CSSW October 2017 Cytology Quiz

Cases Contributed by

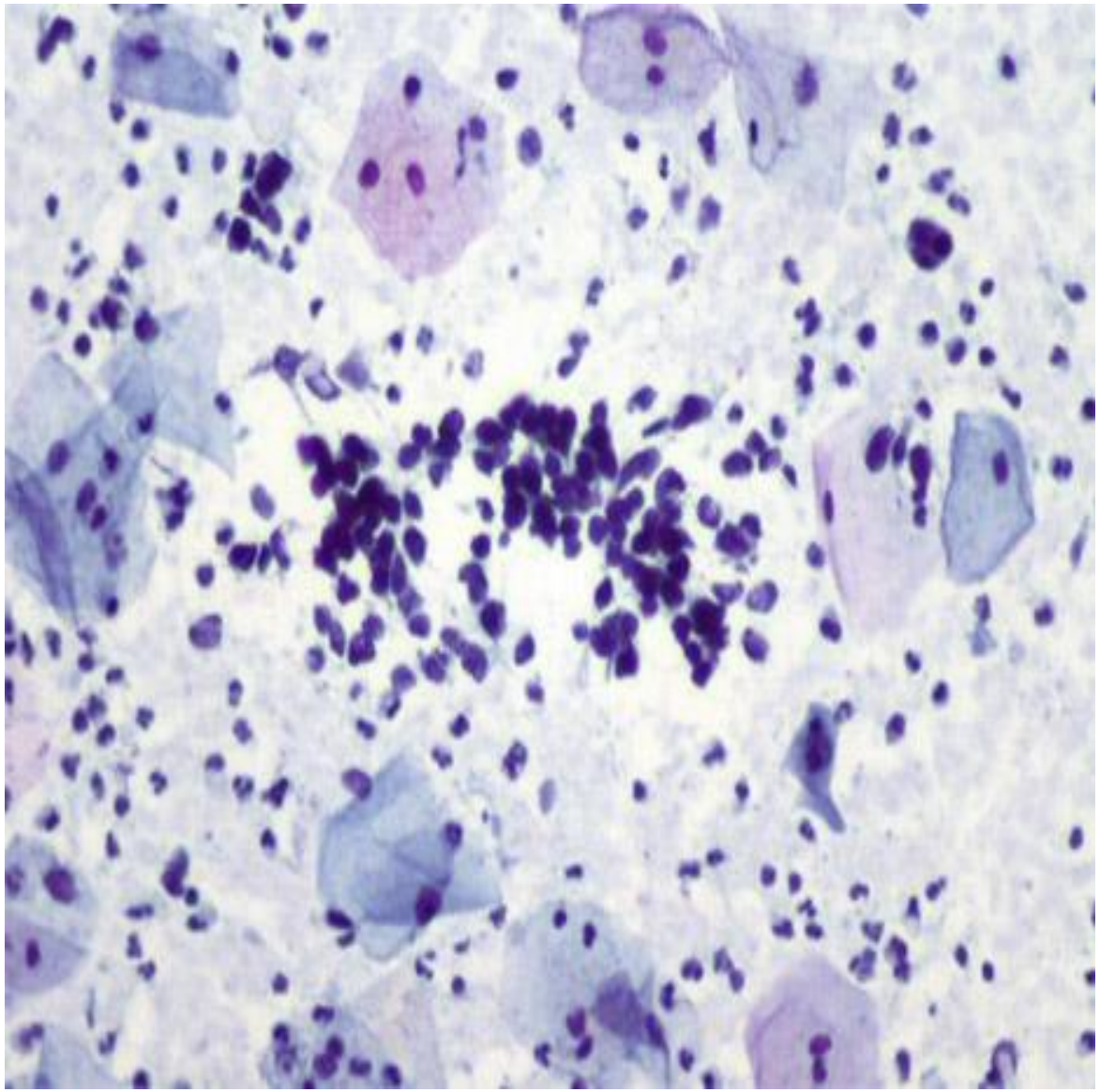
The BC Cancer Agency, Canada
Brenda Smith, BSc and Tom Thomson, MD

and

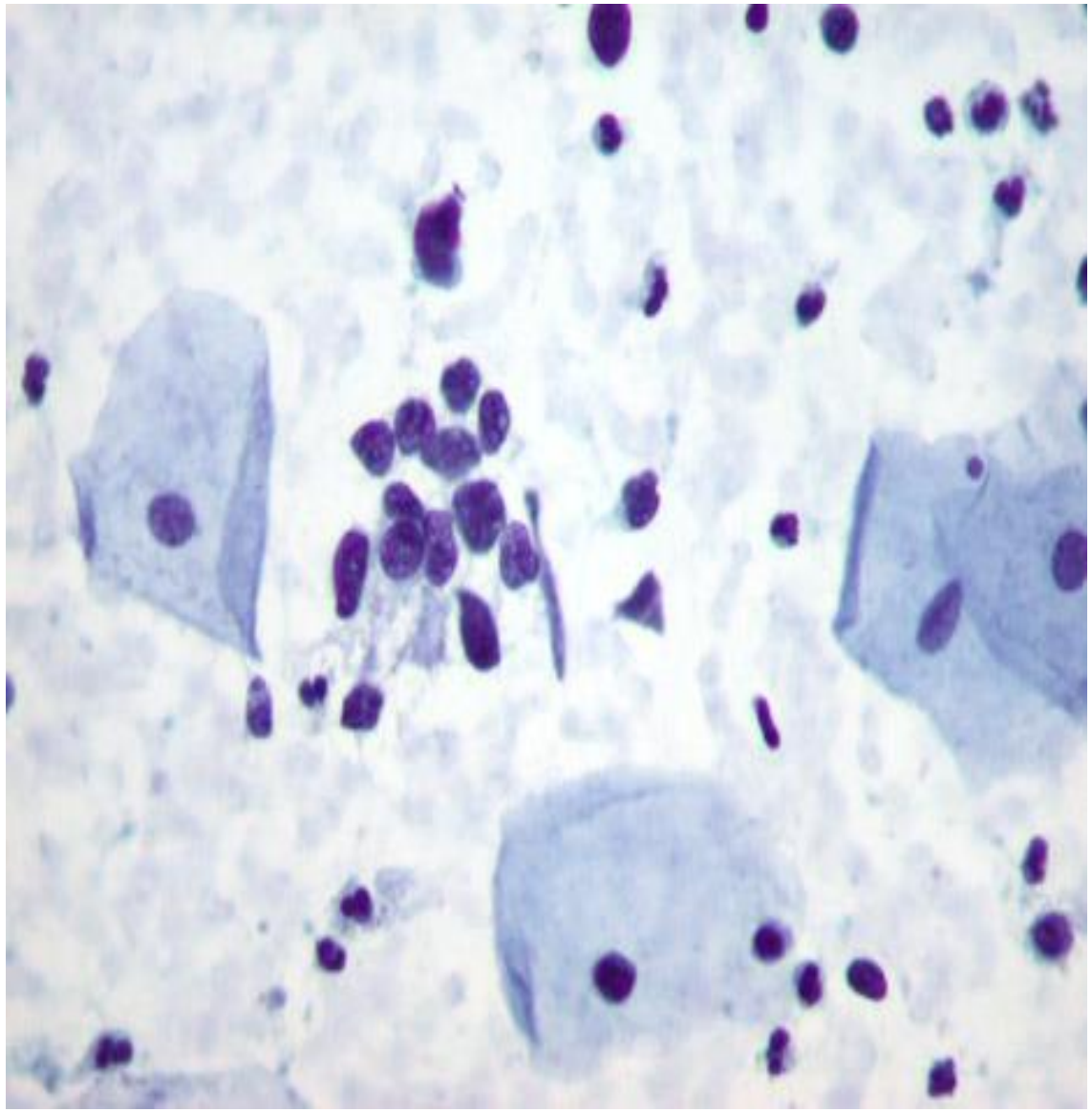
Gillian H. Levy, MD and Guoping Cai, MD
Department of Pathology
Yale University School of Medicine, USA

