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Cyto-histological correlates of an interesting soft tissue lesion FNA case

Clinical information

- 60M presents with a slow-growing left paramidline subcutaneous lesion
- MRI performed shows a 5cm lesion with solid components ?atypical lipomatous tumour/liposarcoma
- FNAC performed targeting the solid component to exclude malignancy
- Patient was not keen for excision of lesion, therefore if low risk of malignant potential for conservative management (surveillance)

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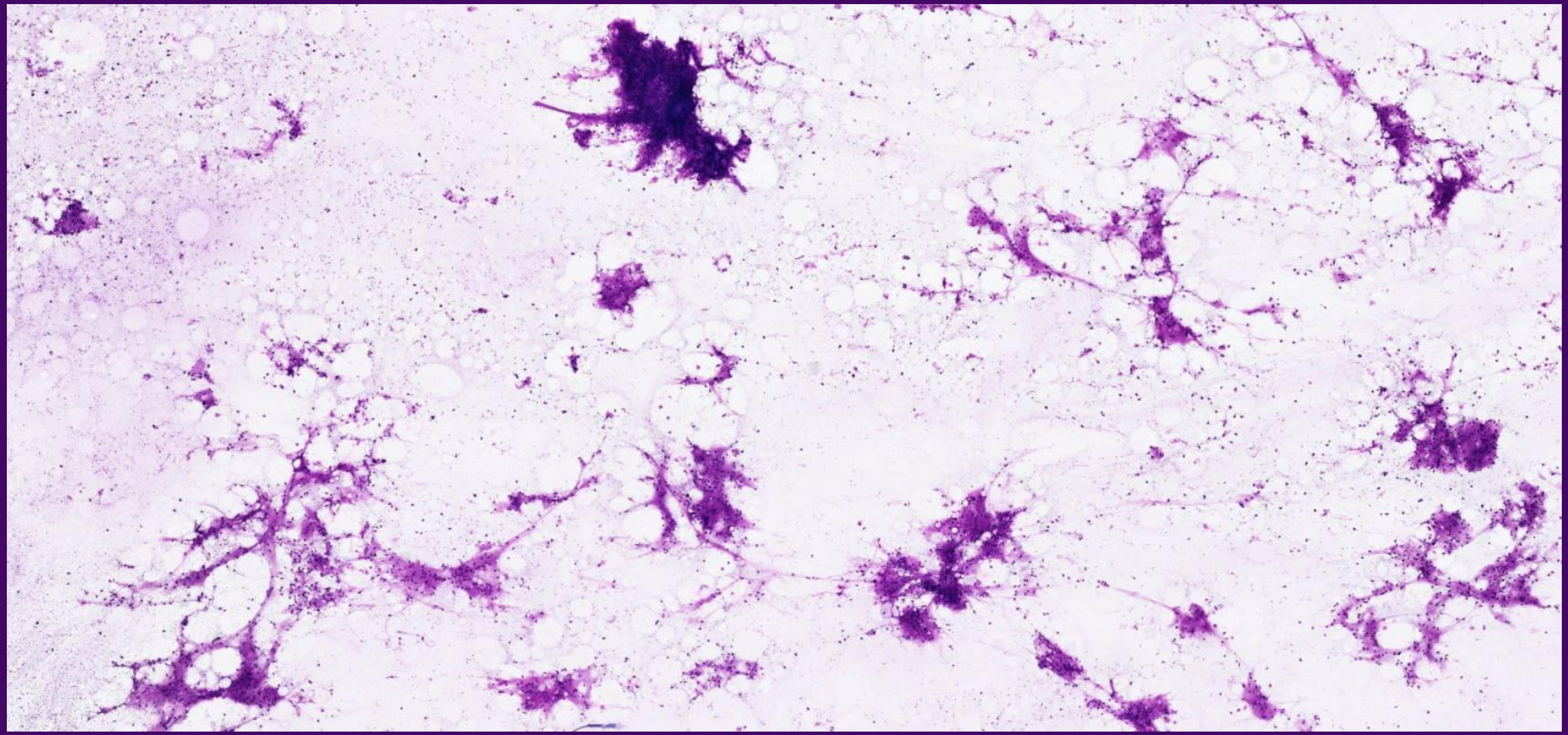
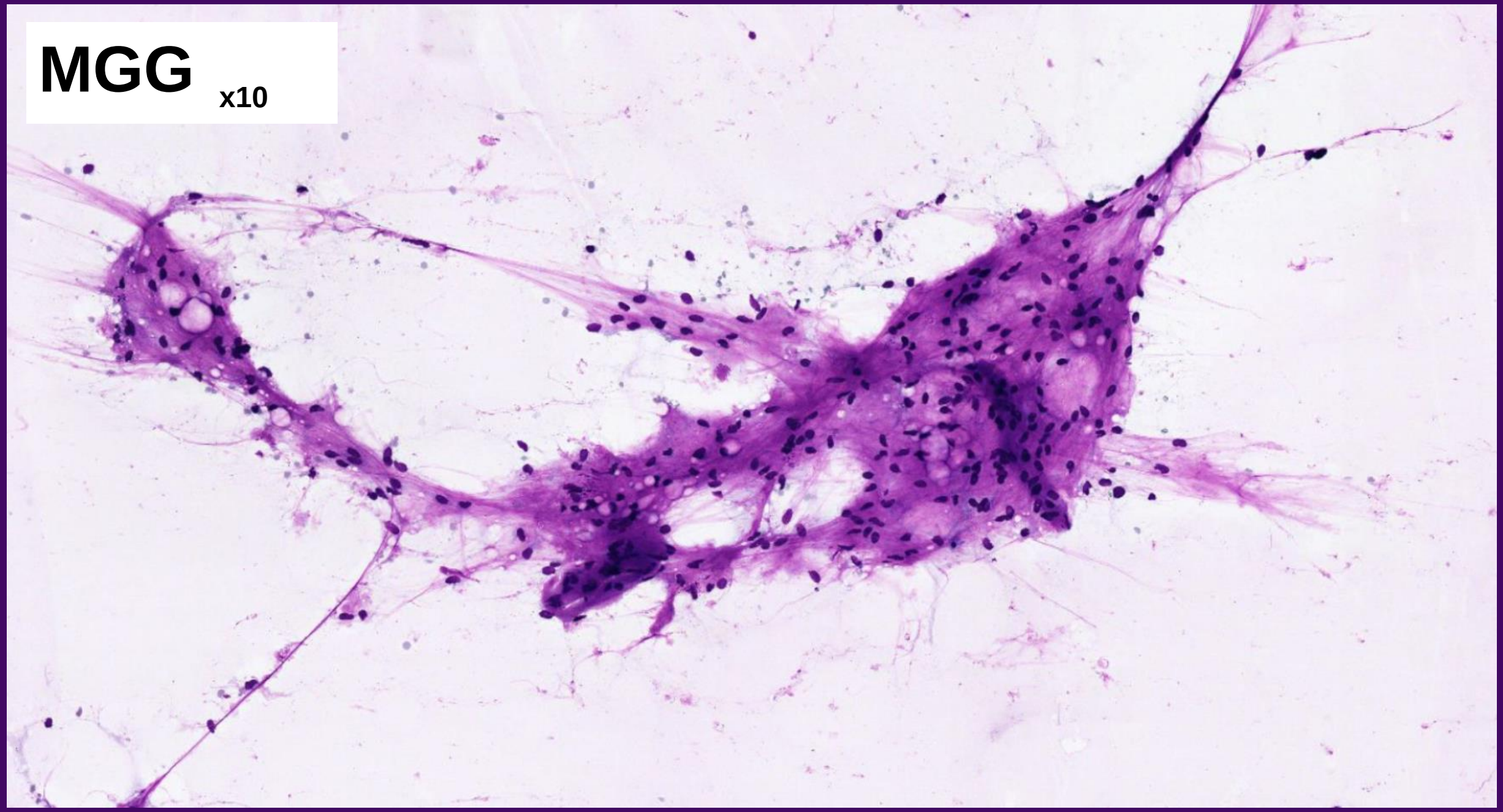
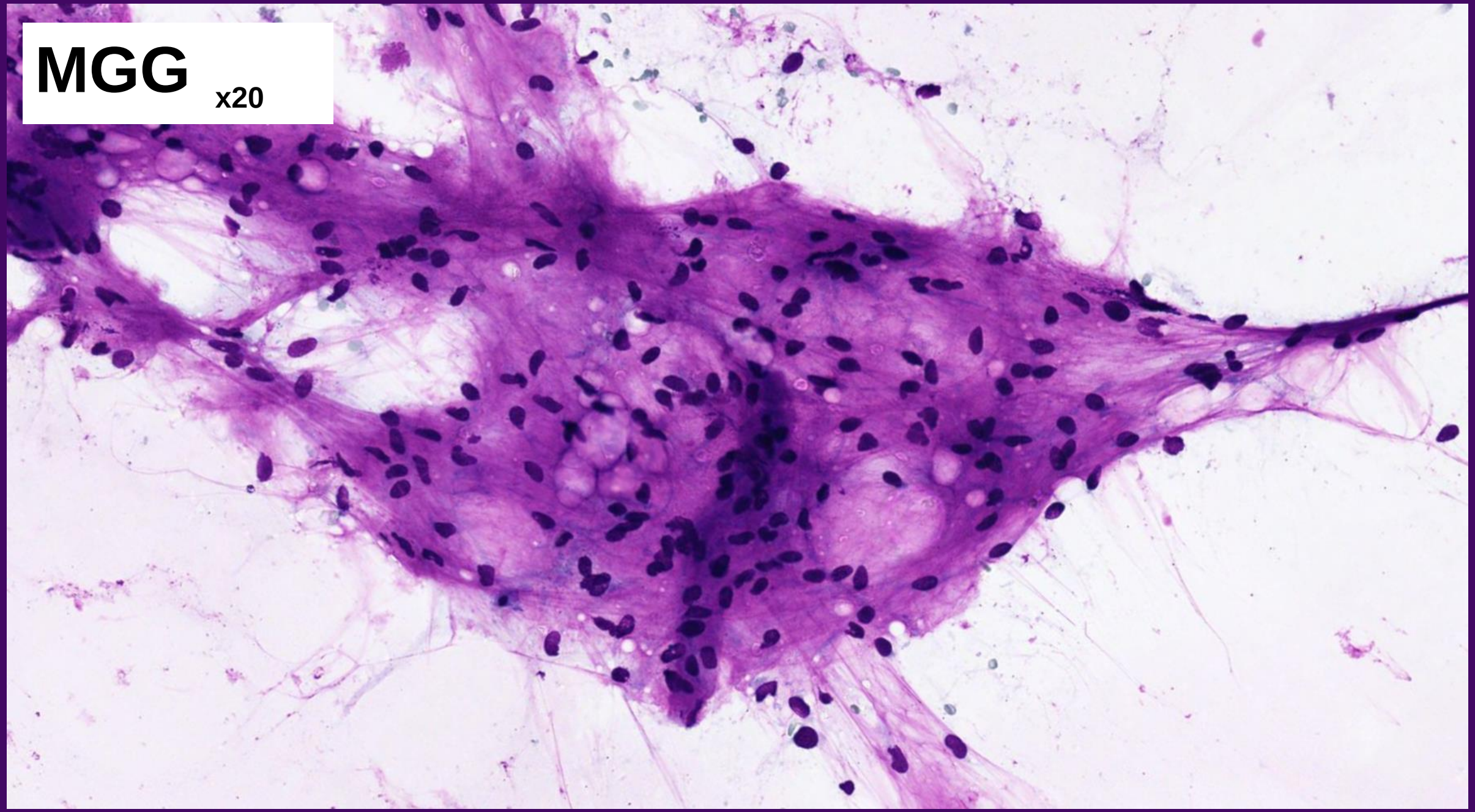
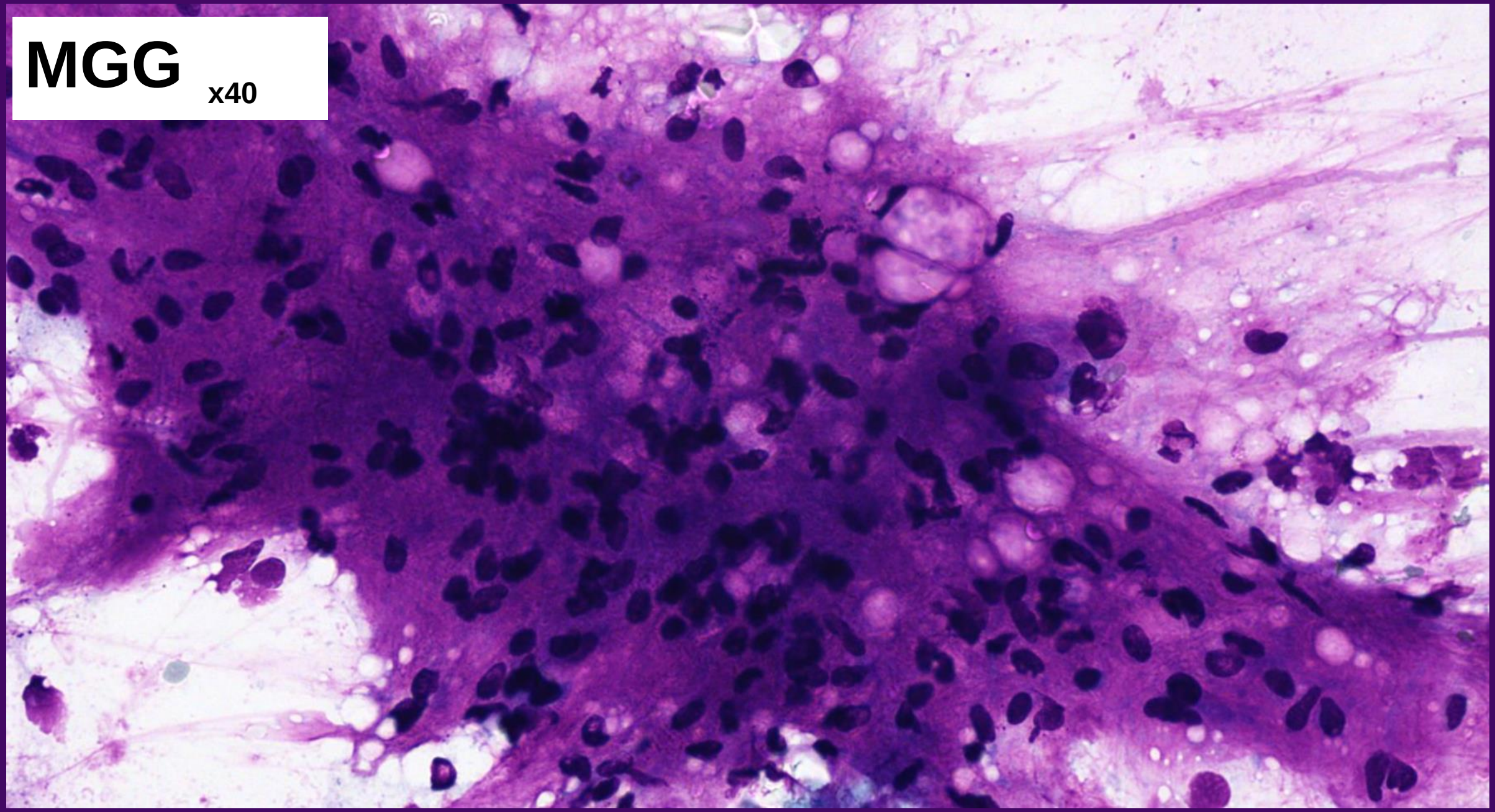
