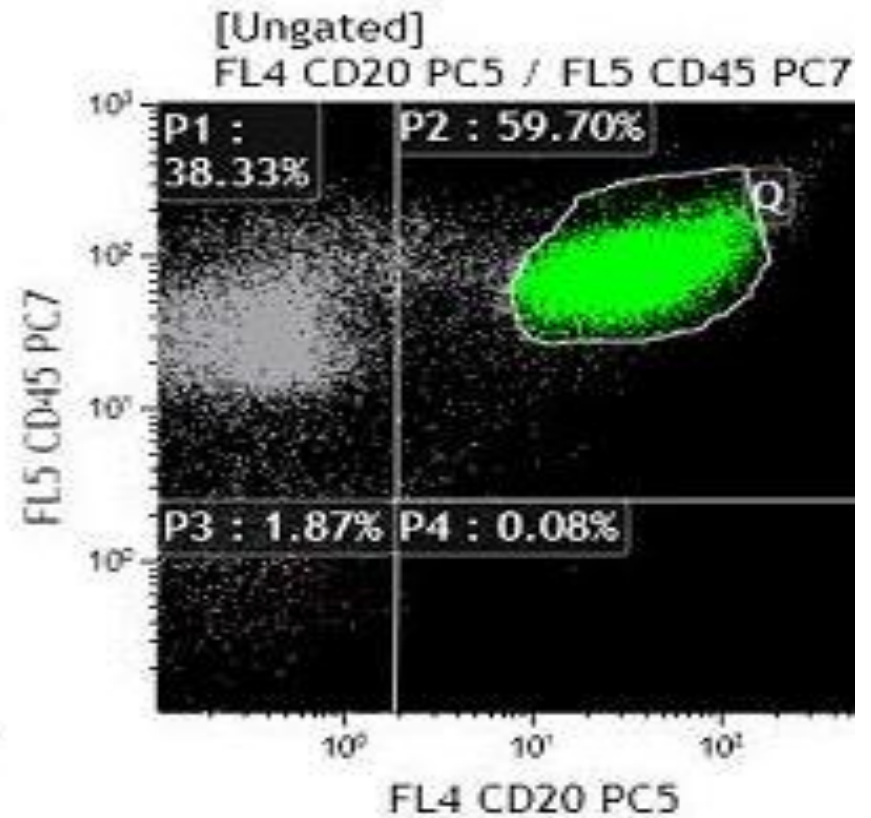
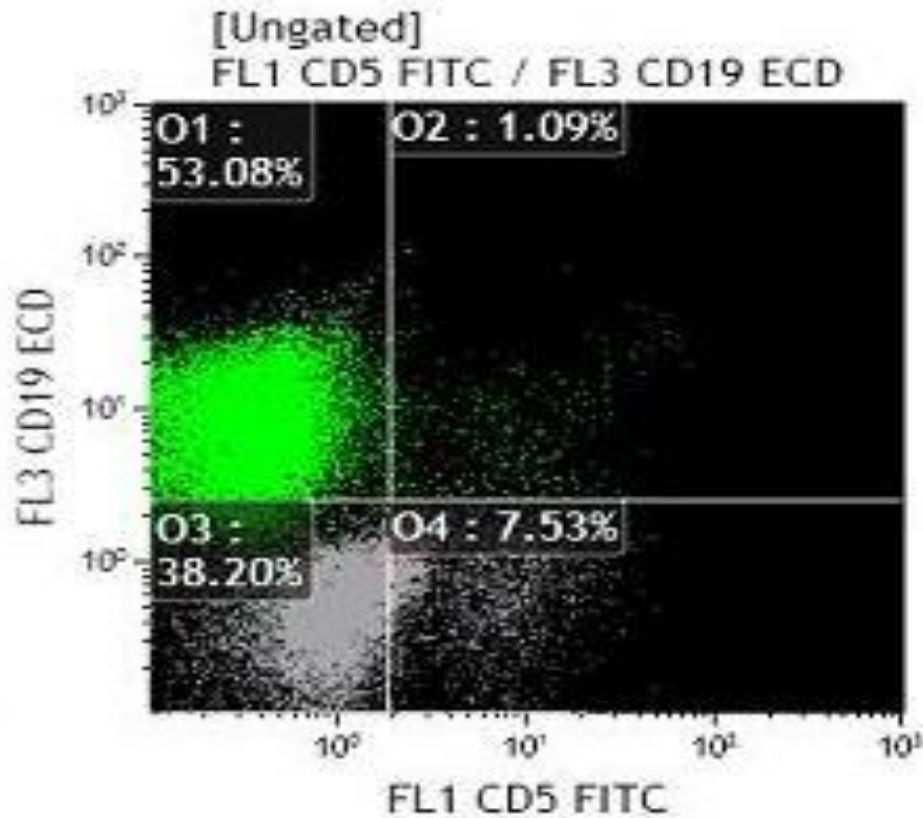
CD20



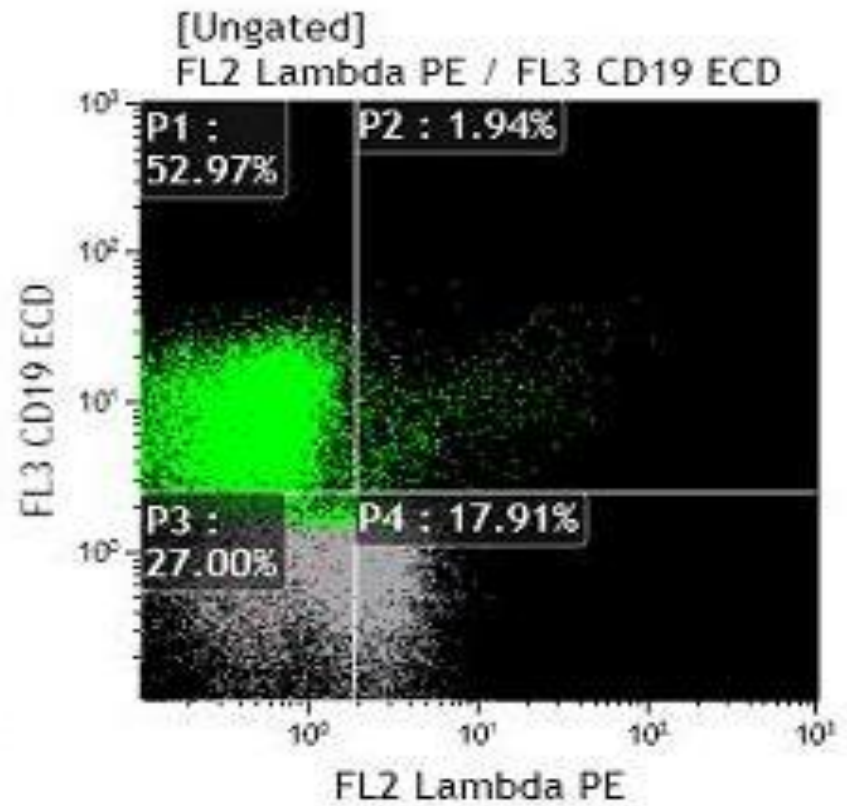
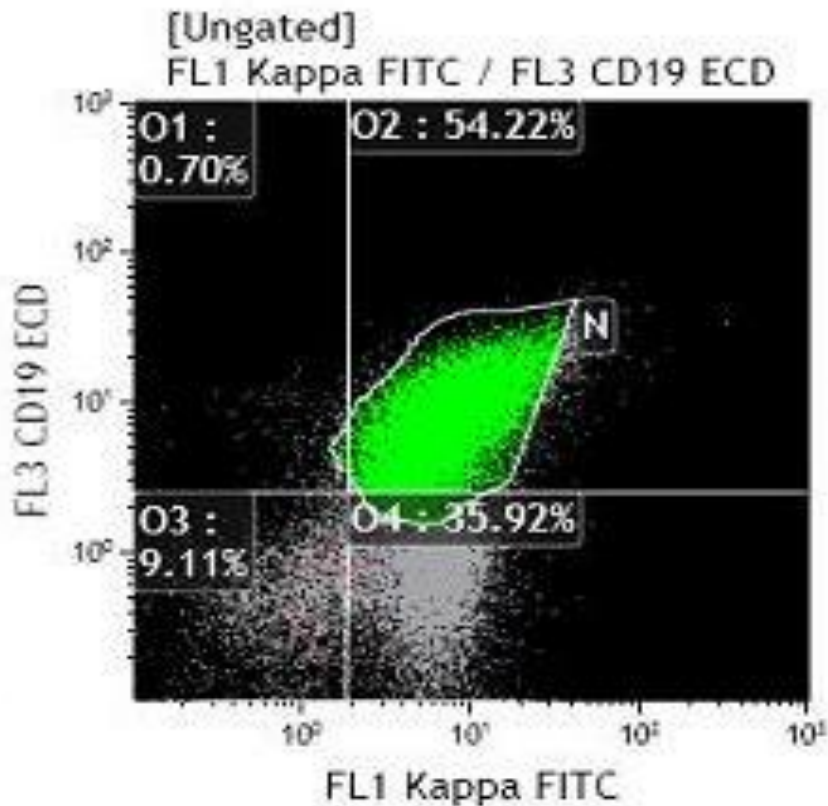
Ki 67



FLOW CYTOMETRY



FLOW CYTOMETRY



DIAGNOSIS



DIFFUSE LARGE B CELL LYMPHOMA

Treated with R-CHOP and responded well.