Case 1

Cervical cytology sample taken from a 35-year old woman, LMP Day 25



X 10



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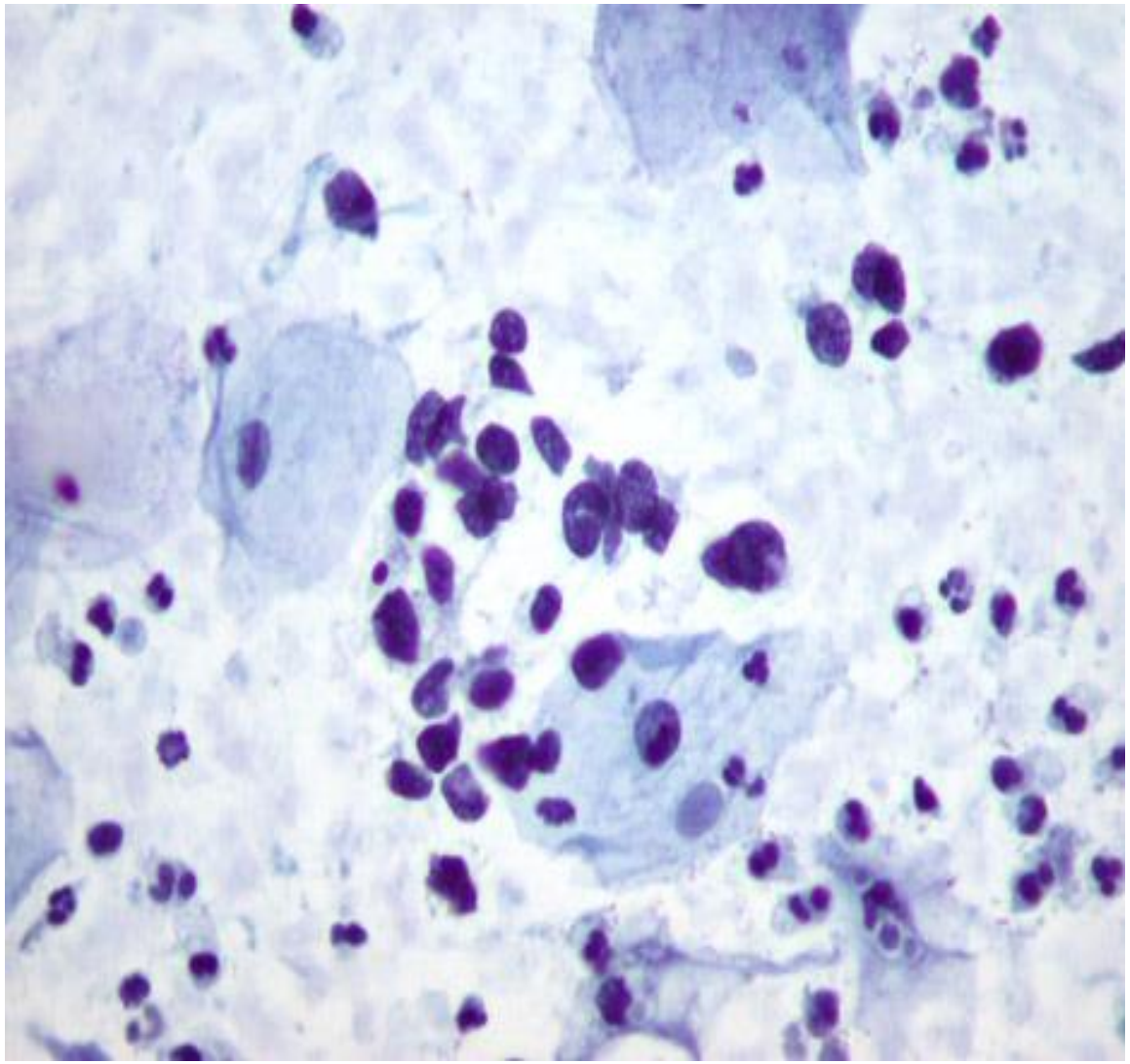

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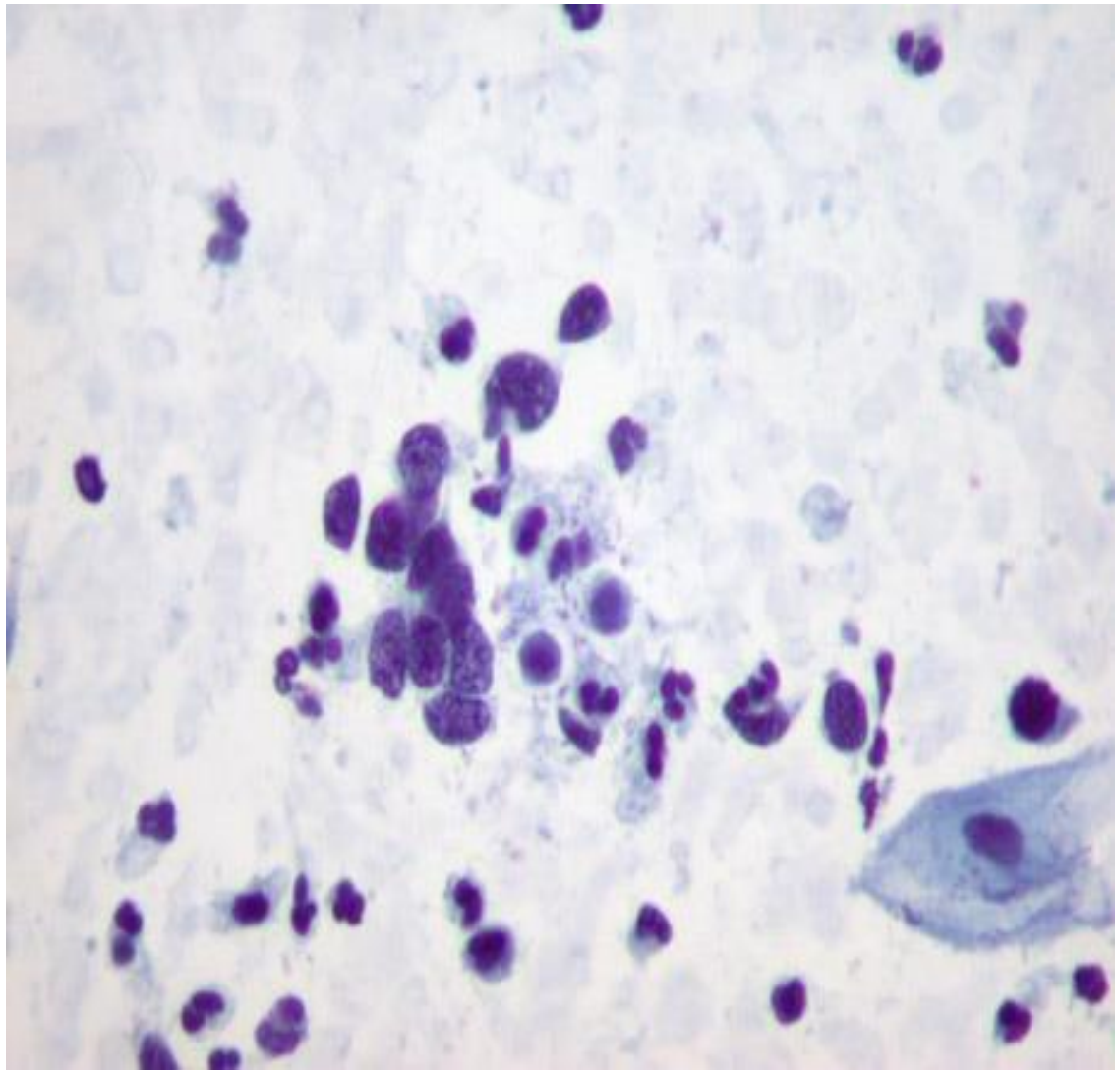


X 40

Select the correct diagnosis from the following:

- **Endometrial cells**
- **Severe squamous dyskaryosis**
- **Small cell neuroendocrine carcinoma**
- **Cervical Glandular Intraepithelial Neoplasia**

Answer: Small cell neuroendocrine carcinoma

CYTOPATHOLOGY:

•Numerous groups of loosely cohesive aggregates of small cells with scanty cytoplasm

•Nuclei are hyperchromatic and angulated

•Nuclear molding is evident

•The cytologic features suggest small cell carcinoma

Small cell carcinoma is a highly aggressive tumour of neuroendocrine differentiation strongly associated with HPV types 18 and 16