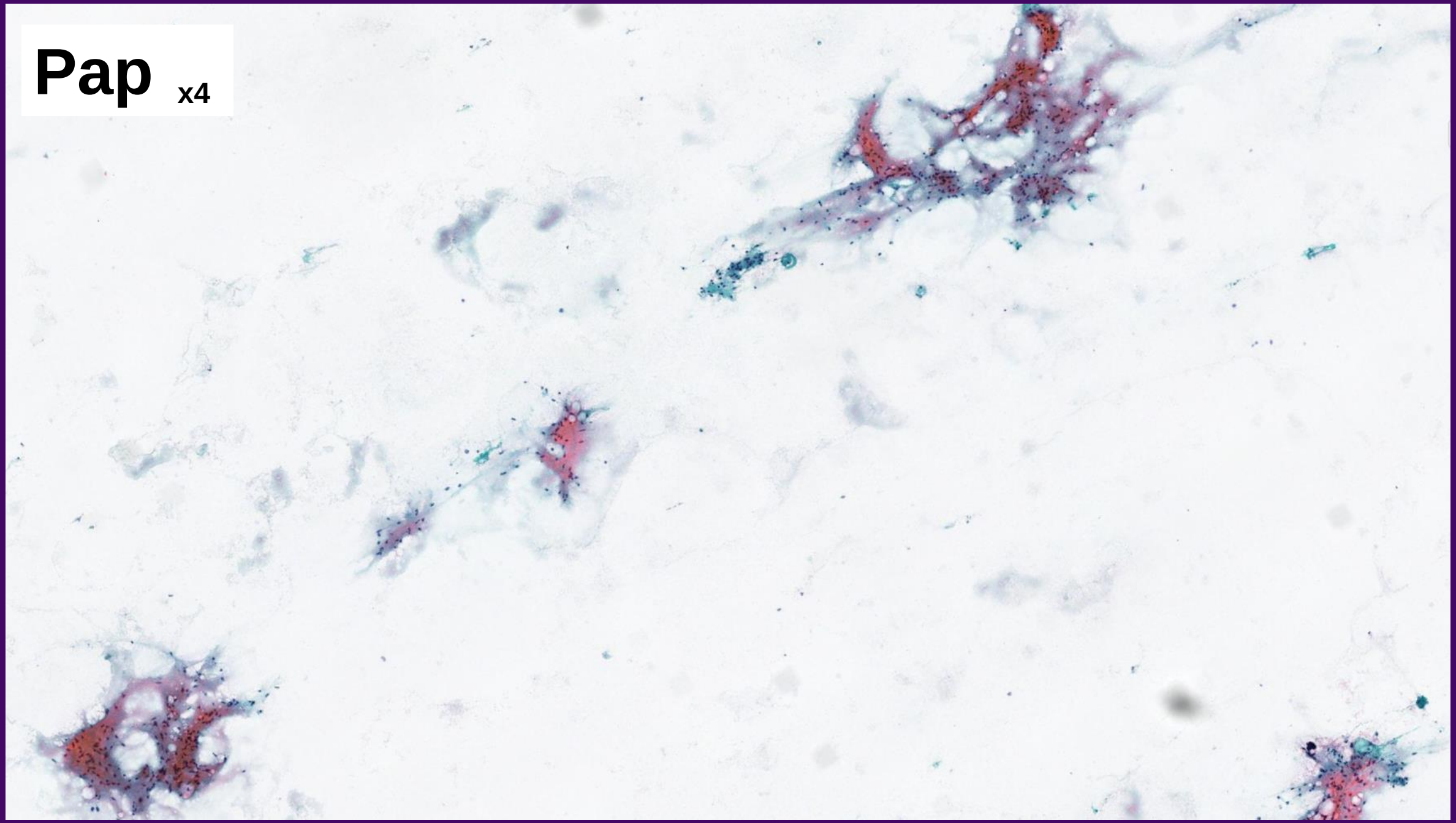
US guided FNA: MGG

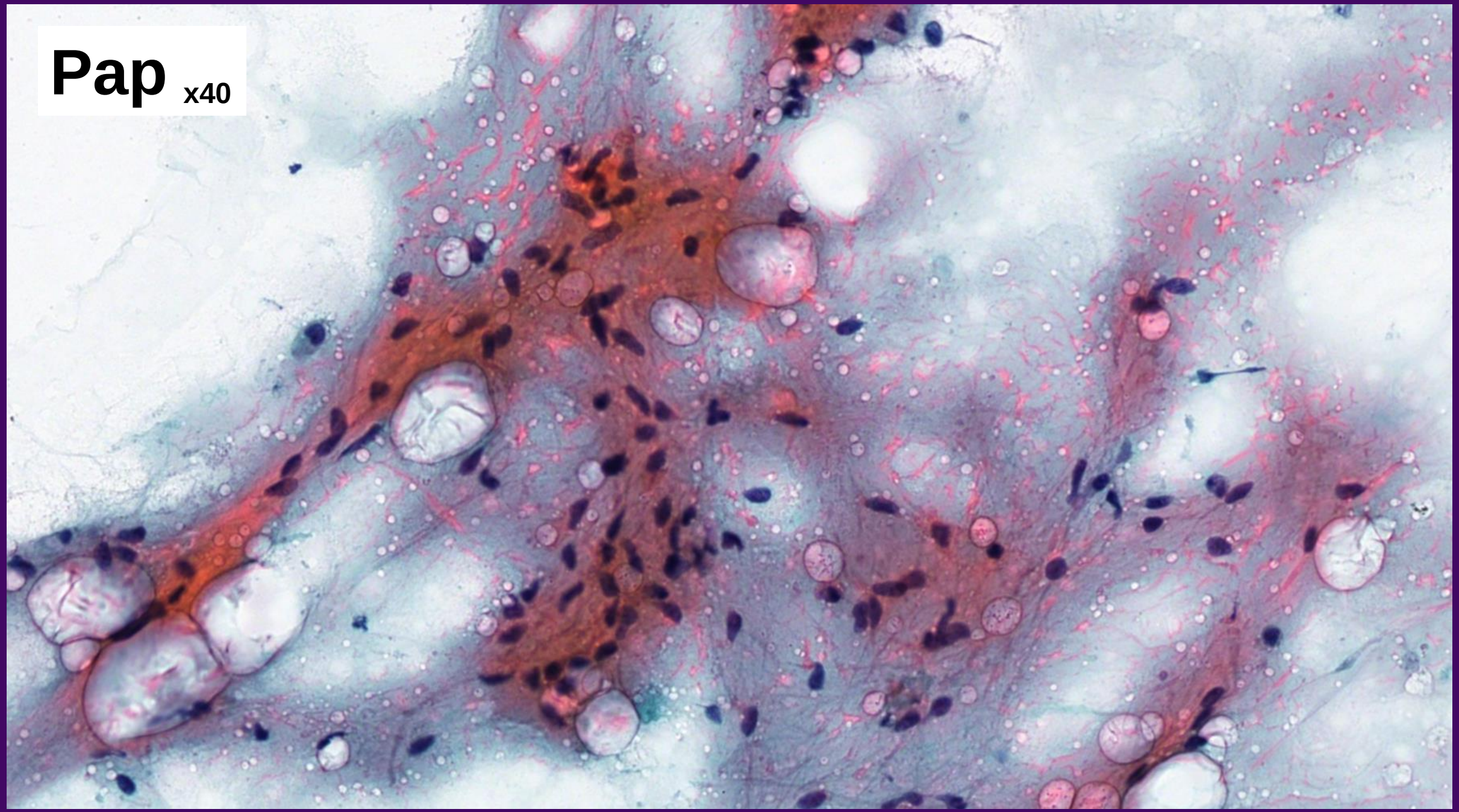



MGG x10


MGG x20


MGG x40