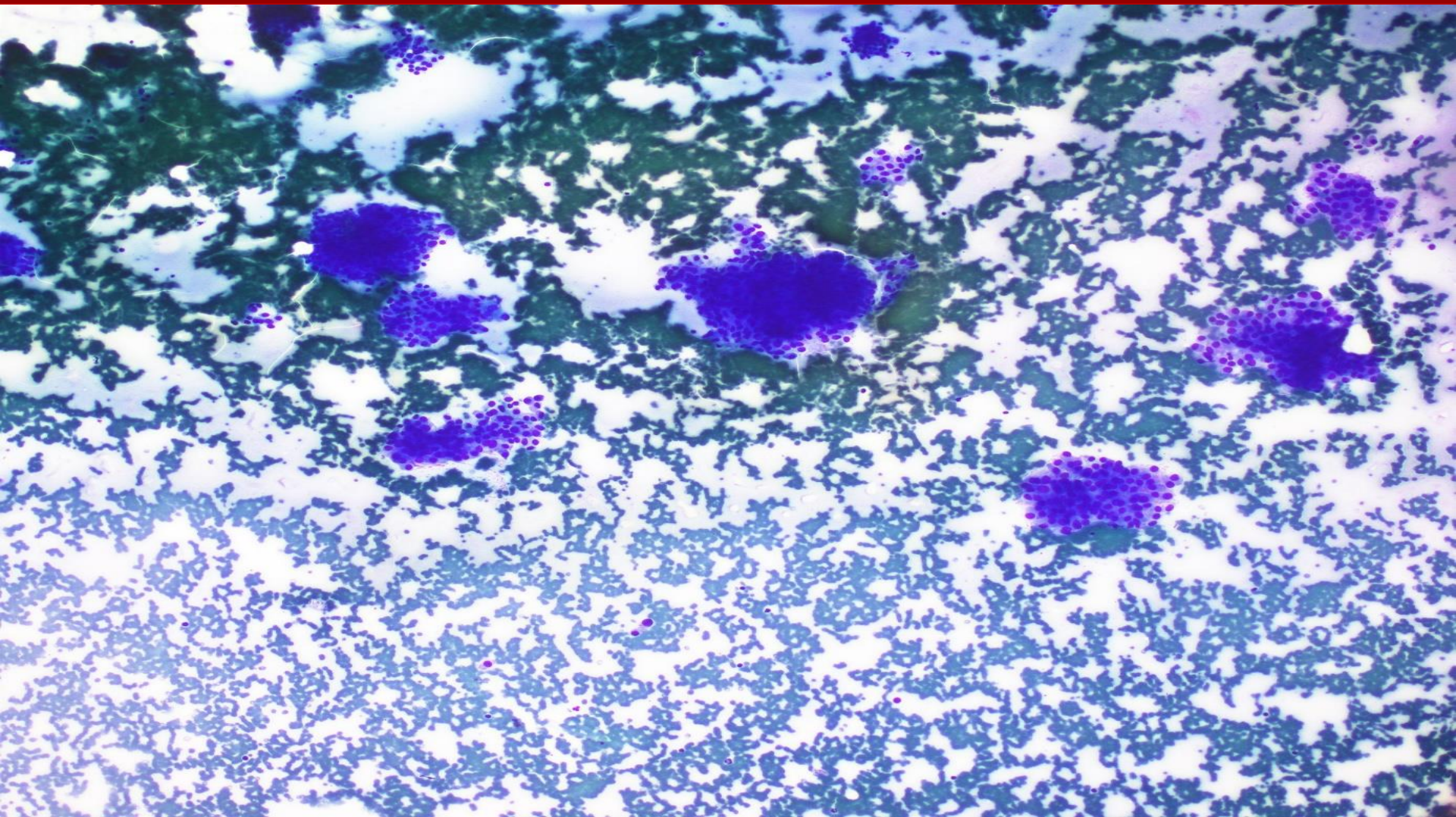
CASE NO. 4

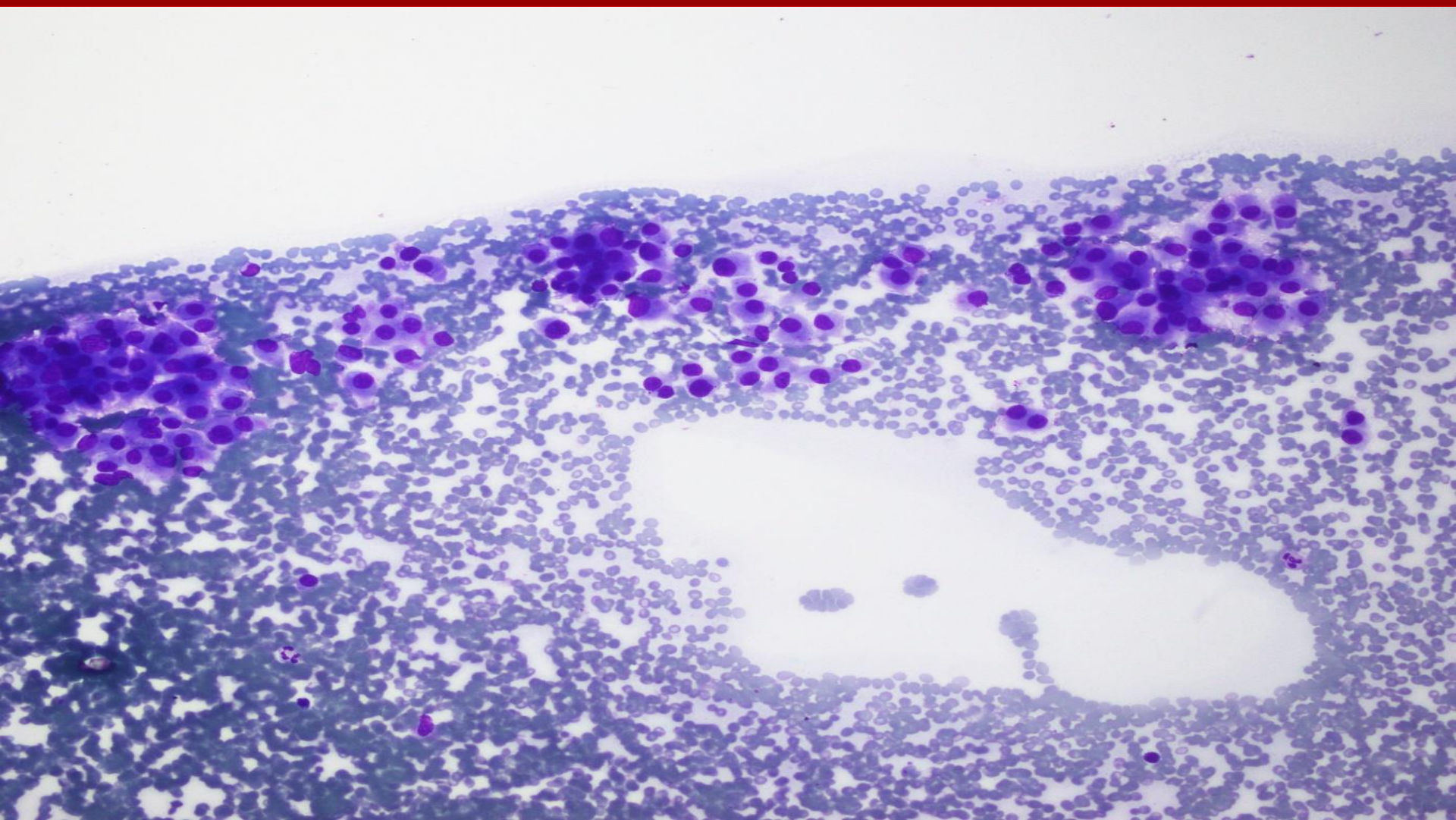
78 male

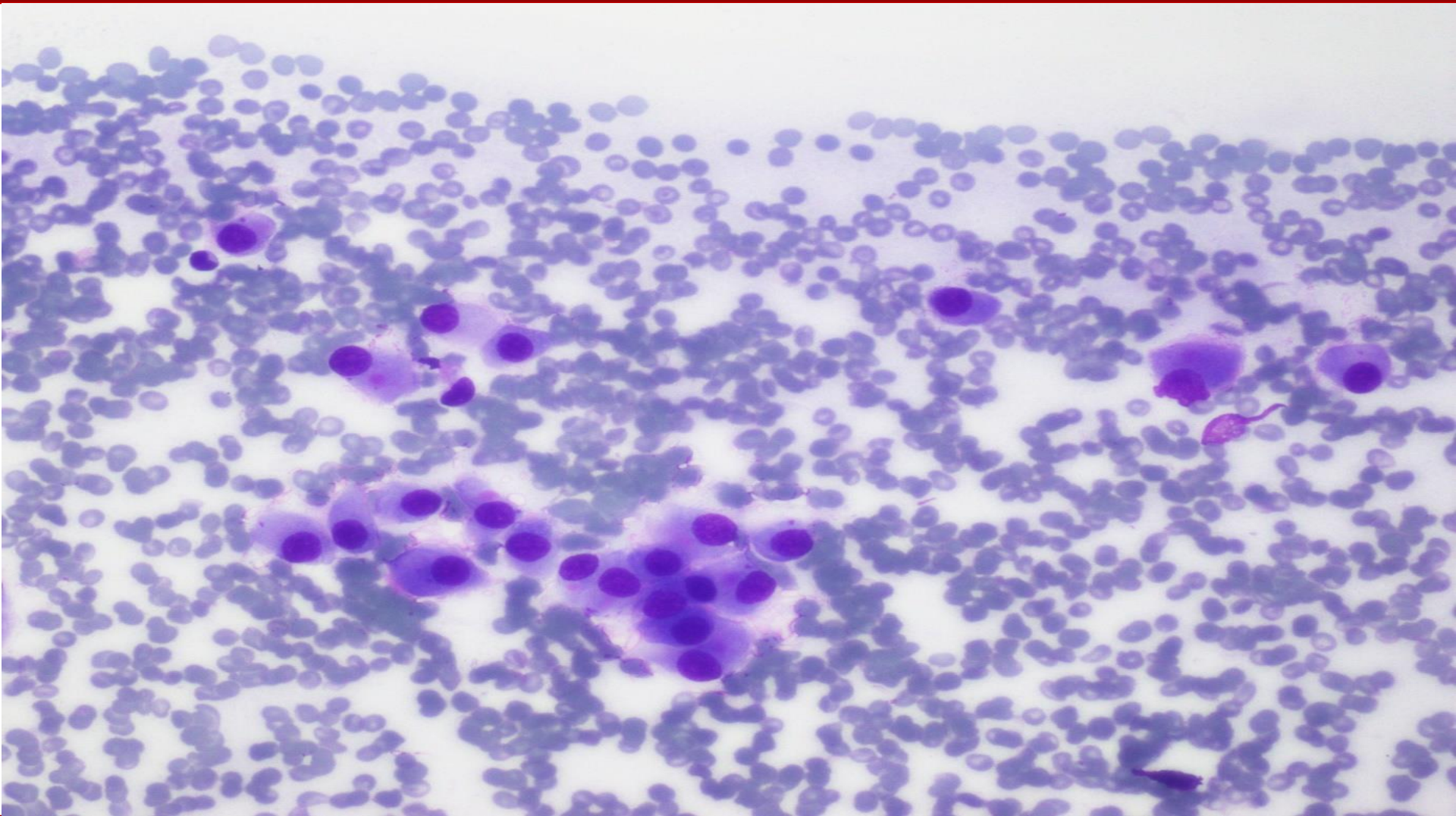
Pancreatic uncinate process mass

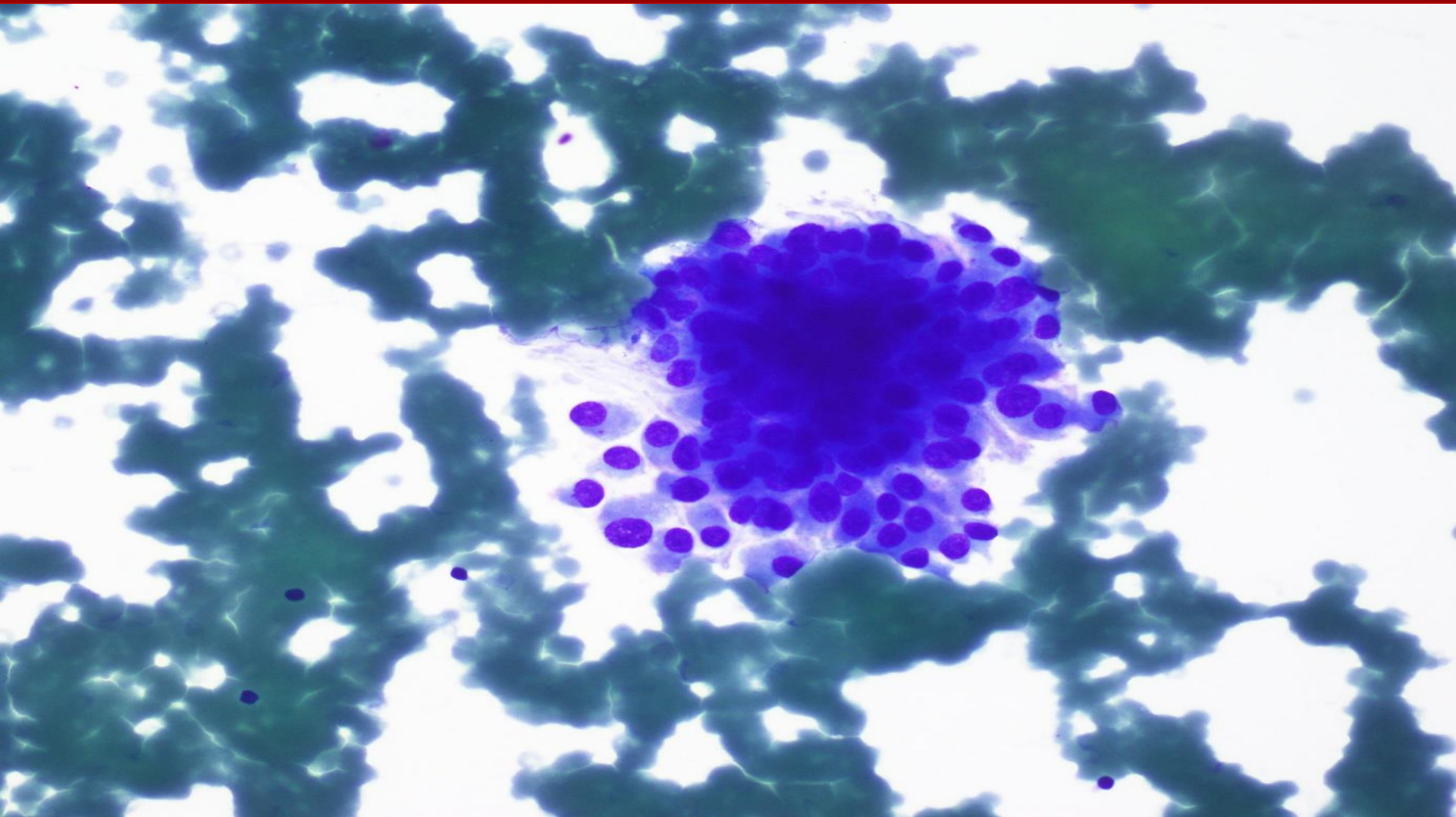
EUS guided FNA

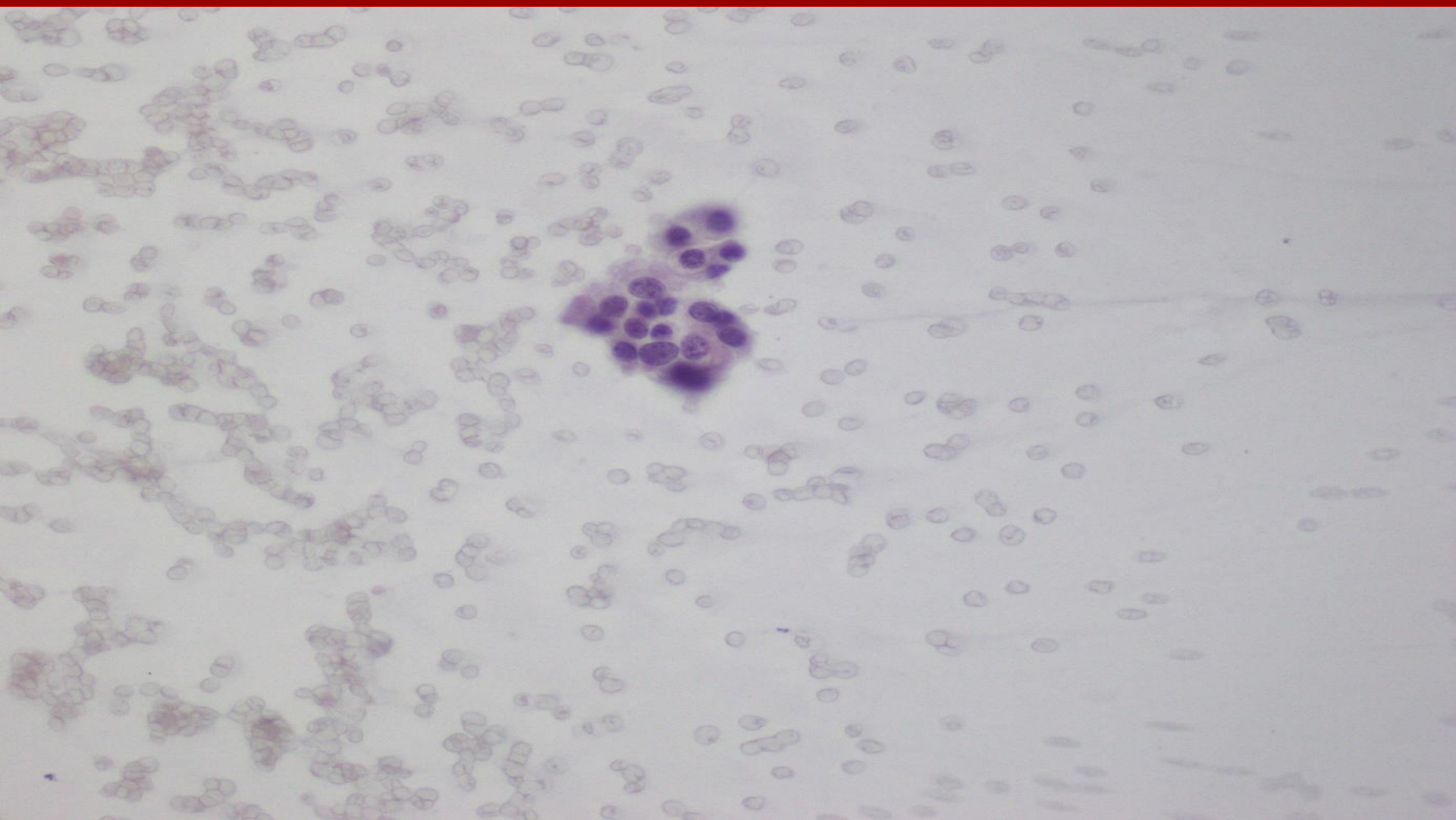


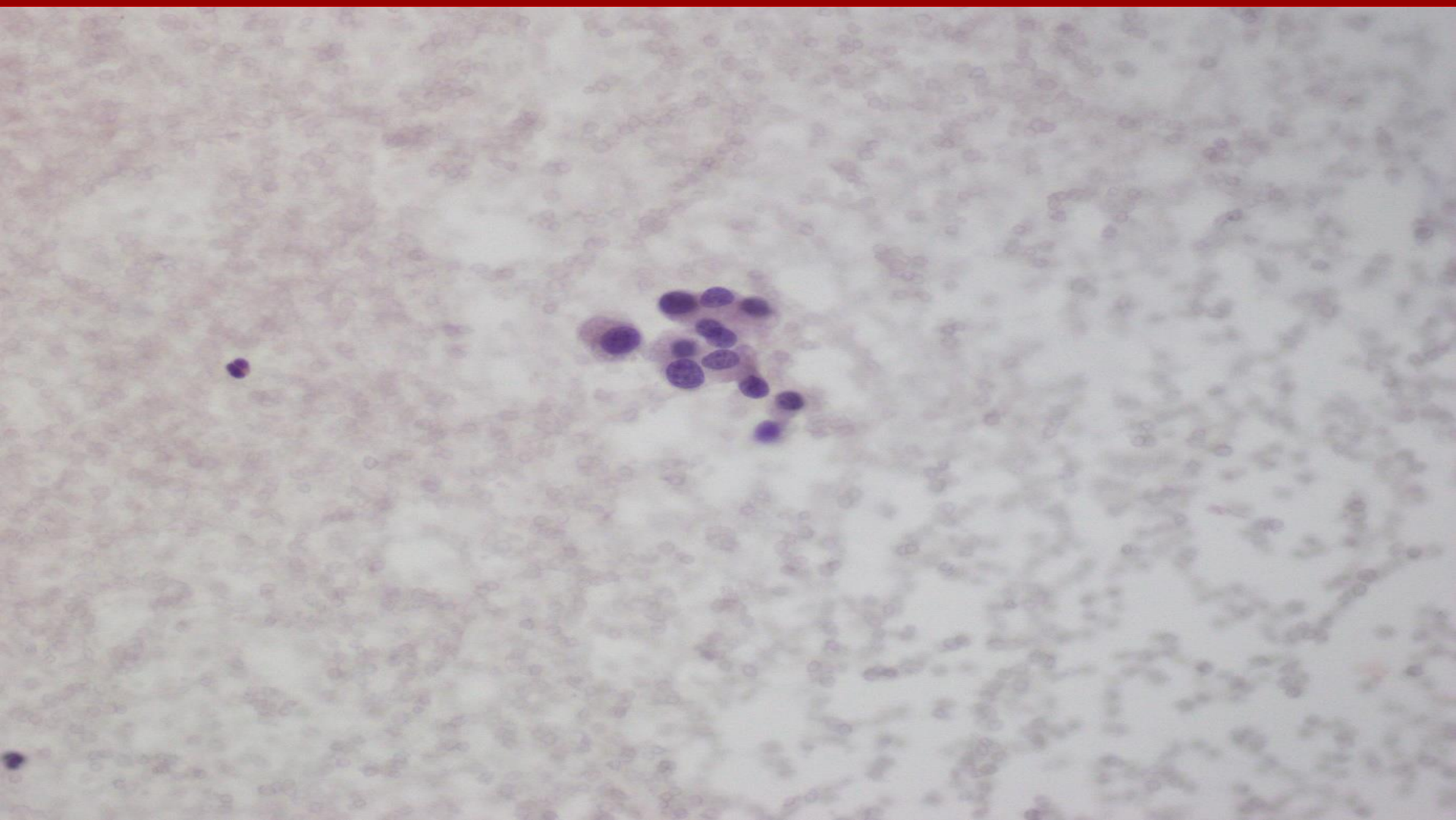


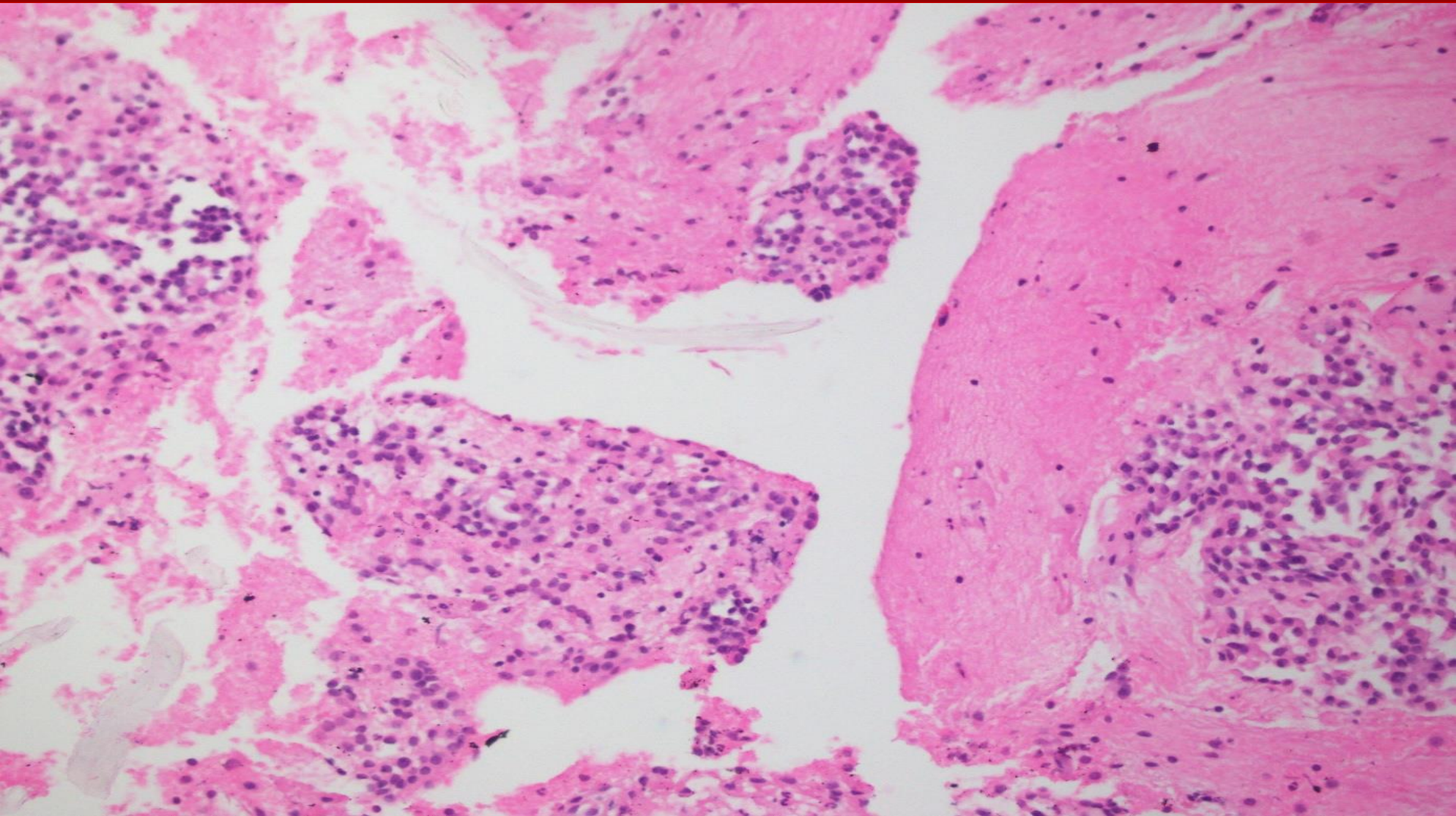


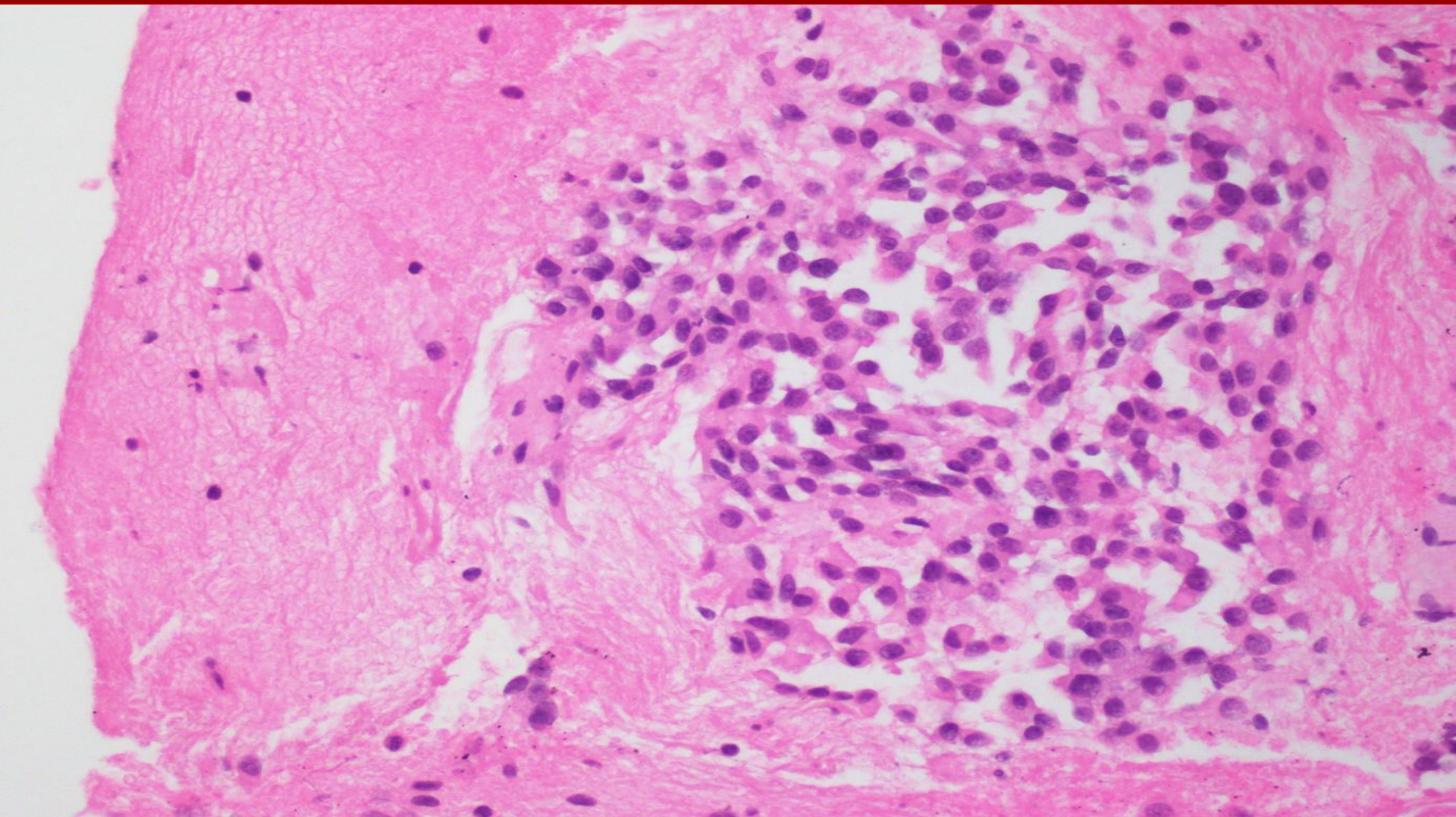




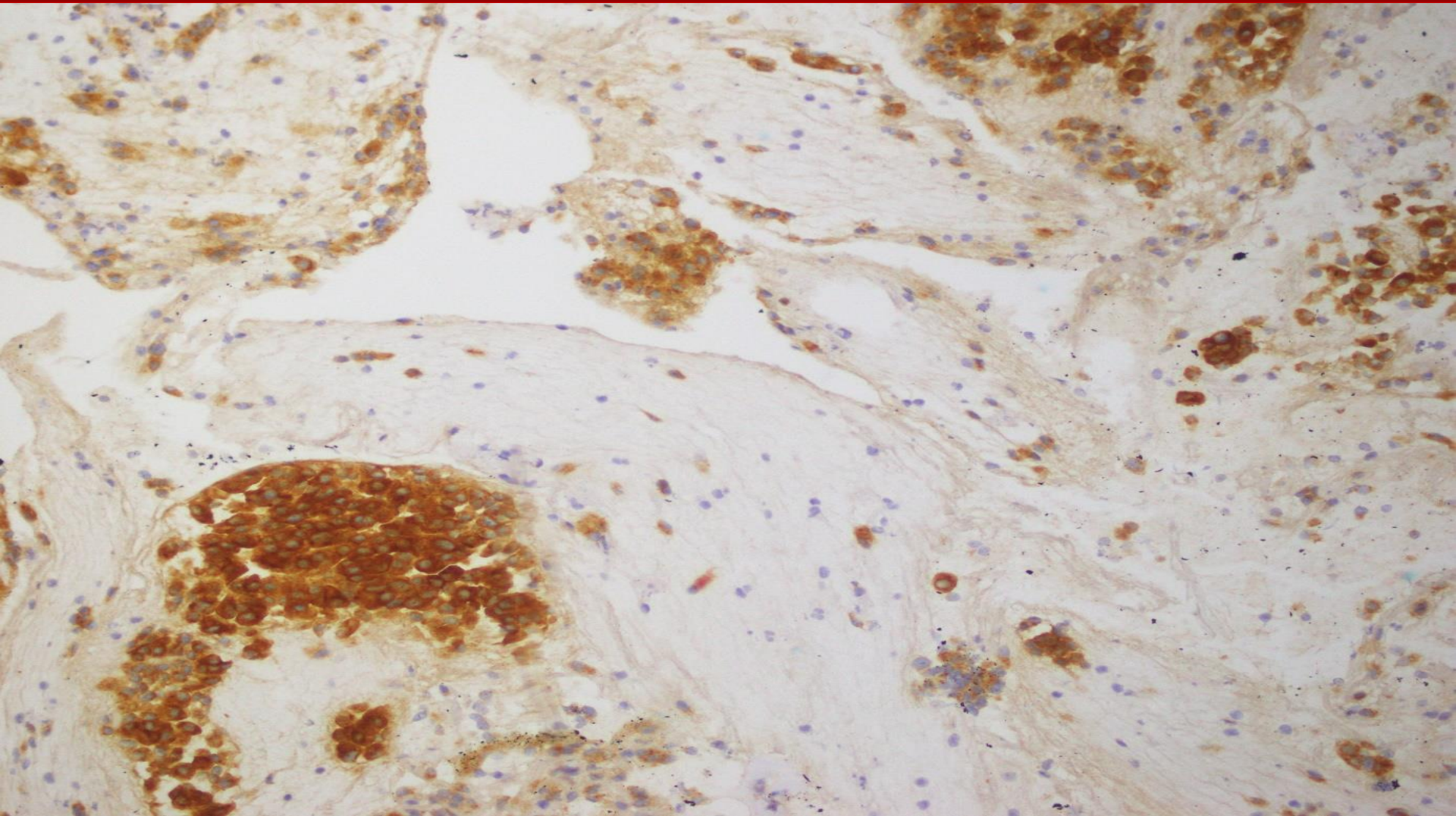




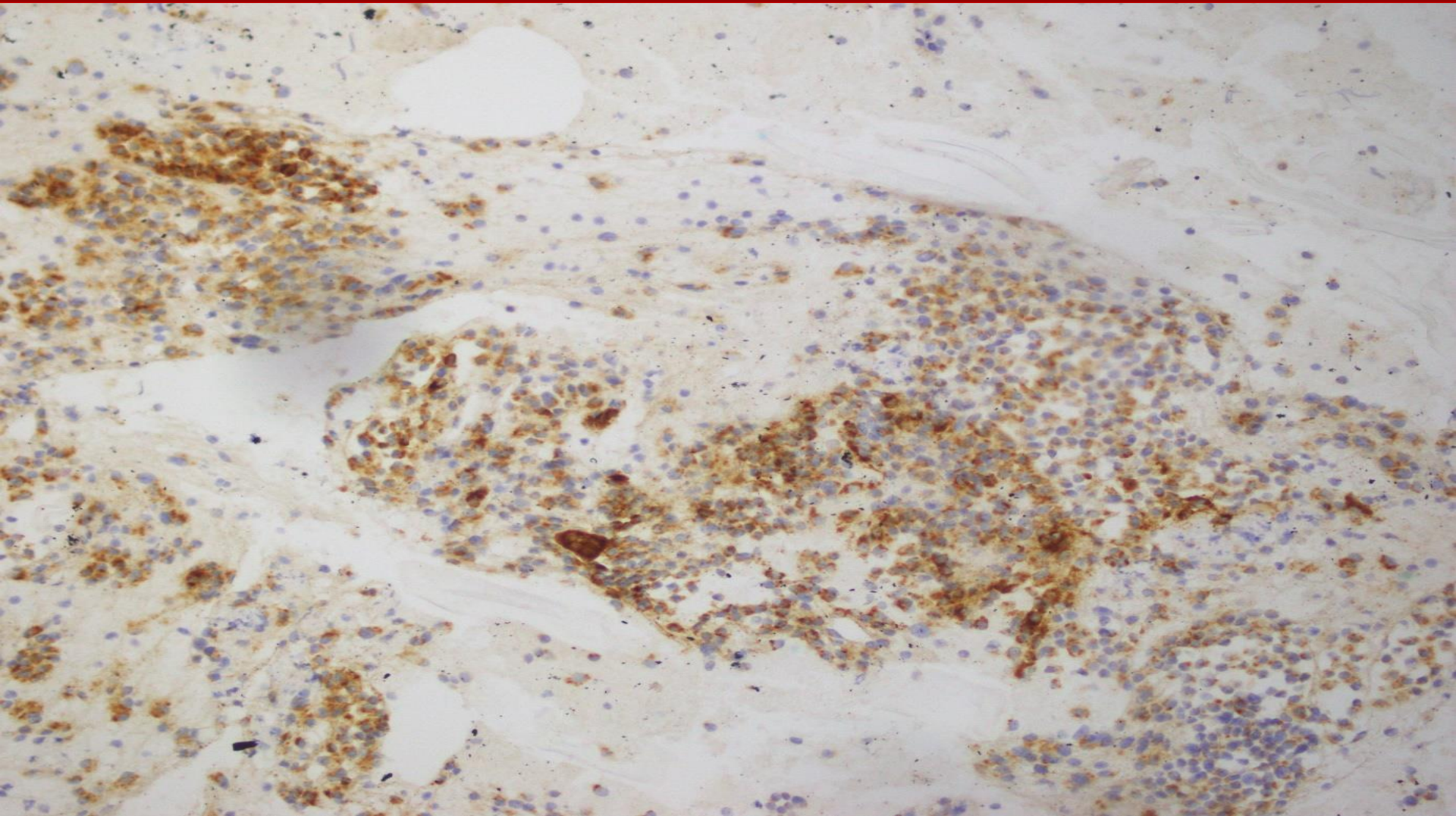




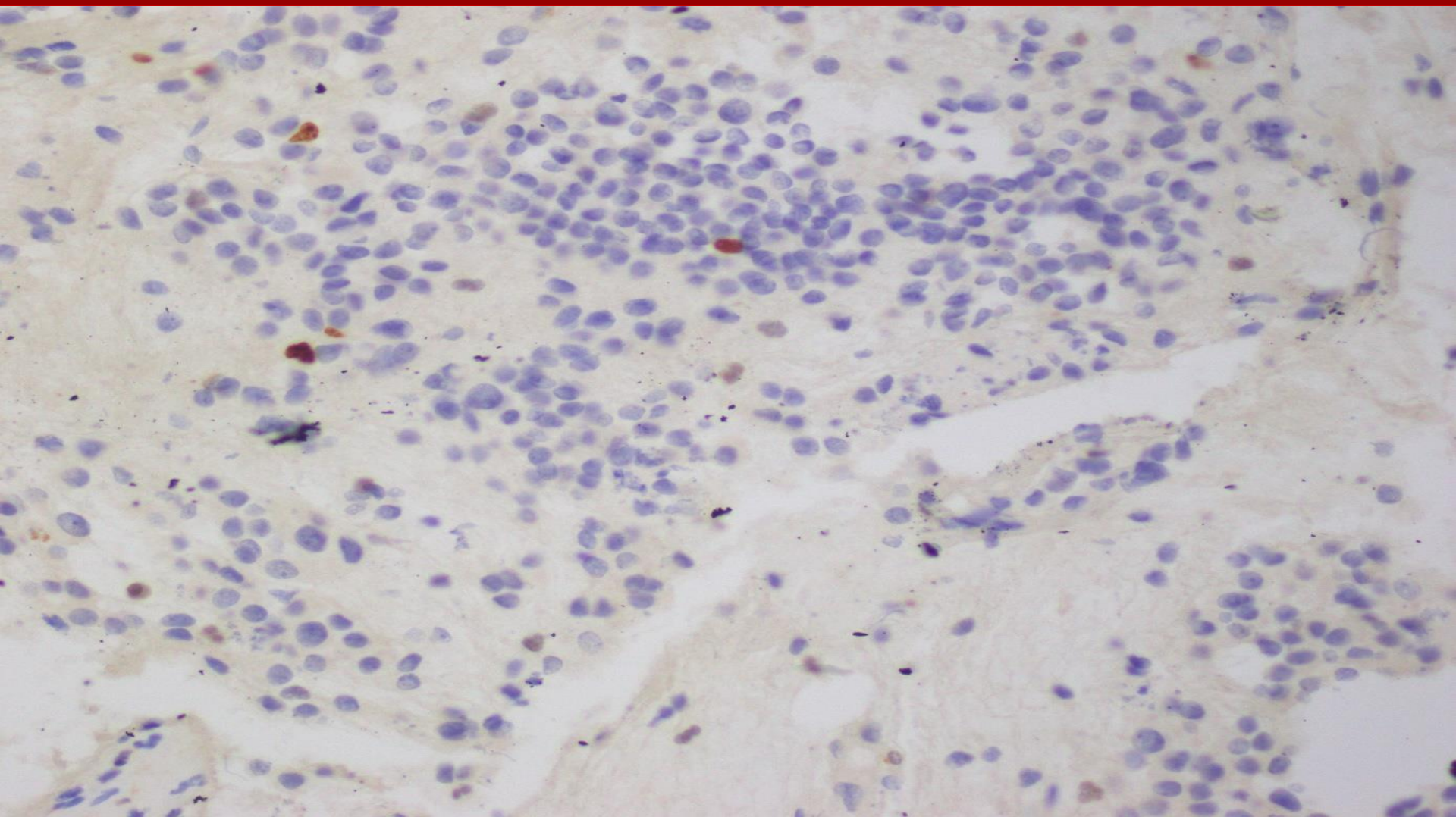
SYNAPTOPHYSIN



CHROMOGRANIN



Ki67- <3%



DIAGNOSIS



NEUROENDOCRINE TUMOR, WHO GRADE I



**Table 3. World Health Organization 2010
Classification of Neuroendocrine Tumors (NETs) in
the Gastrointestinal and Pancreatobiliary Tracts**

Grade	Mitotic Count/ 10 HPFs	Ki-67 Labeling Index, %
NET, grade 1	<2	<3
NET, grade 2	2–20	3–20
NEC, grade 3	>20	>20