CASE 1 DISCUSSION:

•Cervical cytology is a relatively insensitive and nonspecific method of detecting small cell carcinoma

•The specific diagnosis on cervical samples *can* be difficult

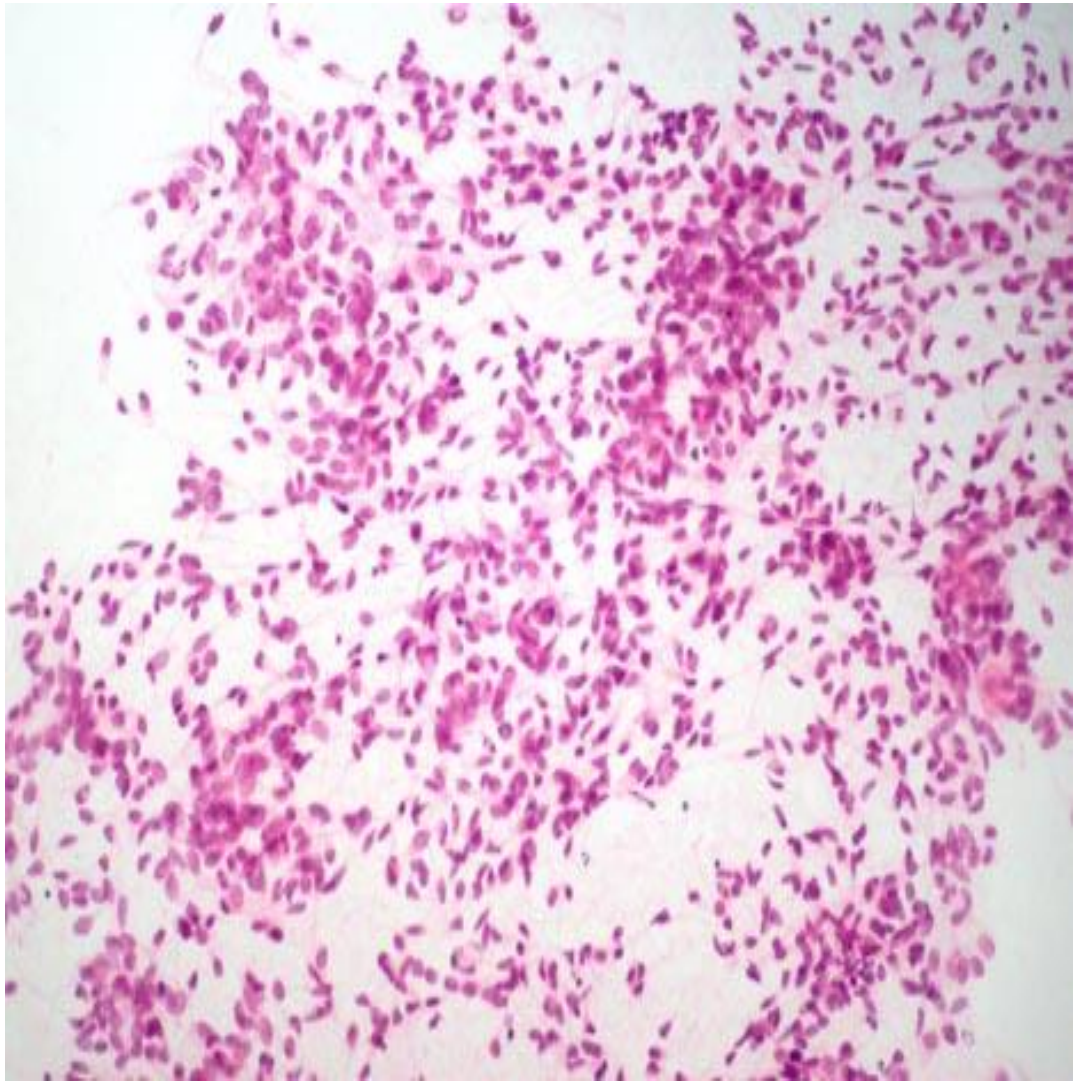
•Small cell carcinoma can mimic follicular cervicitis, endometrial cells, endocervical neoplasia, squamous cell carcinoma of small cell type and non-Hodgkin's lymphoma

•Biopsies reveal tumours composed of densely packed small to intermediate sized cells with scant cytoplasm, oval to spindle shaped, hyperchromatic nuclei and usually indistinct nucleoli

•Mitoses and apoptotic nuclear debris are frequent

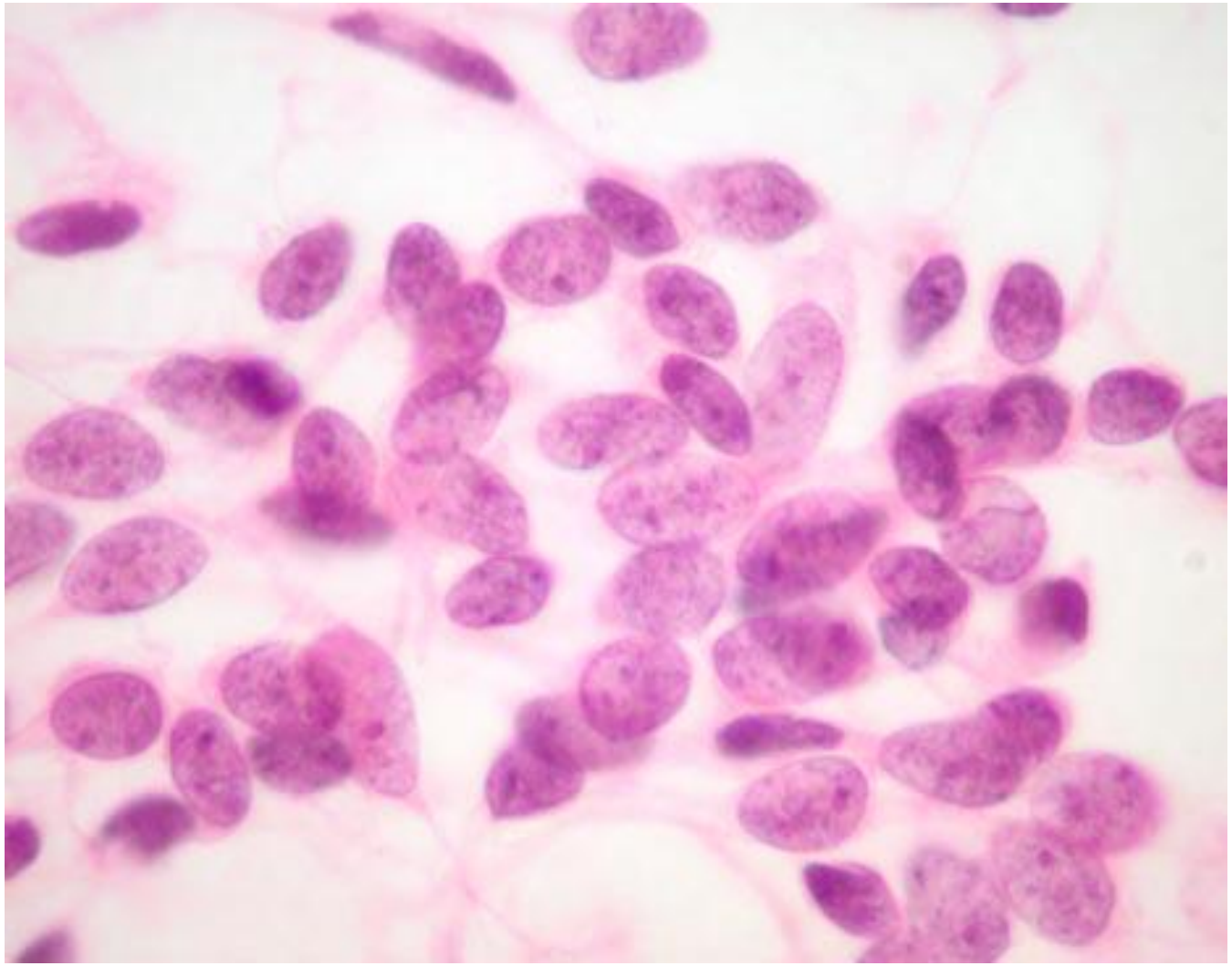
Case 2

- **FNA of Thyroid from a 45-year-old woman**

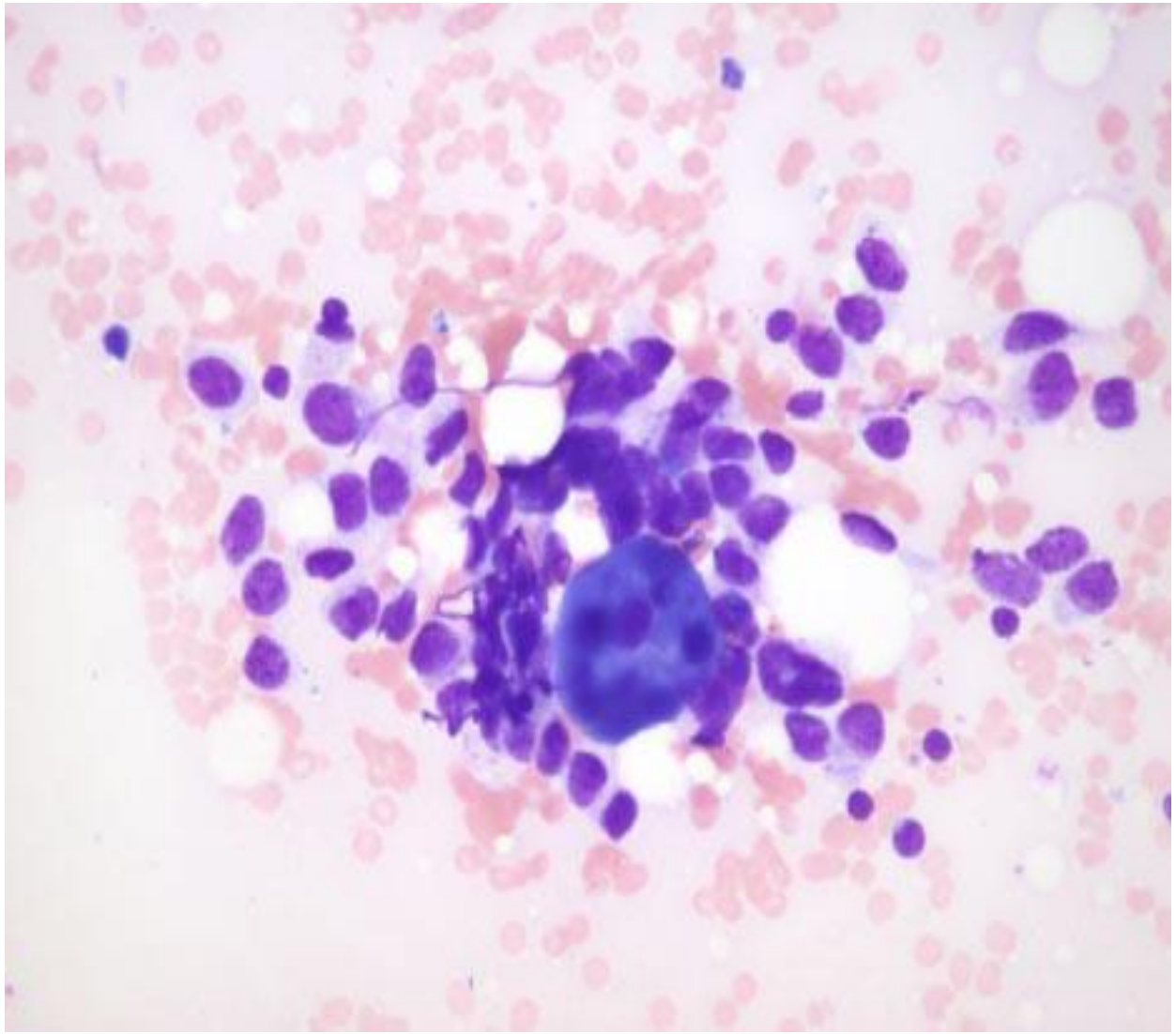


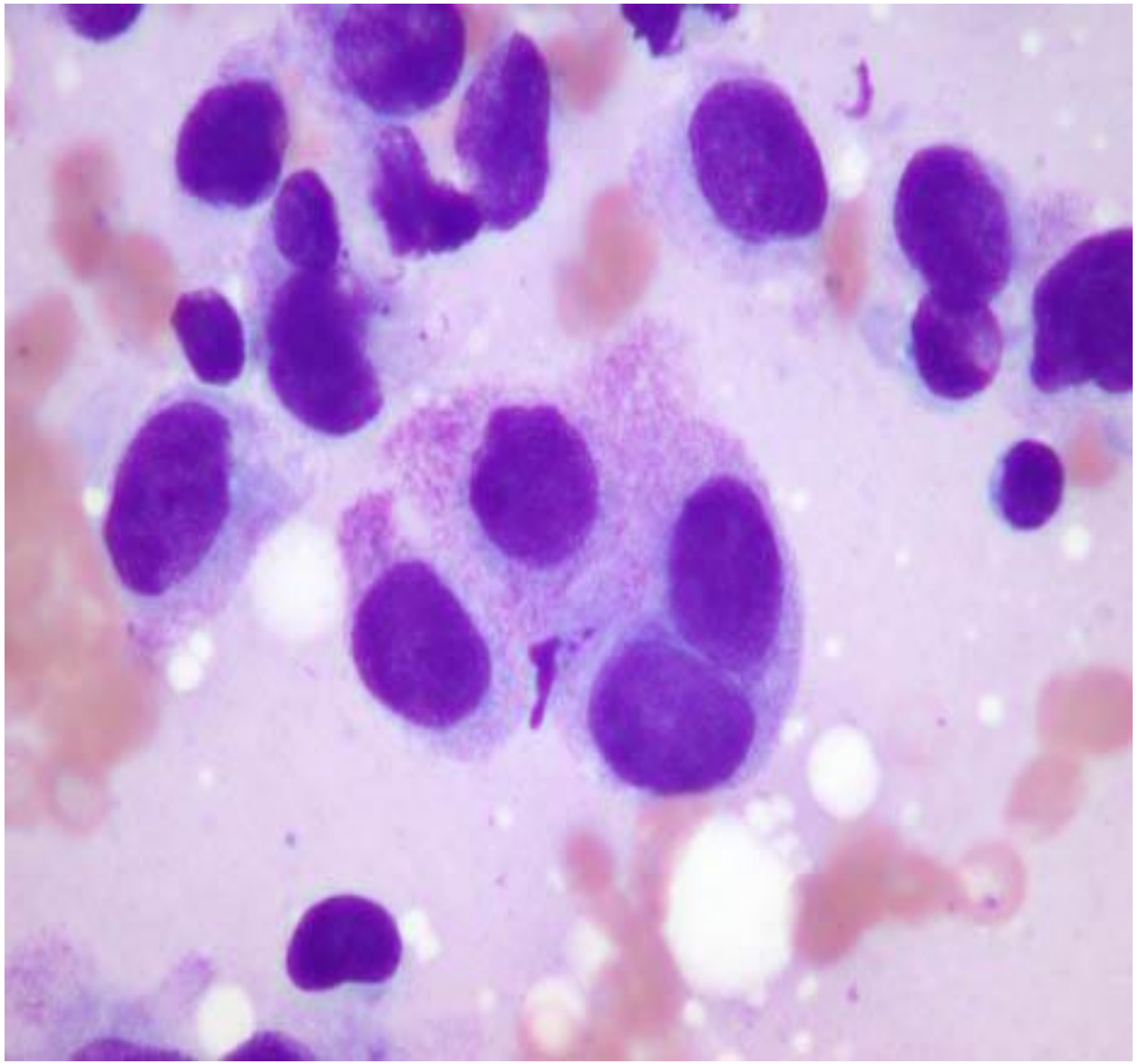
X 10 PAP

X 40 PAP



X 10 MGG





X 40 MGG

Answer: Medullary thyroid carcinoma

CYTOPATHOLOGY:

• A highly cellular specimen containing a mainly dispersed population of pleomorphic cells

•Nuclei are round to oval and occasionally spindle-shaped, with granular salt and pepper chromatin best seen in Papanicolaou-stained material