Disease entity	Demographic differences	Clinical presentation/ Radiological features	Cytomorphological differences	Immunohistochemical differences
Pancreatic neuroendocrine tumor	More common in older age. No sex predilection.	Associated with variety of hereditary syndromes. Presents both as solid and cystic neoplasm. More common in pancreatic body and tail.	Loose sheets of monotonous cells, abundant cytoplasm, characteristic salt and pepper chromatin. Plasmacytoid cells, Bi and multinucleation, red cytoplasmic granules	CD56+ Synaptophysin+ Chromogranin+ NSE+ CAM5.2+
Acinic cell carcinoma	More common in older males.	Usually appears as solid well-defined mass in pancreatic head. May have liver and nodal metastasis at presentation.	Loose sheets of monotonous cells with bare nuclei in background. Acini formation and granular cytoplasm.	Trypsin+ Lipase+ Chymotrypsin+
Solid Pseudopapillary neoplasm	Predominantly in adolescent girls and young females.	Well-demarcated solid cystic tumor, more common in pancreatic body and tail.	Loose sheets of monotonous cells, branching papillary fronds, clefted nuclei, metachromatic and myxoid stroma.	CD10+ CD56+ Beta-catenin+ Progesterone receptor+
Well differentiated pancreatic adenocarcinoma	Older individuals (7 th to 8 th decade) Equally common in males and females.	Mostly solid mass with infiltrative borders. Jaundice, epigastric pain, weight loss. Mostly have liver and nodal metastasis at presentation	Two dimensional sheets of ductal cells with drunken honeycomb architecture, Well-defined cell border. May have inflammatory/ necrotic background.	CK+
Plasma cell and other Hematopoietic malignancies	Any age. No sex predilection	Primary pancreatic involvement rare, usually involve secondarily.	Single scattered atypical lymphoid cells, lymphoglandular bodies in the background	LCA+ CD20+ CD38+CD138+

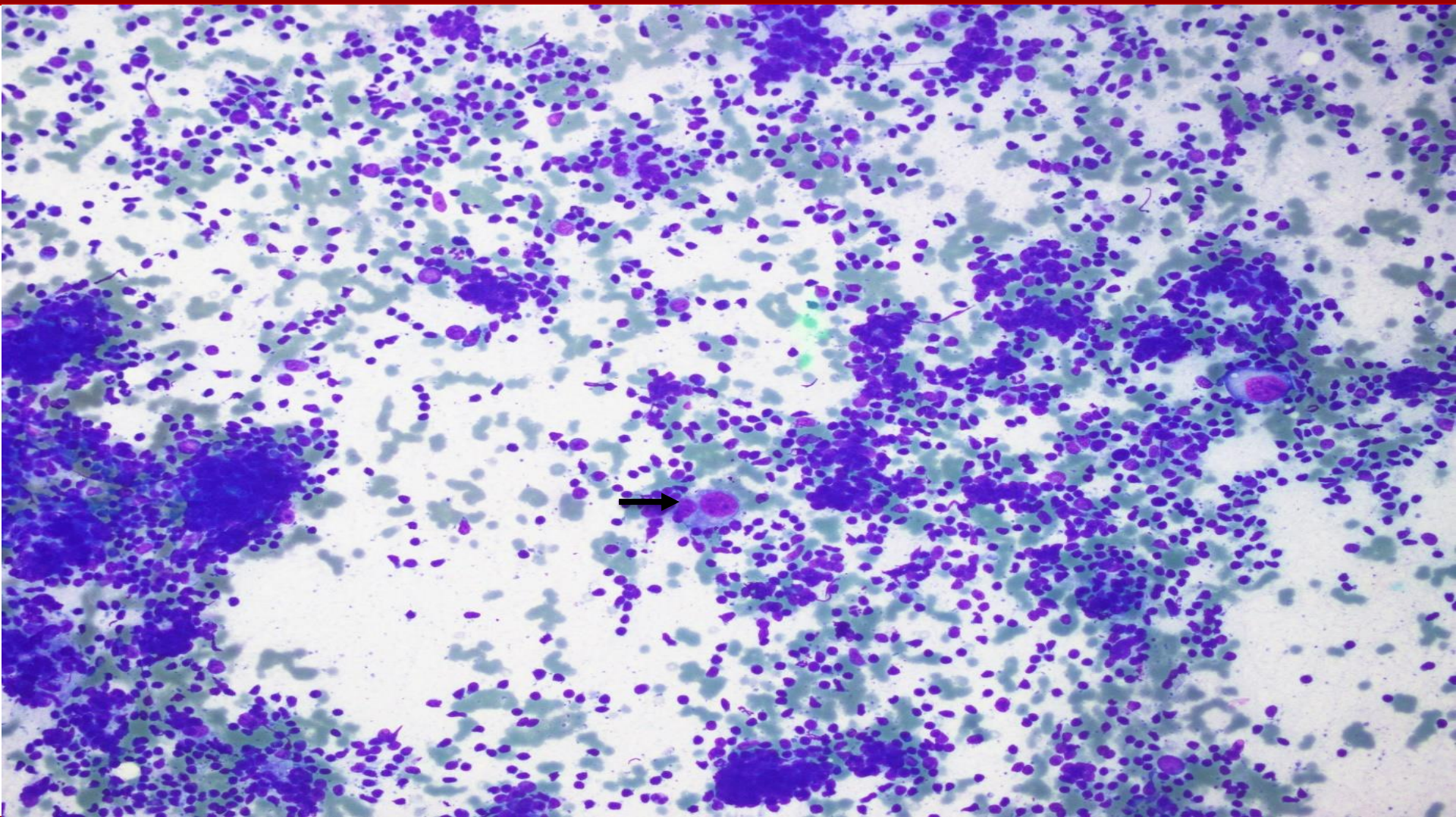


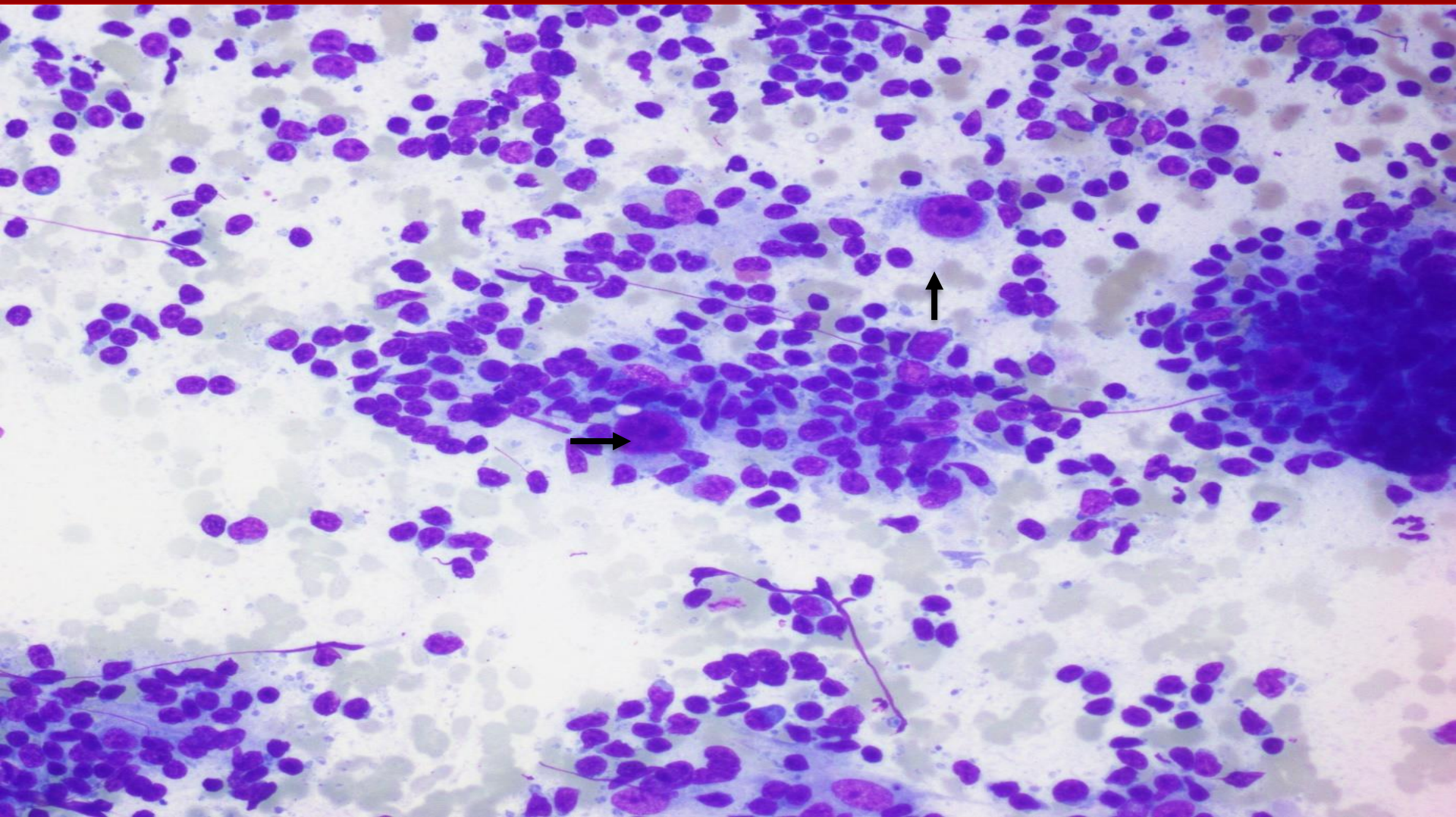
CASE NO. 5

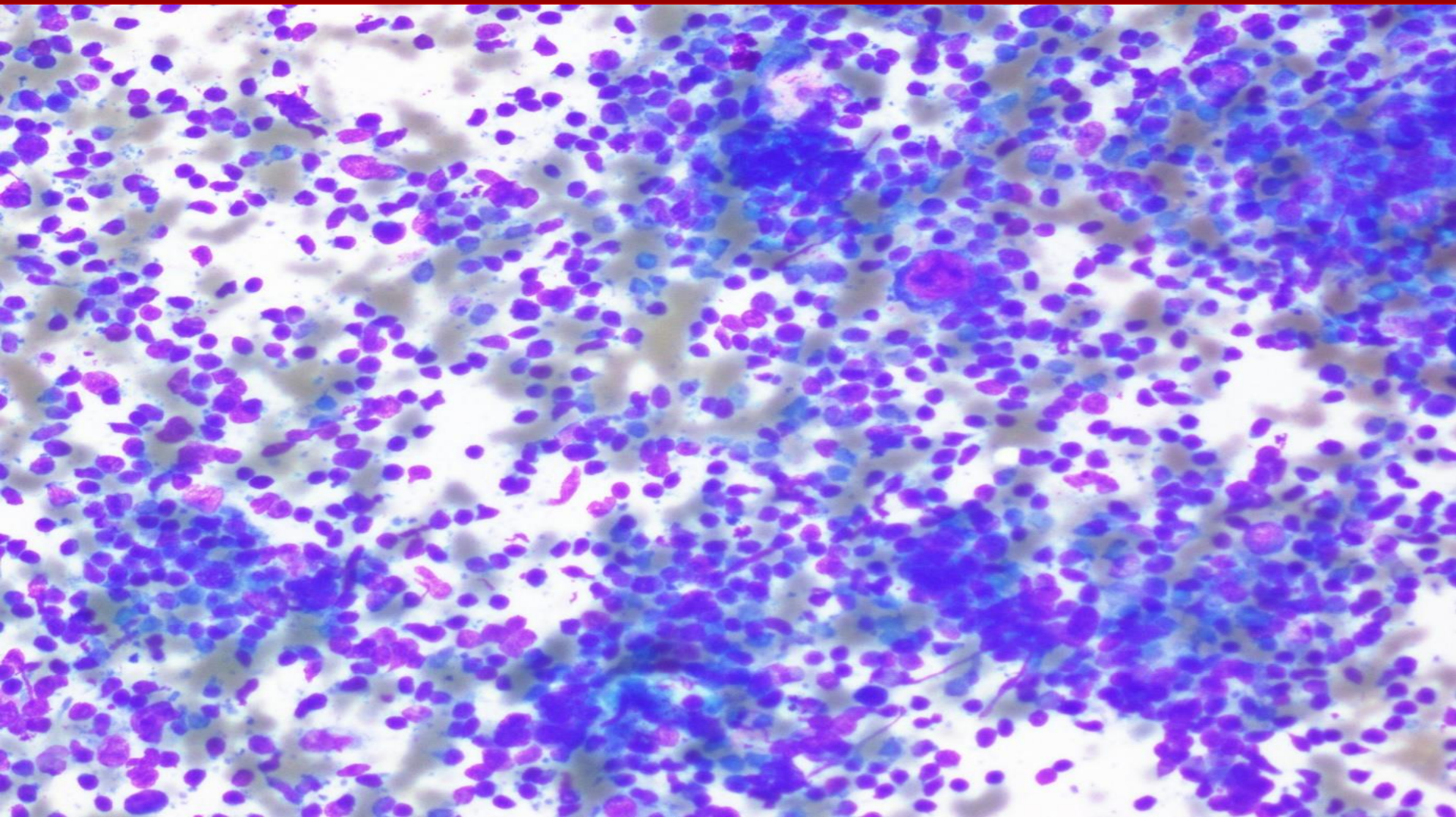
19 year male
Celiac Lymphnode FNA

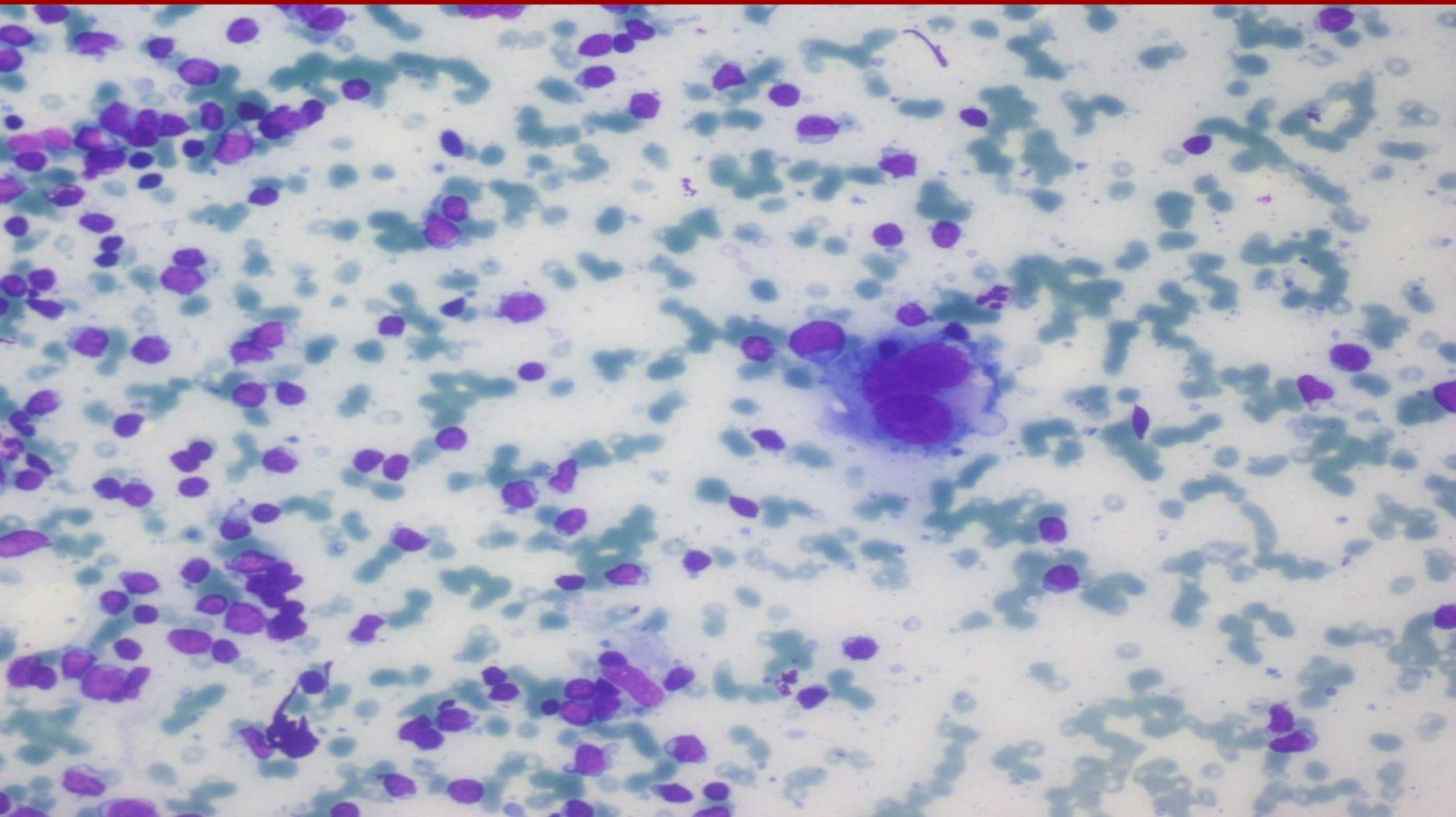
EUS guided FNA