•In the MGG stained material red neuroendocrine cytoplasmic granules are identified, as well as occasional intra-nuclear inclusions

•Dark blue amorphous material is most likely amyloid

•Cytologic features consistent with medullary carcinoma of the thyroid

CASE 2 Discussion: Medullary thyroid carcinoma

•Medullary carcinoma is a ***neuroendocrine*** type malignant tumour comprising approximately 5-10% of thyroid carcinomas

•Thought to arise from parafollicular C cells
•Tumour cells produce calcitonin which may be demonstrated by immunocytochemistry
•Elevated serum levels of calcitonin in conjunction with a thyroid nodule are virtually pathognomonic of medullary carcinoma

•Approximately 20% of cases are familial
•Tend to present at a younger age, may be bilateral and may occur as part of multiple endocrine neoplasia (MEN) syndrome
•Majority of cases are sporadic with a mean age range of 30-50 years and a slight female predominance

CASE 2 Discussion: Medullary thyroid carcinoma

- Histopathology reveals solid sheets and nests of large, polygonal malignant cells with amyloid deposits within a highly vascularised stroma
- Tumour cells are usually polygonal but may be spindled or small and round in a carcinoid-like pattern
- Giant cells, clear cell, melanotic, mucinous and oncocytic forms have also been identified

- Amyloid is a characteristic component of medullary carcinoma but the amount of amyloid within the tumour is variable
- On cytology, amyloid stains purplish blue on Giemsa stains and pale green-blue on Papanicolaou stain
- Tumour cells are often very closely associated with amyloid, a feature that may help distinguish it from colloid

CASE 2 Discussion: Medullary thyroid carcinoma

•Intra-nuclear inclusions seen in up to 50% of medullary carcinomas may be a pitfall, suggesting papillary carcinoma

•Identifying red neuroendocrine cytoplasmic granules on air-dried Giemsa stained material and the coarser granular chromatin will help with this differential diagnosis

•Aspirates usually lack the microfollicular pattern typical of a follicular neoplasm, which also tends to demonstrate more uniform, round nuclei than that of medullary carcinoma

•The characteristic salt and pepper chromatin pattern also supports the diagnosis of a neuroendocrine carcinoma

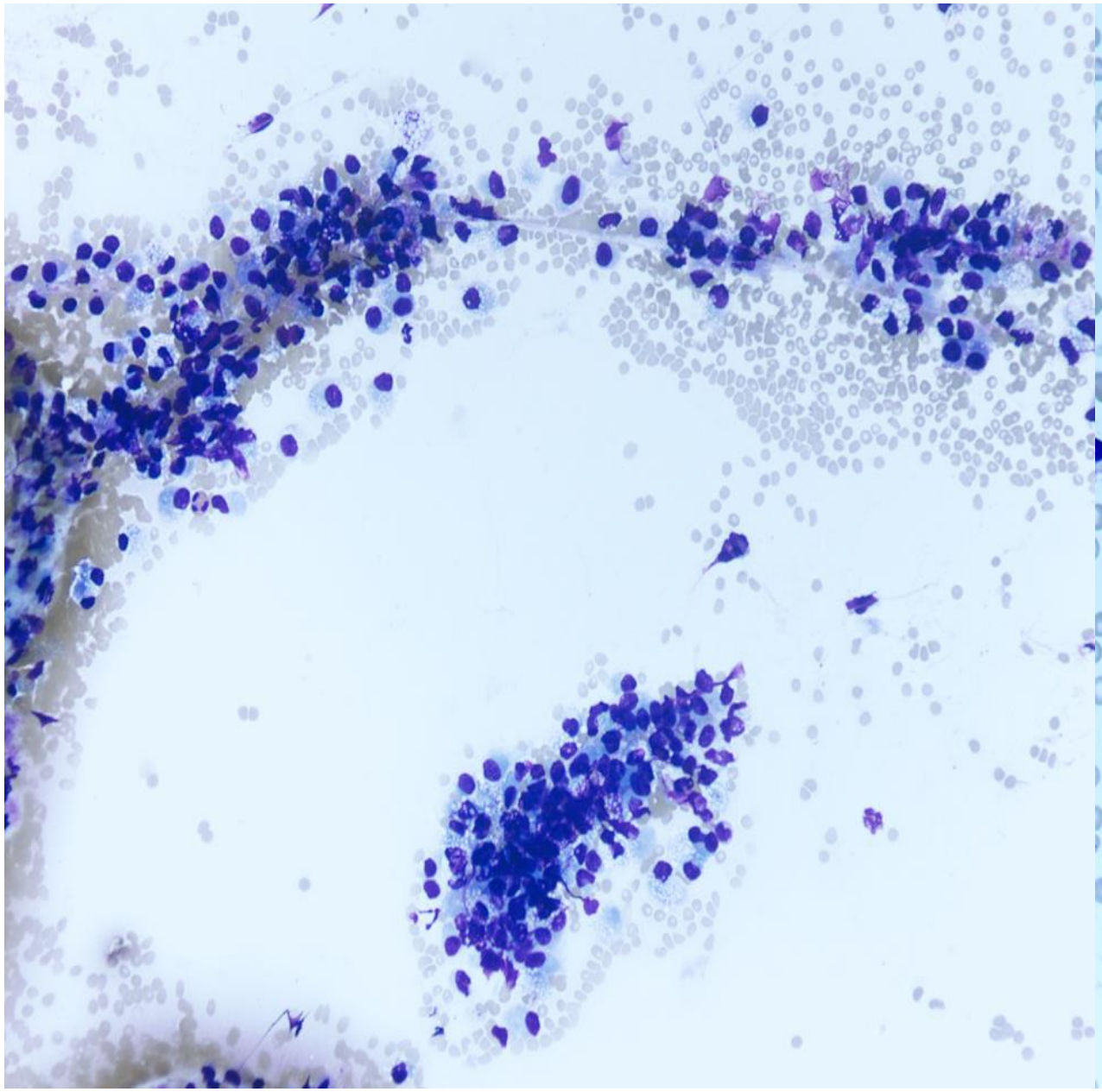
CASE 2 Discussion: Medullary Thyroid Carcinoma

•Markedly pleomorphic, bizarre tumour cells which are often present in anaplastic carcinomas are rarely seen in medullary carcinoma