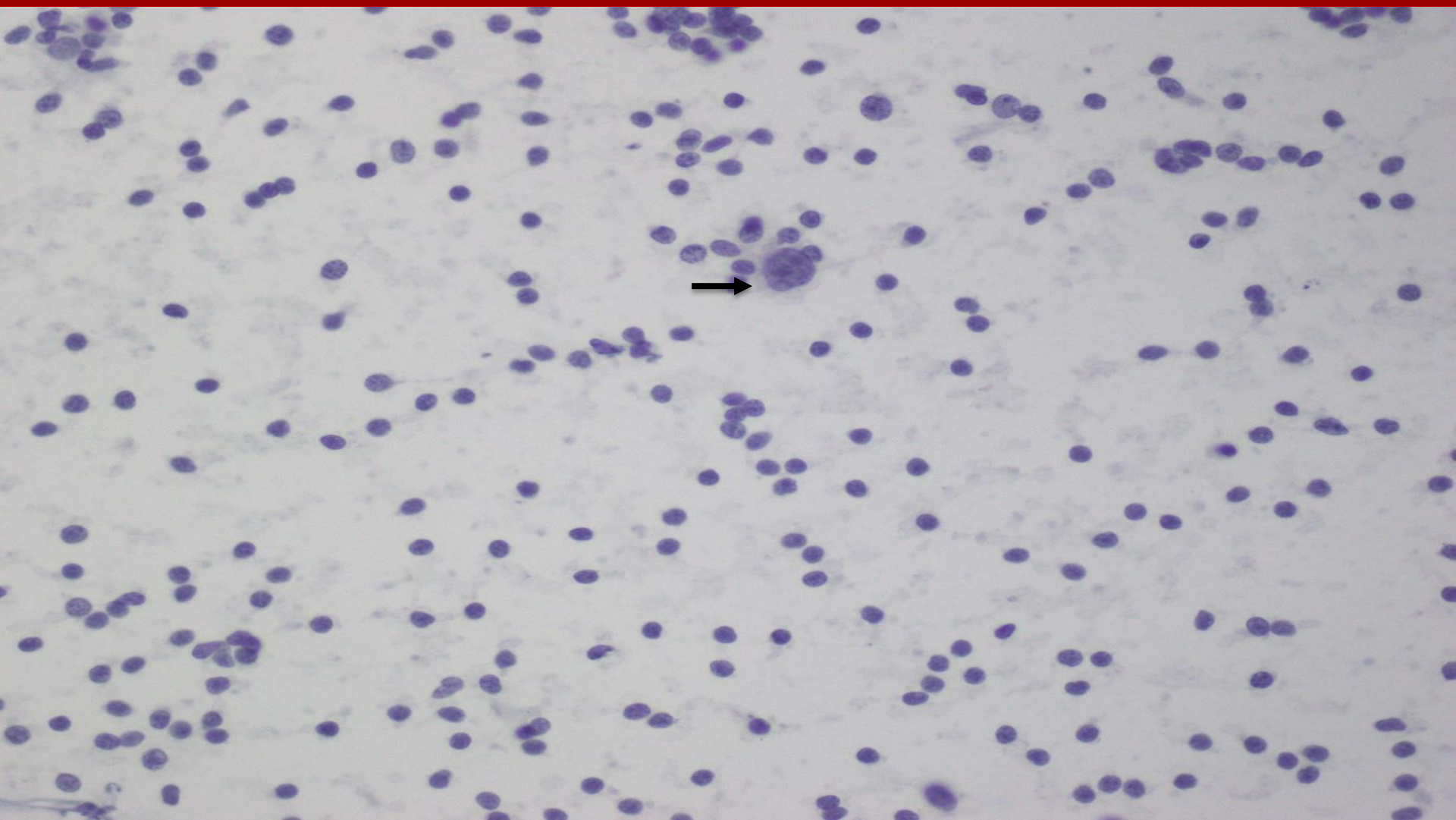


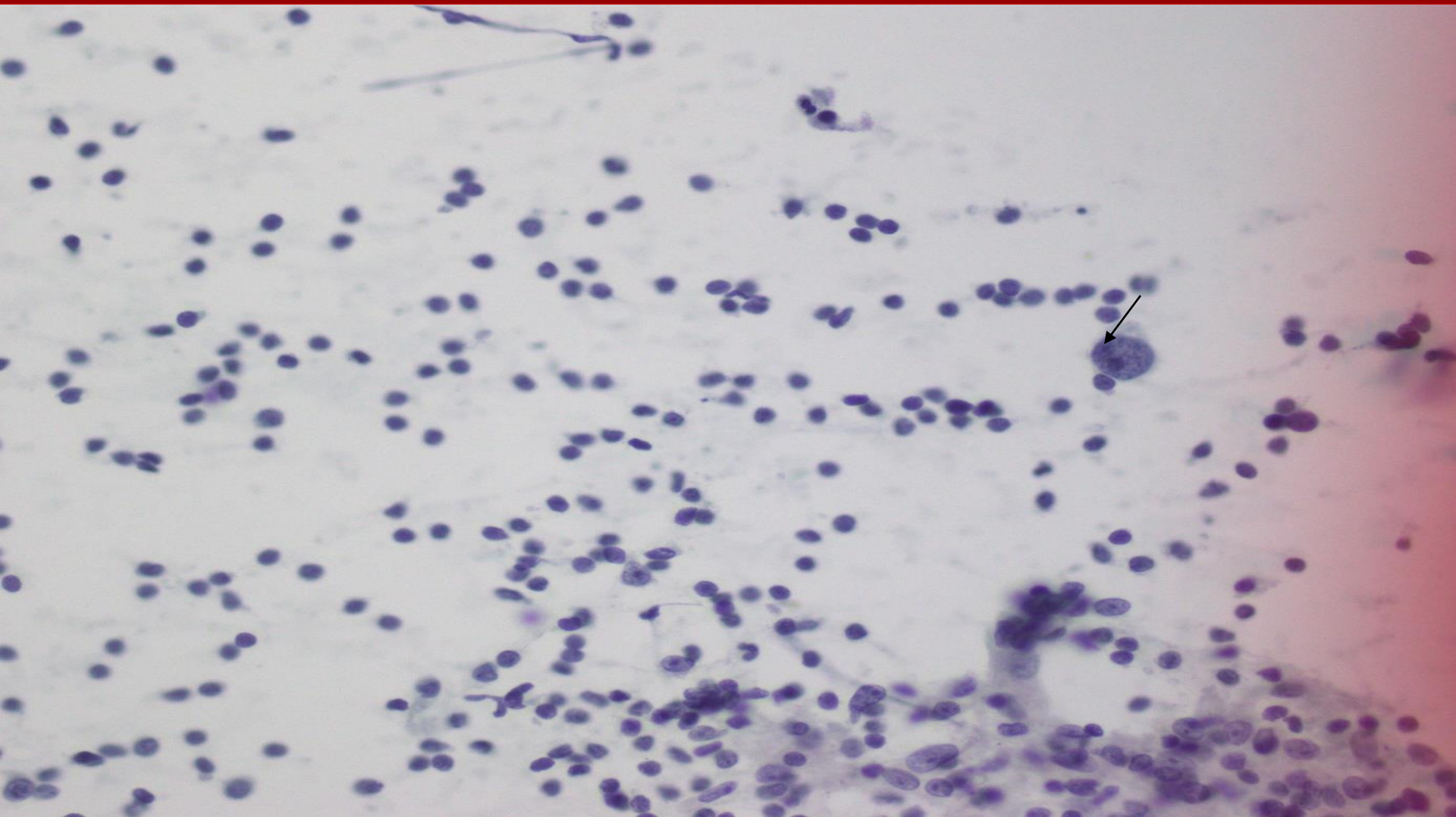




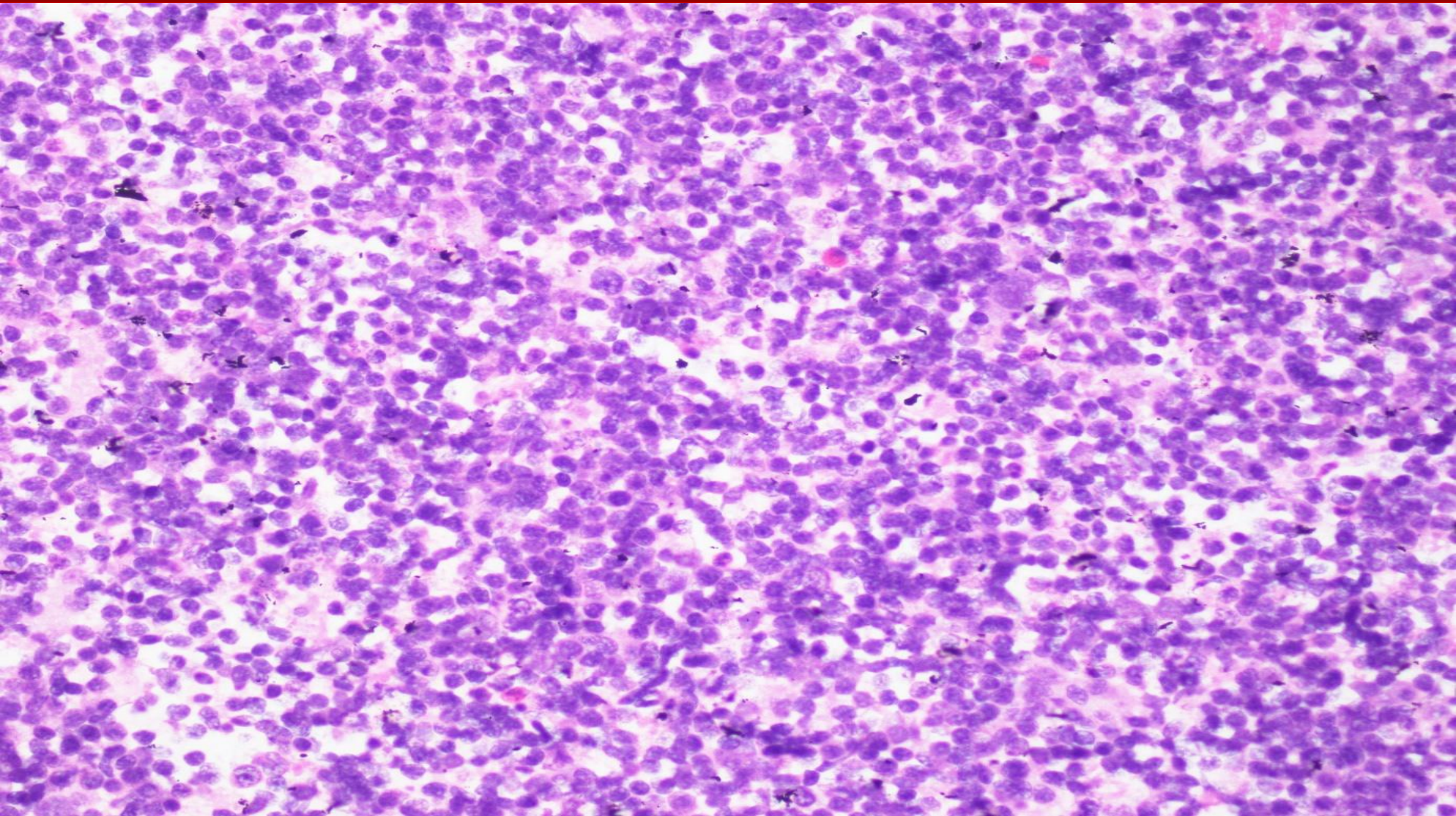


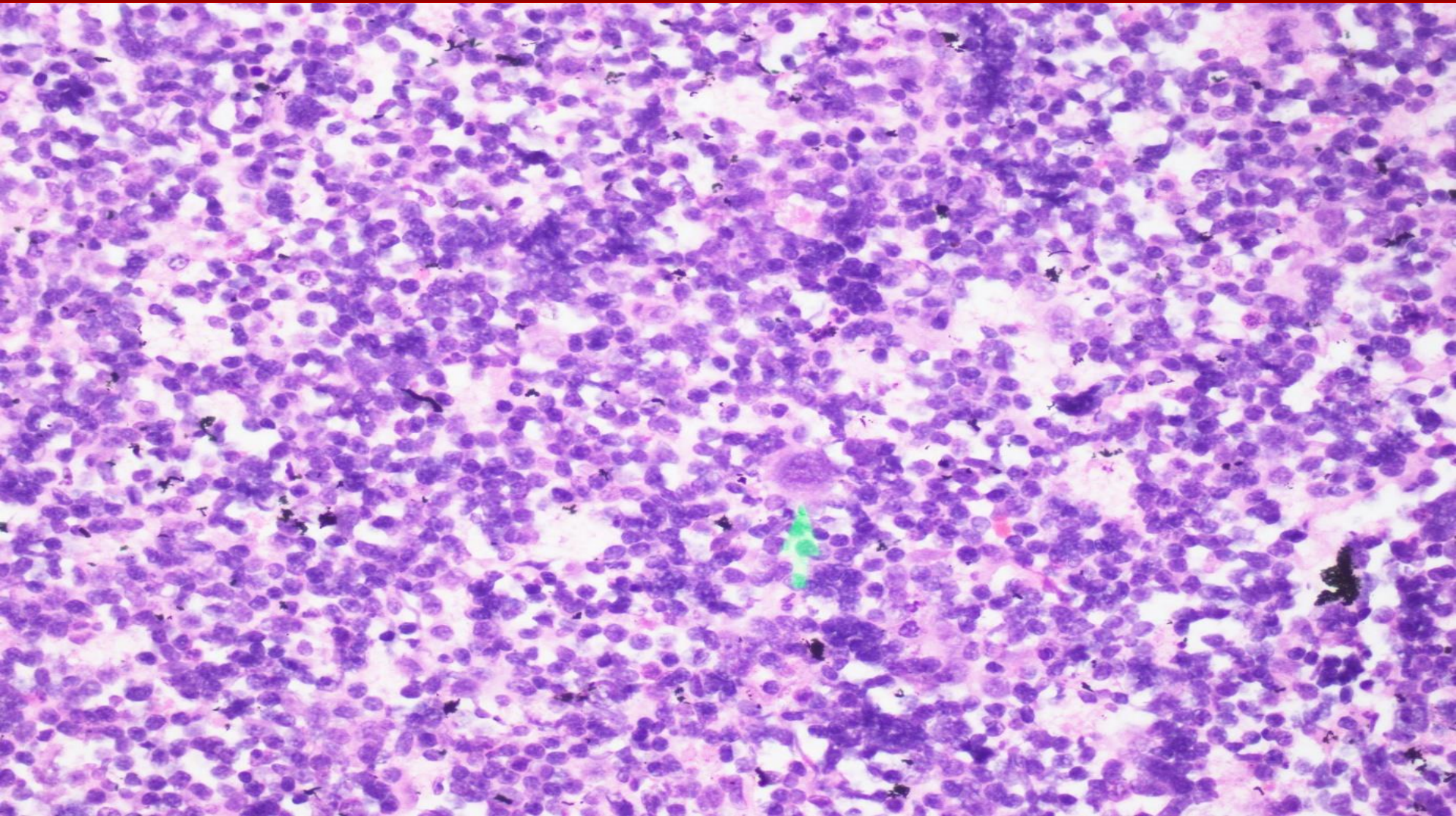




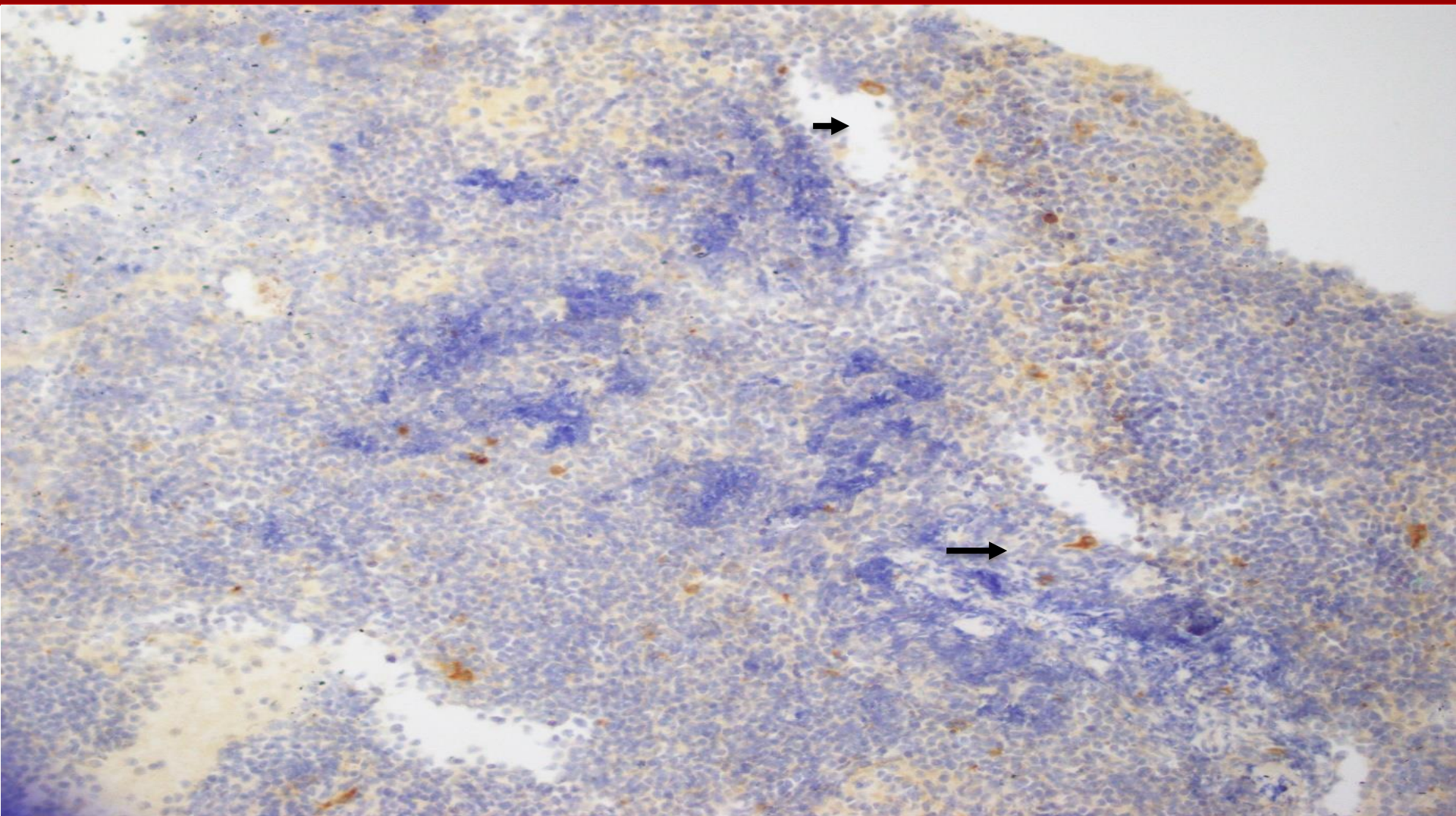


CELL BLOCK