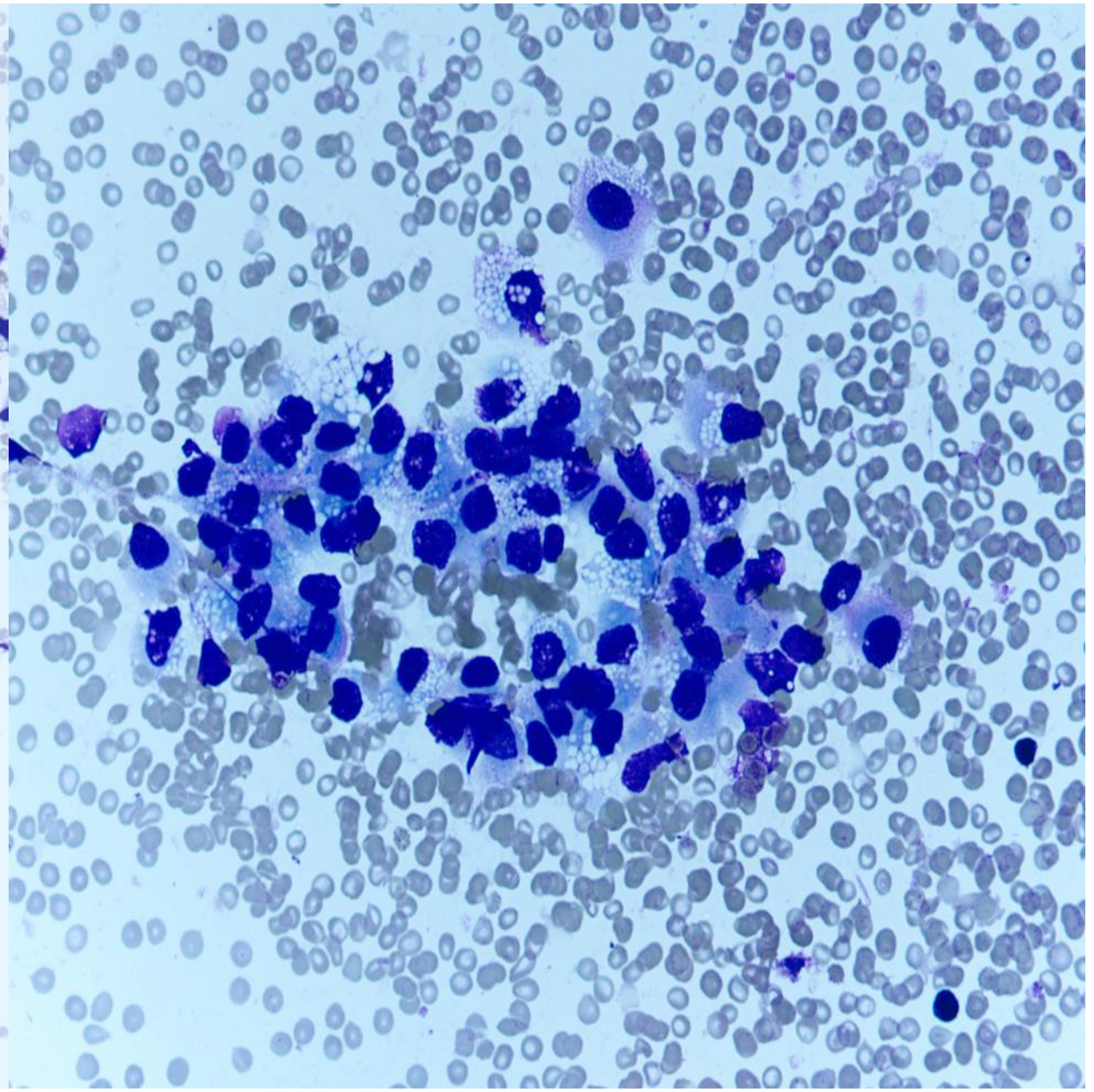
•The cytologic diagnosis of medullary carcinoma is best supported by immunocytochemical stains for calcitonin and other neuroendocrine markers, as well as serum analysis for calcitonin

Case 3

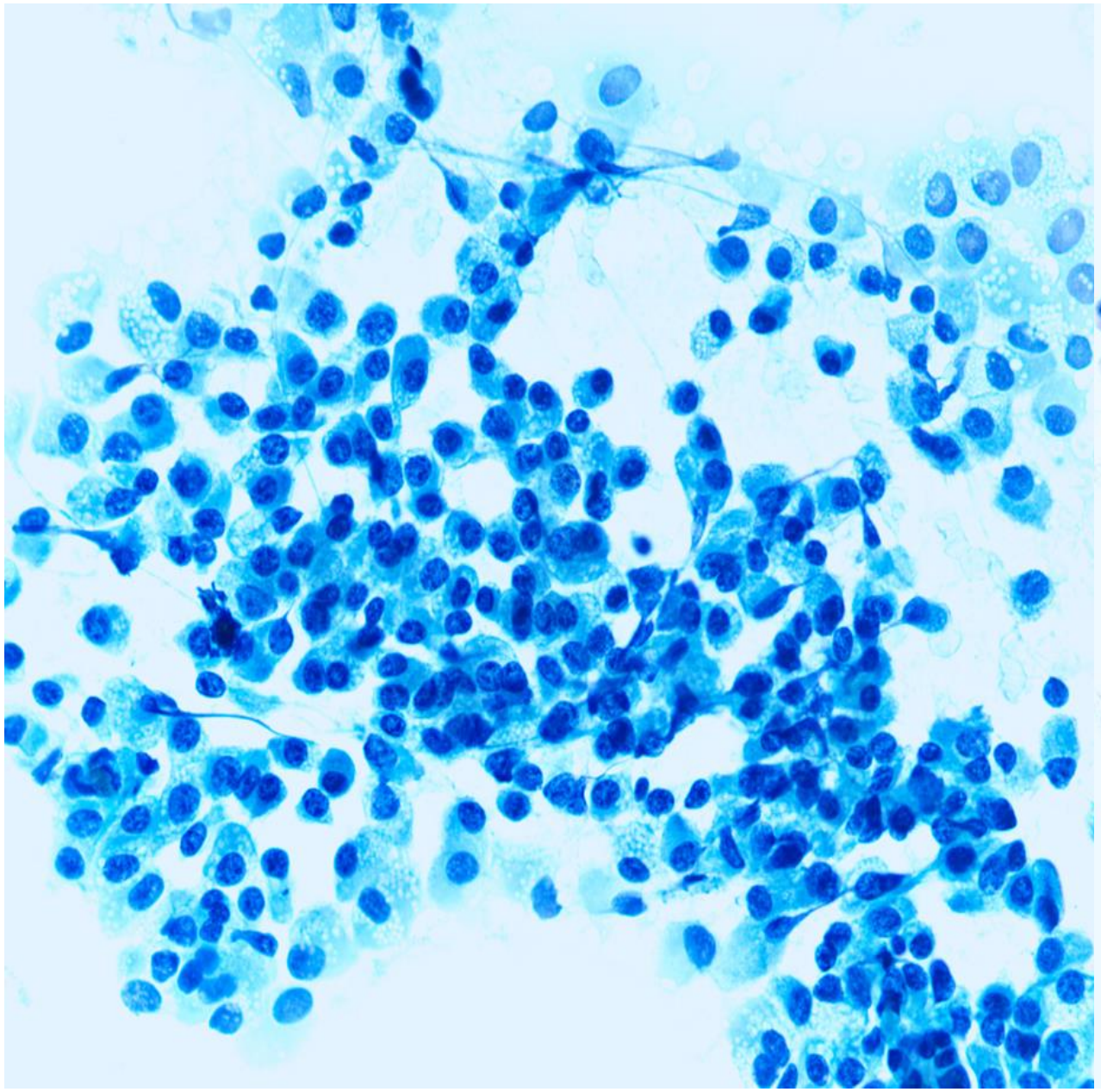
- A 41-year-old man presented with right upper quadrant pain, fever and an elevated white blood cell count.
- CT scan showed multiple ring enhancing lesions throughout the liver, a 3.5-cm mass in the tail of the pancreas, and lymphadenopathy in the portal, peripancreatic, and celiac axis.
- Endoscopic ultrasound-guided fine needle aspiration **(EUS-FNA) biopsy of the pancreatic lesion** was performed



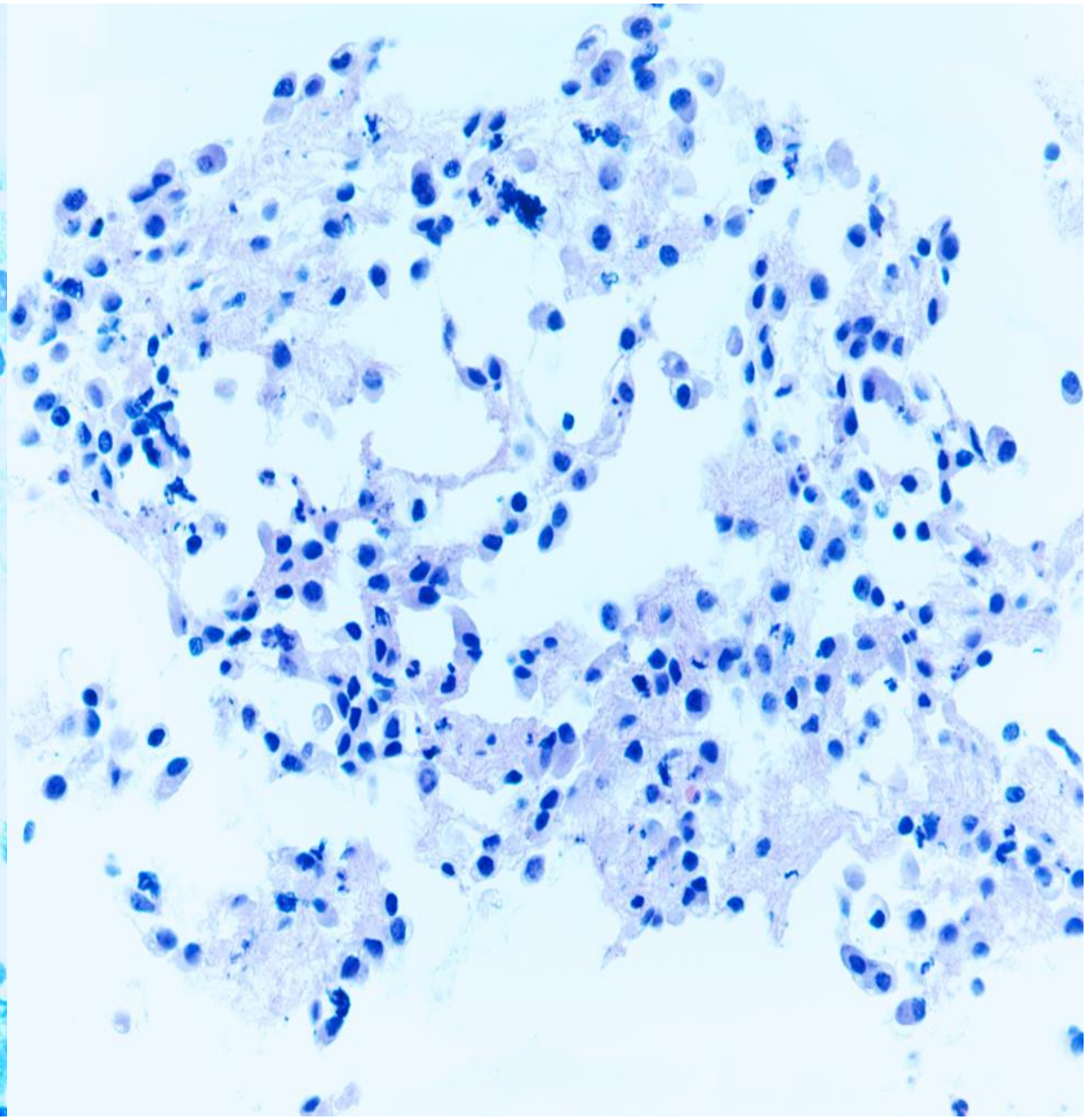
X 10 MGG



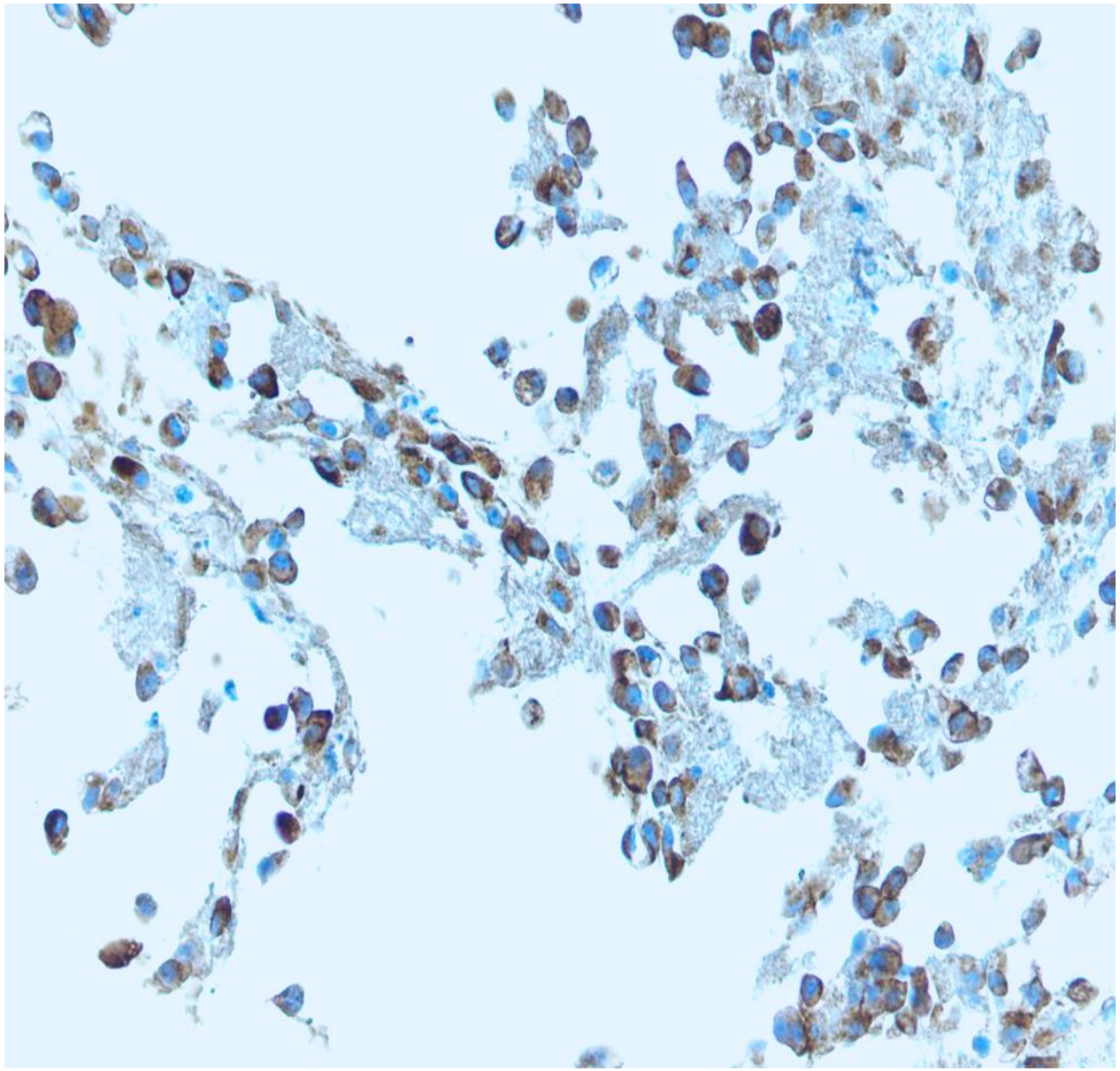
X 40 MGG



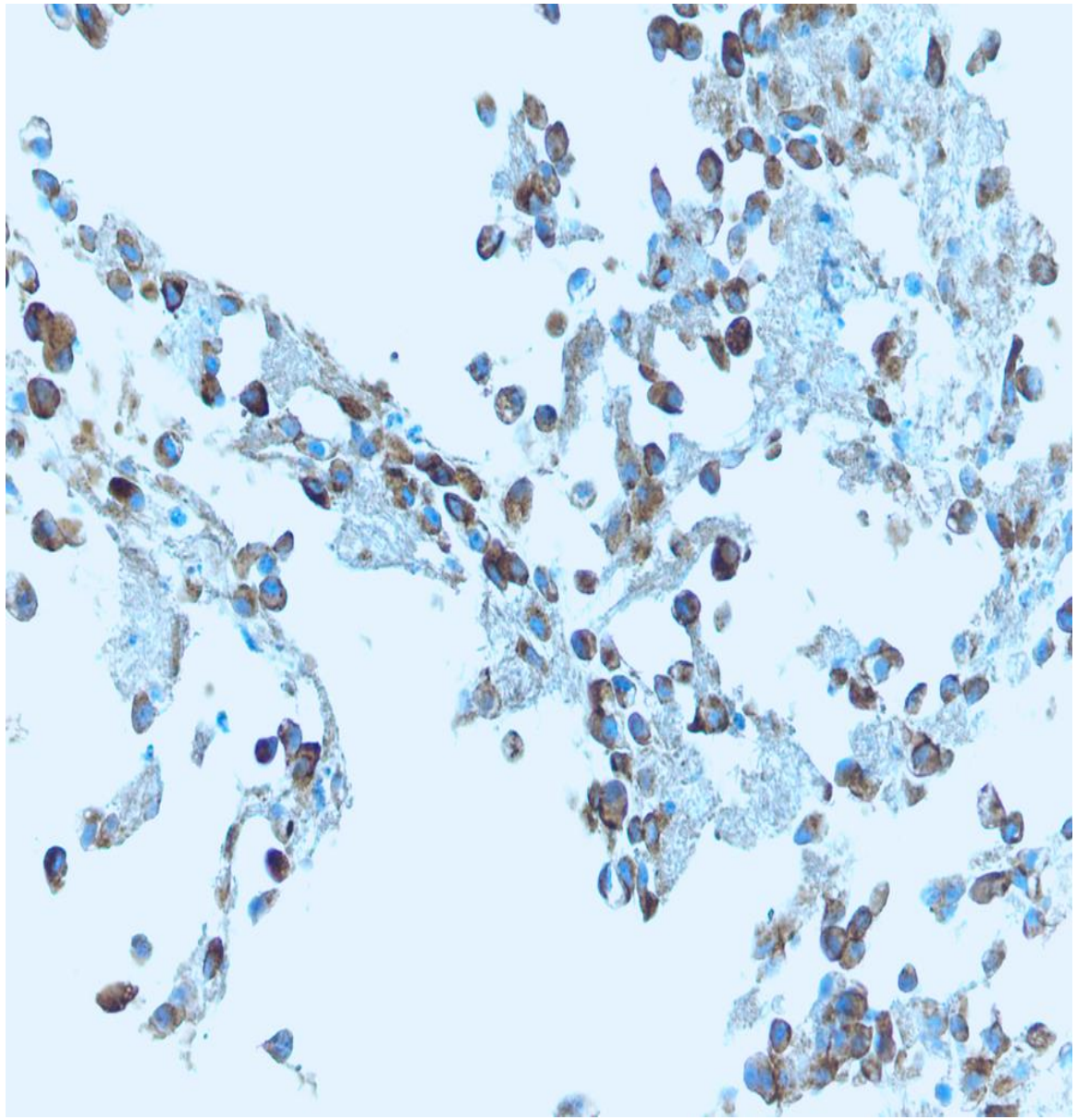
X 40 PAP



X 40 PAP



Cell block, chromogranin immunoperoxidase stain, X40



Cell block, chromogranin immunoperoxidase stain, X40

CASE 3 Discussion: Pancreatic endocrine neoplasms (PENs)

- Relatively uncommon lesions, accounting for 1-2% of all pancreatic neoplasms
- Since the advent of endoscopic ultrasound (EUS), lesions of the pancreas can be better visualized and appropriately sampled with fine-needle aspiration (FNA) biopsy.
- In many cases, diagnosis of PENs can be made based on cytomorphologic and immunophenotypic features

- Classical cytomorphologic features of PENs include single to loosely cohesive monotonous polygonal cells with finely granular cytoplasm and stippled (salt and pepper) chromatin
- Nuclei are eccentrically located, giving a plasmacytoid appearance
- Uncommon cytomorphologic features may impose a diagnostic challenge - within the cytoplasm, oncocytic changes, rhabdoid features, clear cells and lipid-rich variant have been documented

CASE 3 Discussion

- 2 Recent case reports demonstrate prominent cytoplasmic vacuoles in PENs - one clear cell variant and one lipid-rich variant

- Cytoplasmic vacuoles seen in PENs are often fine or small, in contrast to large vacuoles that might be seen in solid pseudopapillary neoplasm of the pancreas

- These cytoplasmic vacuoles are best appreciated on the slides stained with Diff-Quik technique

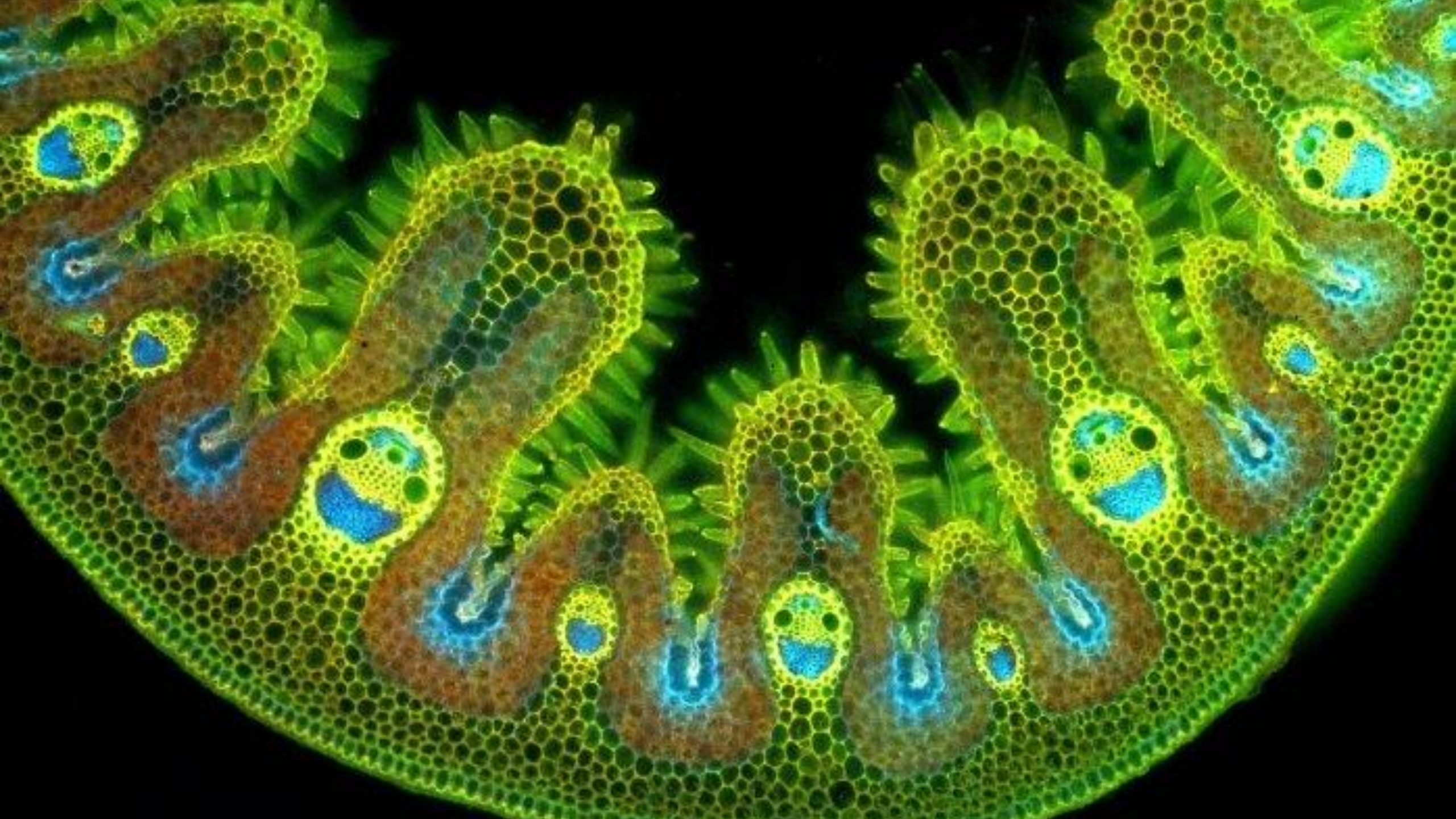