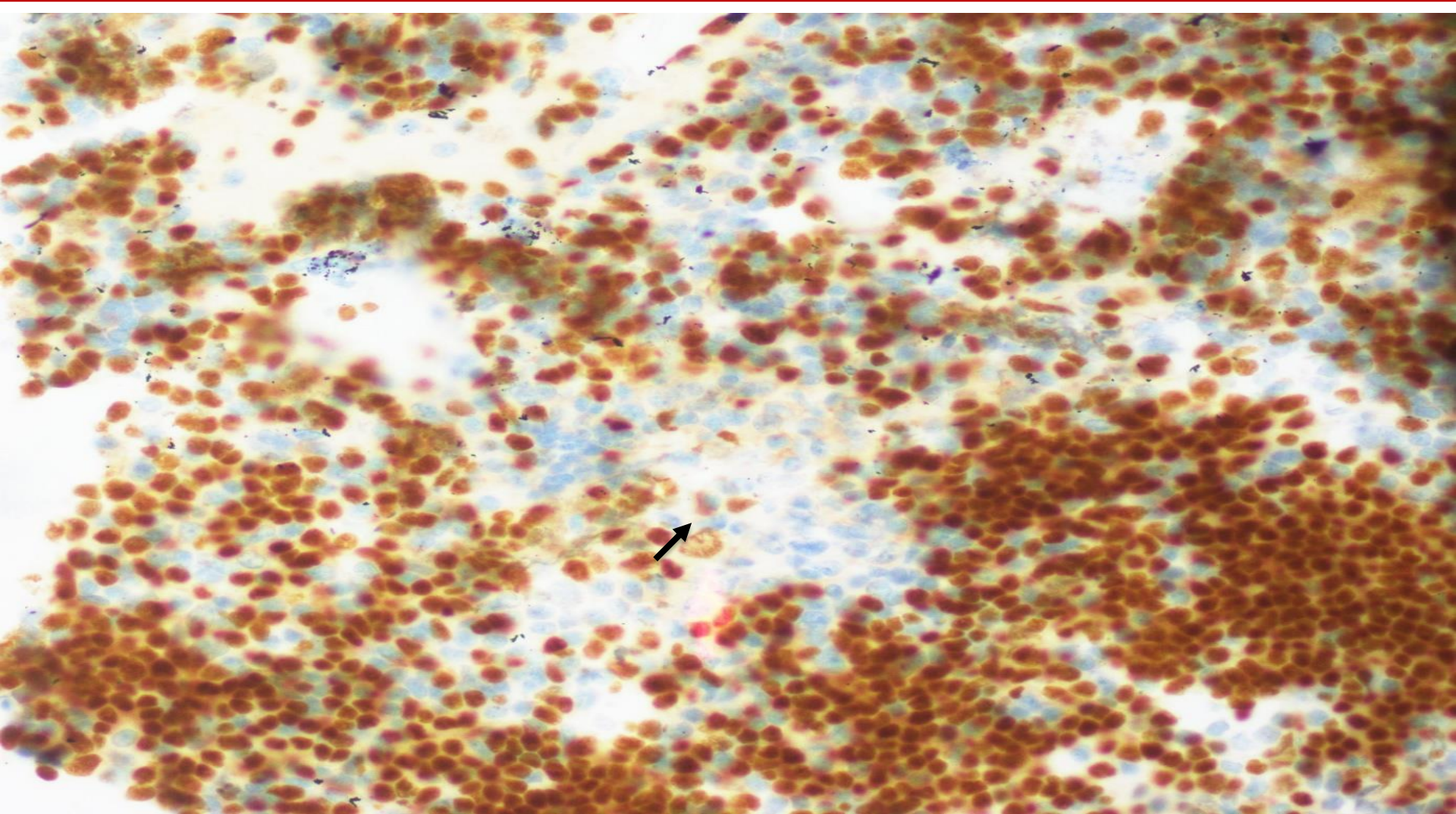




CD30



PAX 5- weak positive



DIAGNOSIS



CLASSIC HODGKINS LYMPHOMA



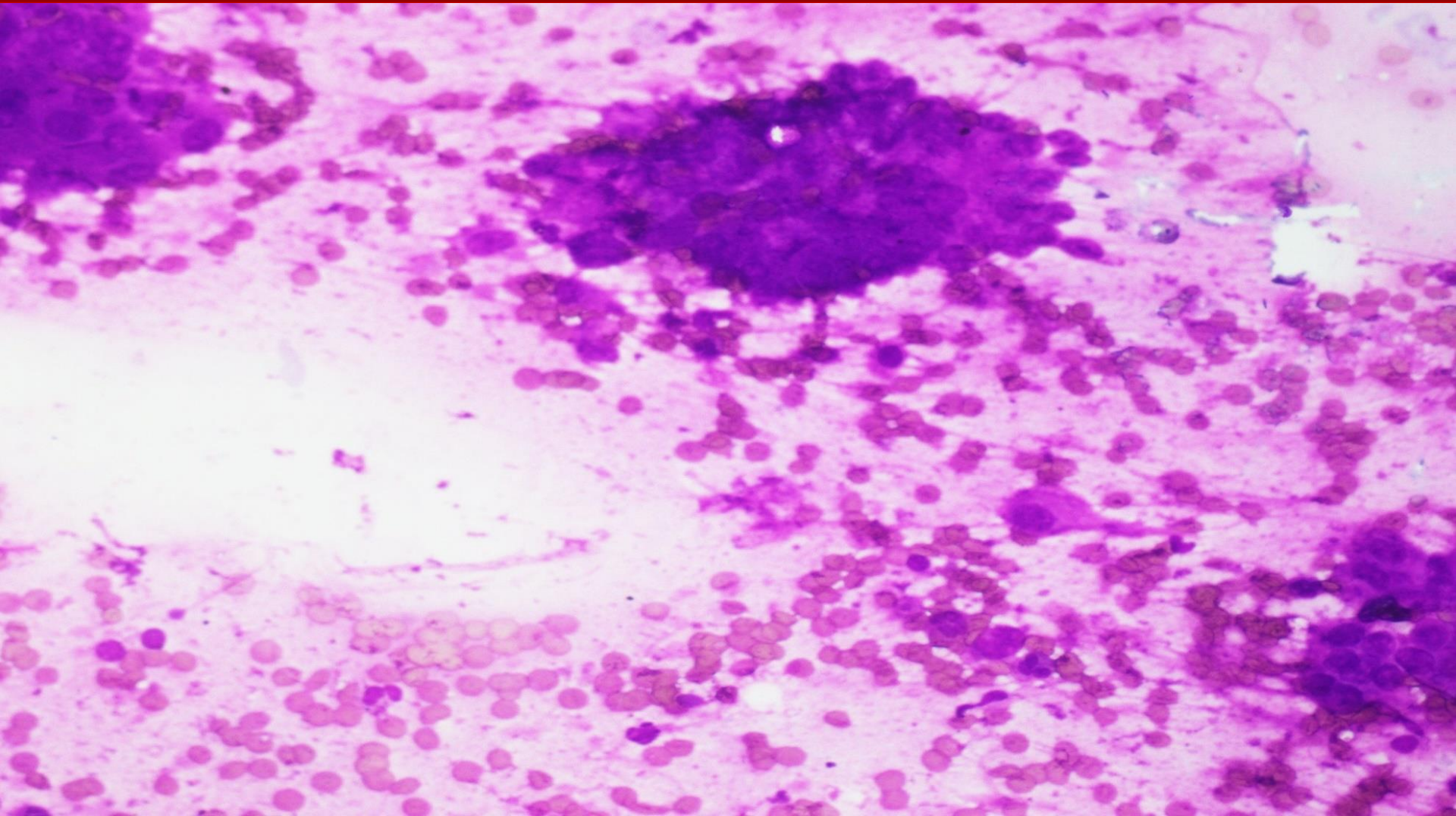
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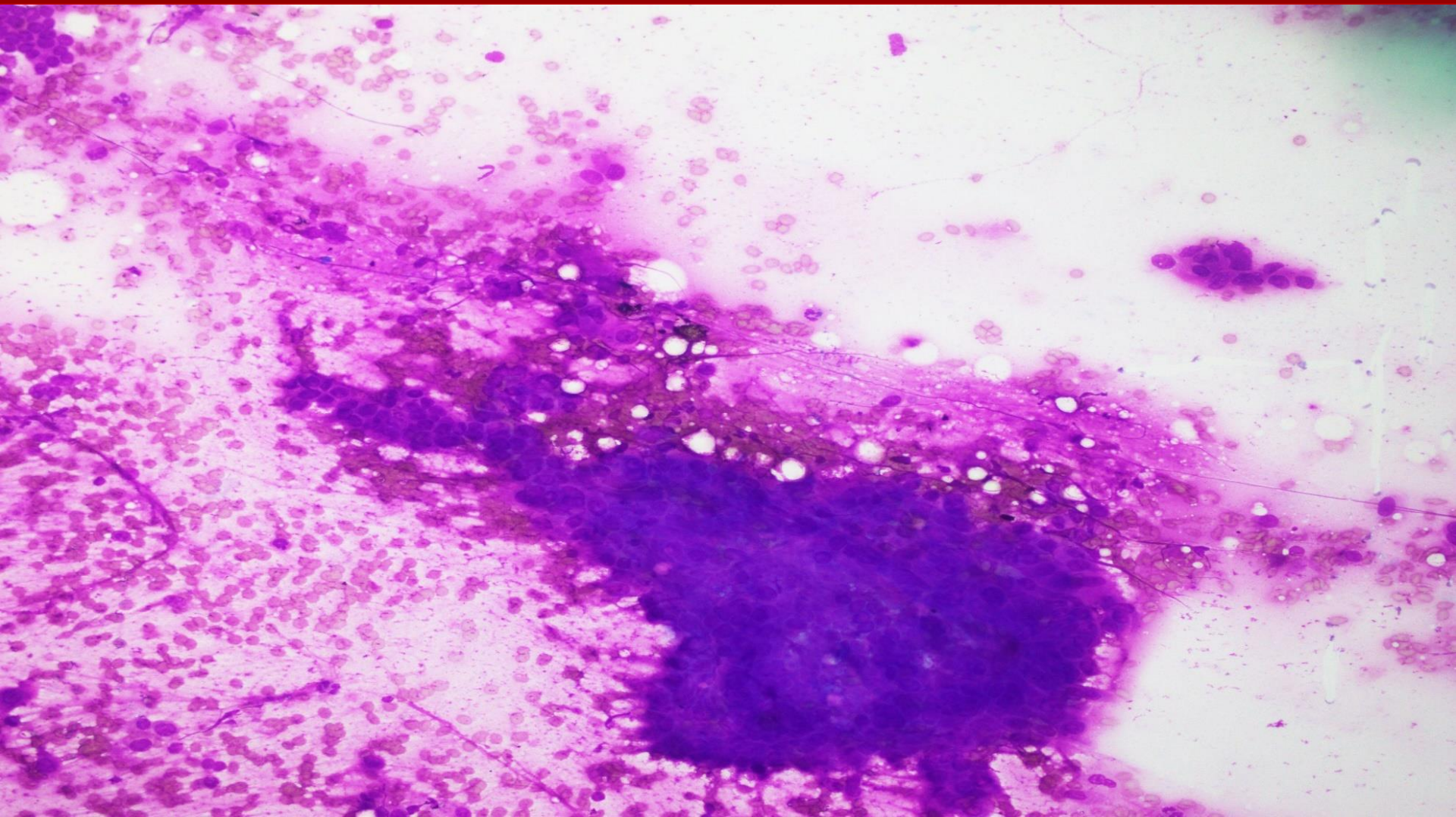
56 male