- The presence of prominent cytoplasmic vacuoles significantly expands the differential diagnosis, including ductal adenocarcinoma, acinar cell carcinoma, solid pseudopapillary tumor, metastatic adrenocortical carcinoma and renal cell carcinoma

CASE 3 Discussion:

- Distinction of clear cell and lipid-rich variants of PENs may have clinical implications because they differ in their clinicopathologic characteristics
- Unlike the clear cell variant, the lipid-rich counterpart most likely has no association with von Hippel-Lindau disease
- However, it is very difficult, if not impossible, to separate these two variants based on the cytomorphologic evaluation alone
- Positive immunostains with neuroendocrine markers such as chromogranin and synaptophysin help establish the diagnosis of PENs with this uncommon cytomorphologic feature

And last but not least…

Within Every Grass Leaf There Are Hidden Smiley Faces .....



Happy Xylem

- The two big 'eyes' in this 'smiley face' (which is typical of a monocot vascular bundle) are metaxylem elements that transport water through the leaf

- The bright blue fluorescence in the 'mouth' of the 'smiley face' is phloem, composed of larger sieve tubes and smaller rectangular companion cells (in cross section), which together transport sugars (made by photosynthesis) out of the leaf

- The bright yellow cells forming the neck of the 'smiley face' are lignified, providing a measure of rigidity in the leaf

- The band of cells along the bottom of the section are epidermal cells covered by a cuticle