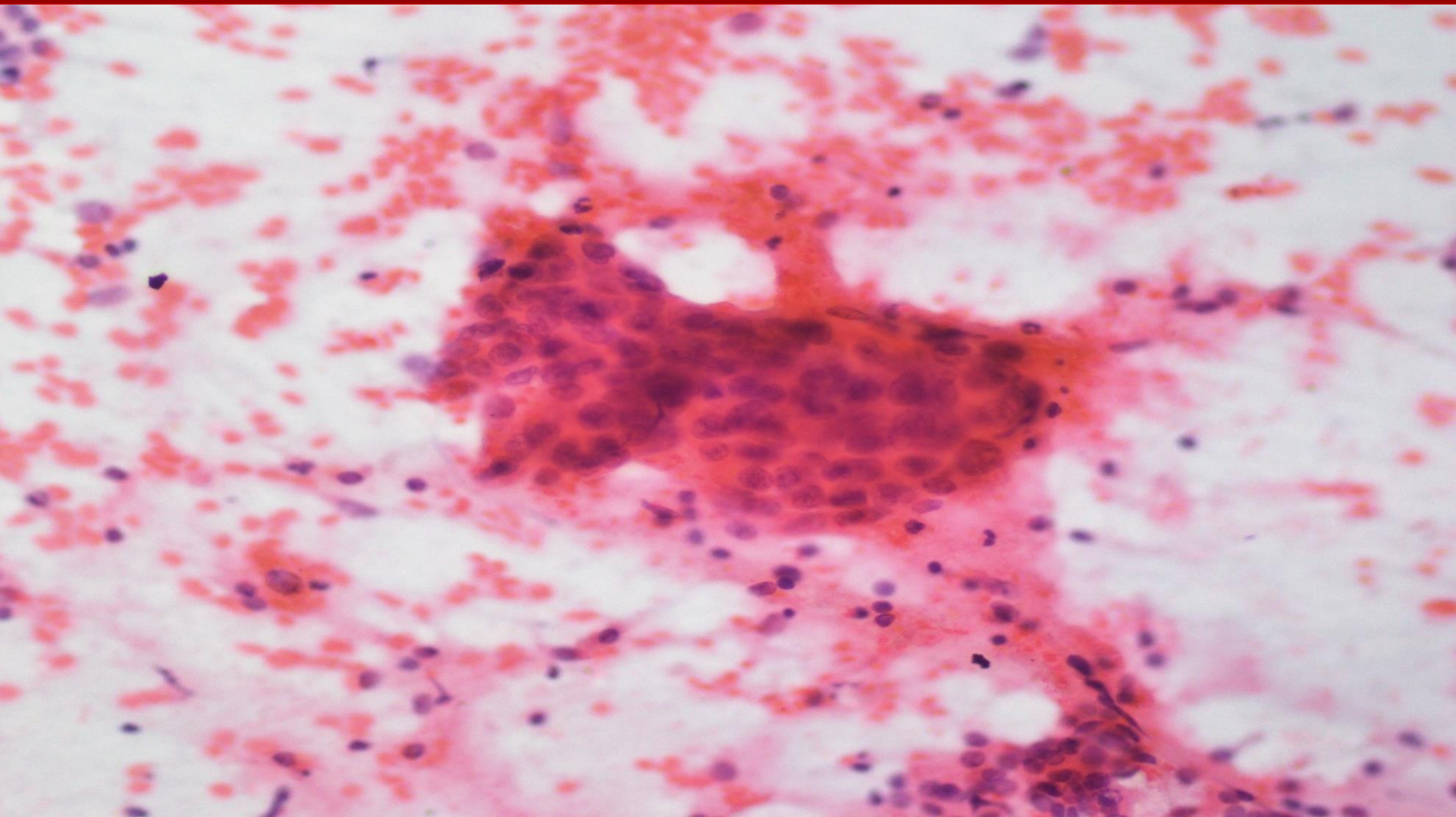
Pancreatic Head mass

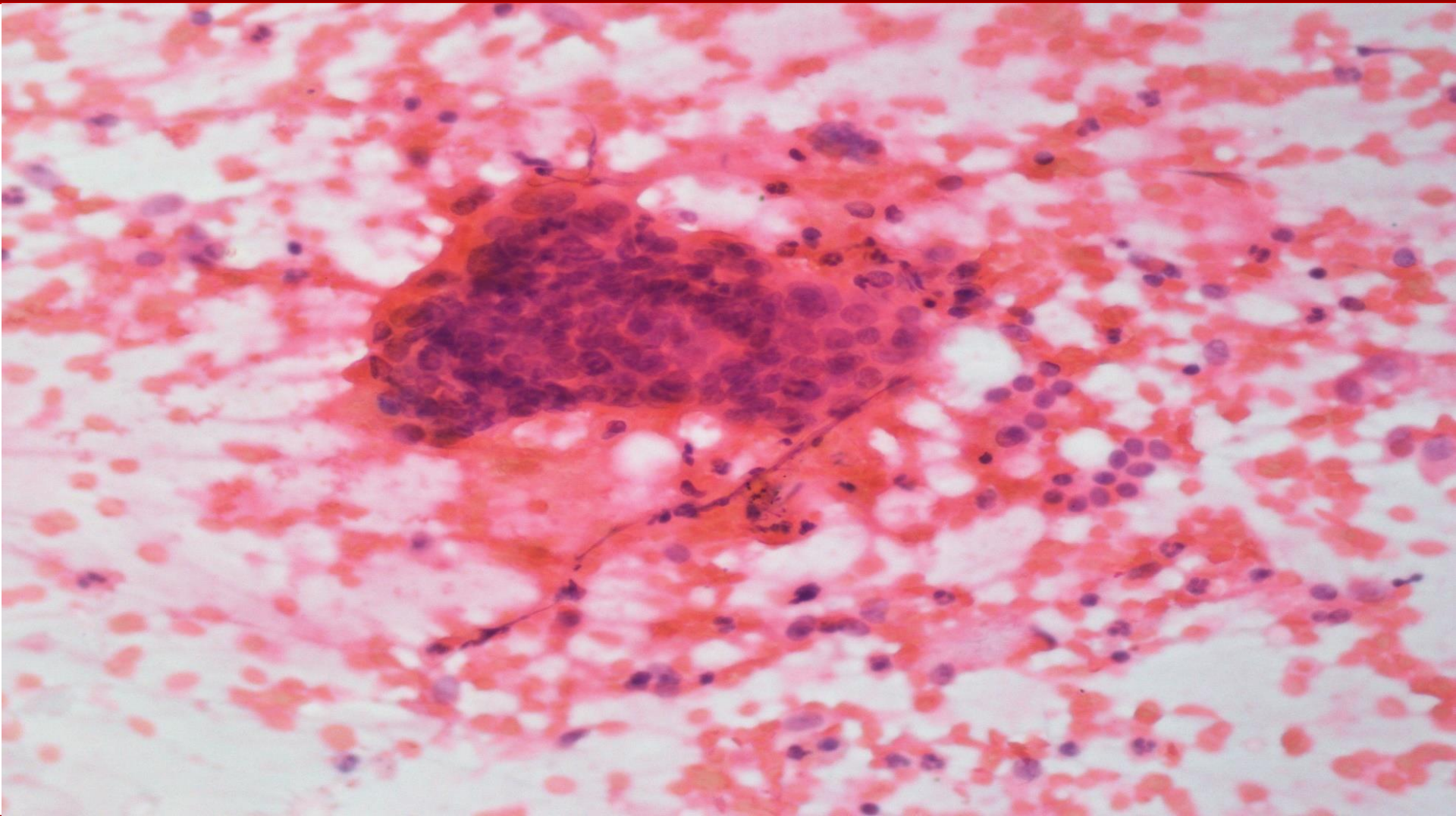
EUS guided FNA was performed

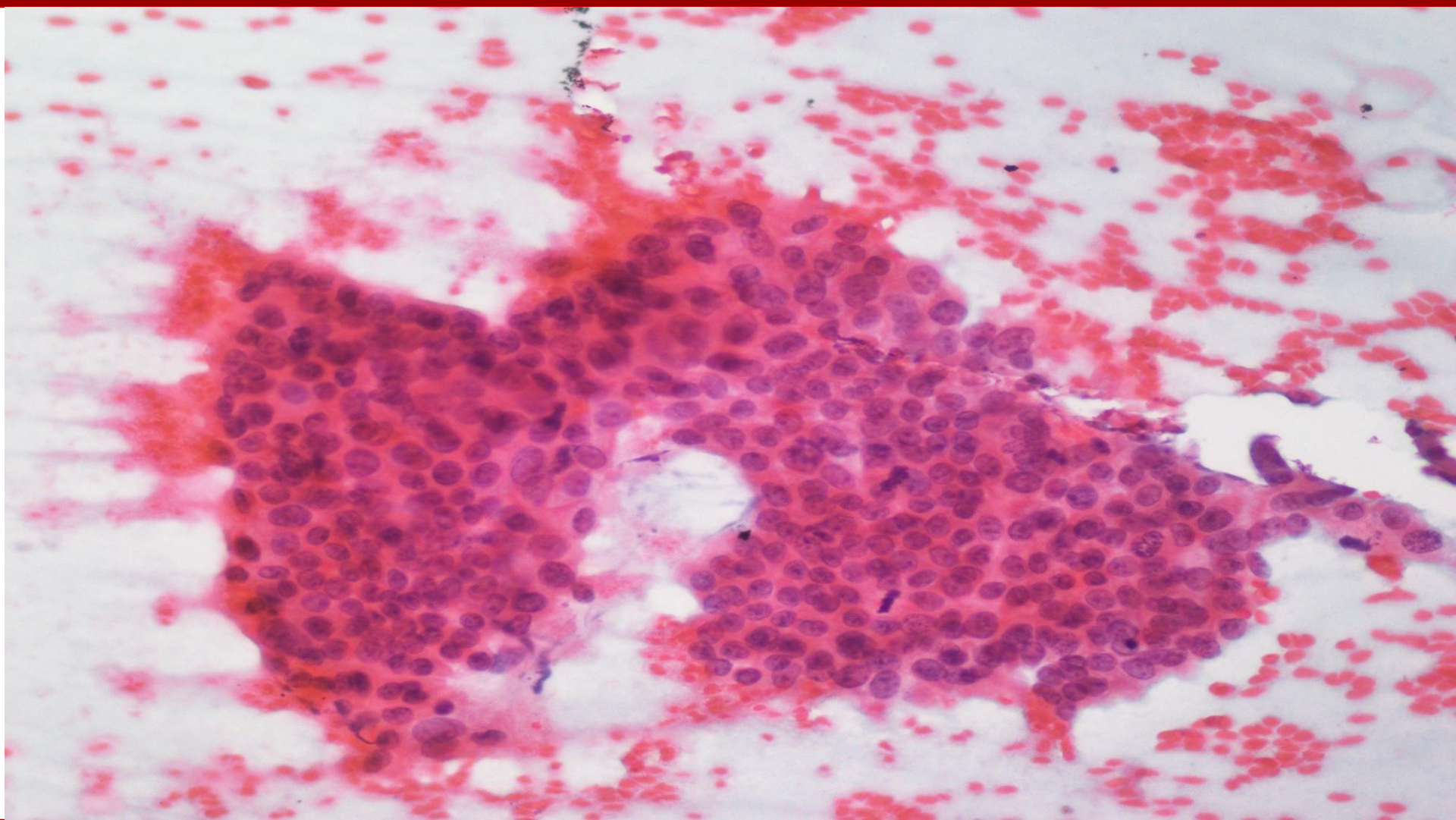




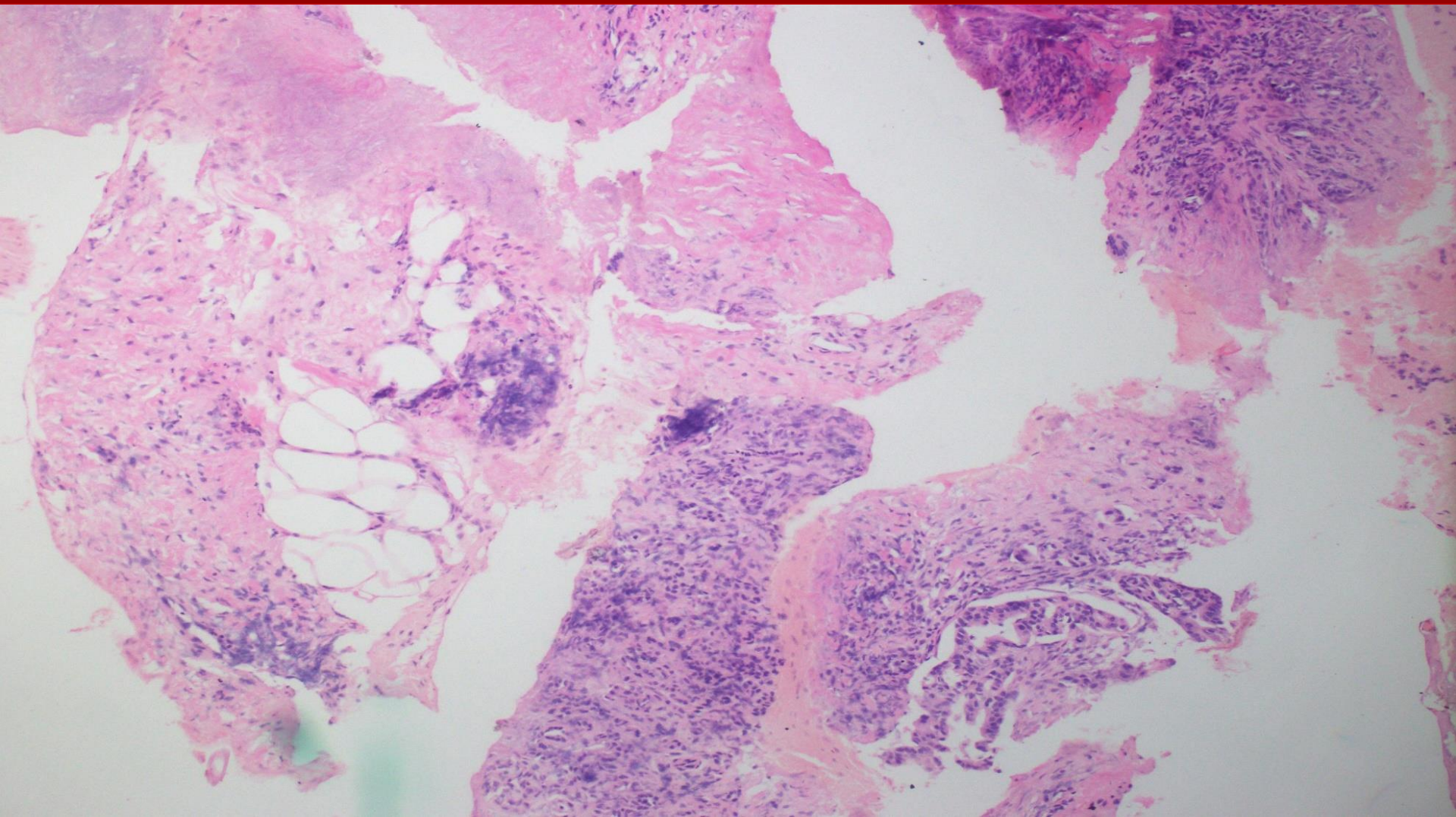




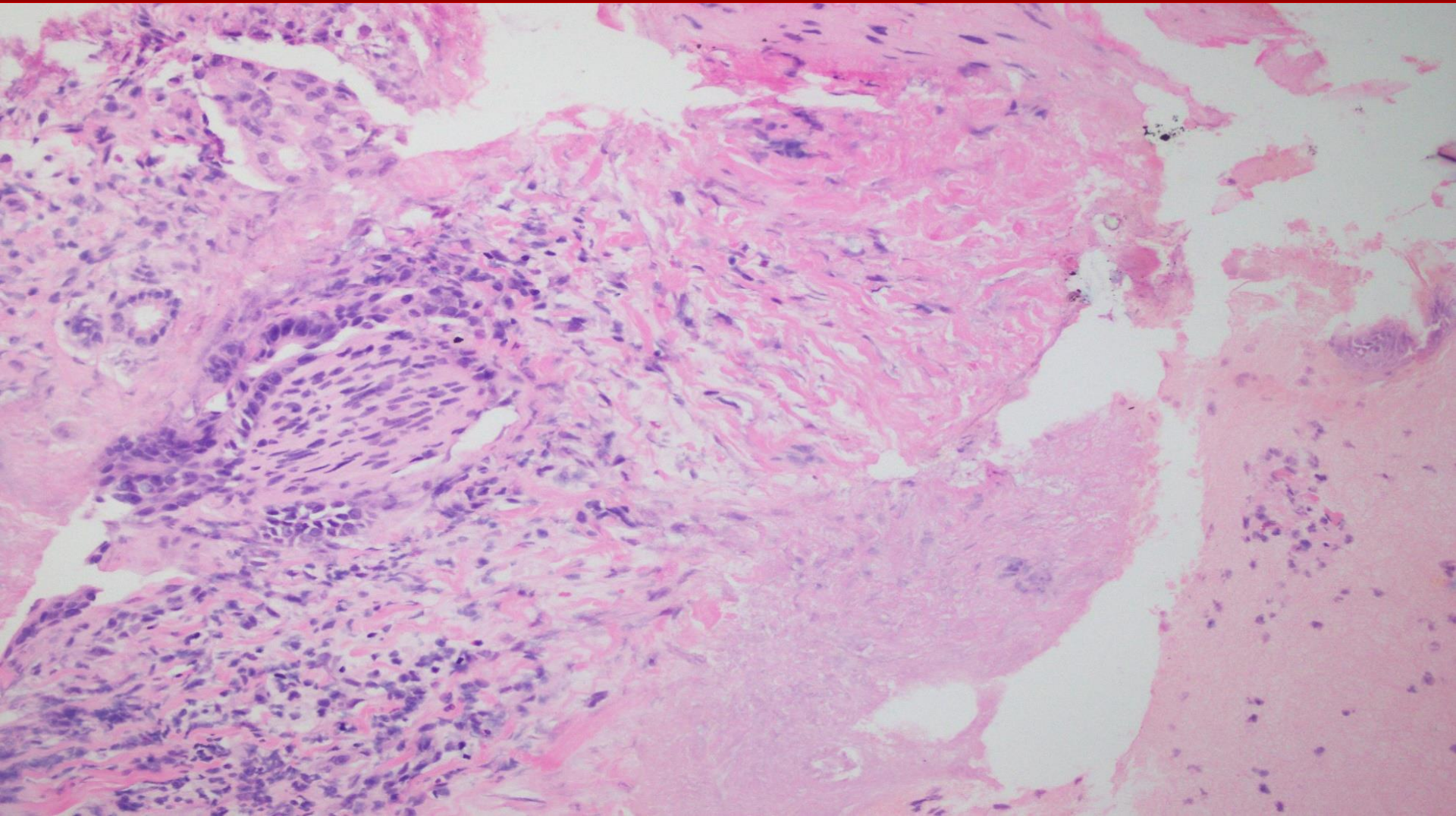




CELL BLOCK



PNI



DIAGNOSIS



ADENOCARCINOMA



Conclusion

- EUS-FNA is a highly sensitive diagnostic modality in experienced hands
- Sensitivity and diagnostic accuracy increases with ROSE
- Very effective in diagnosing and grading of neoplasms and infectious processes with appropriate use of ancillary techniques
- Very effective in diagnosing lesions inaccessible by CT, U/S, ERCP and Bronchial brushings



Thank you