Pap x4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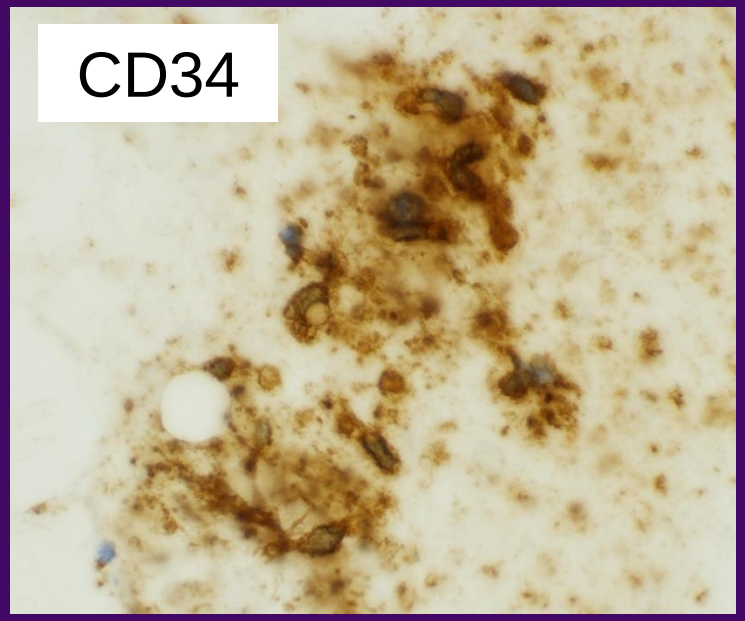
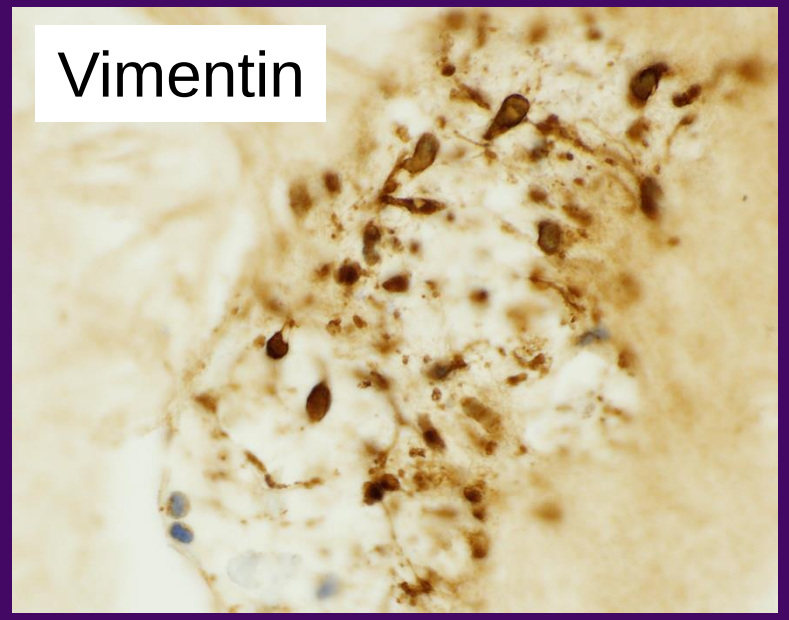
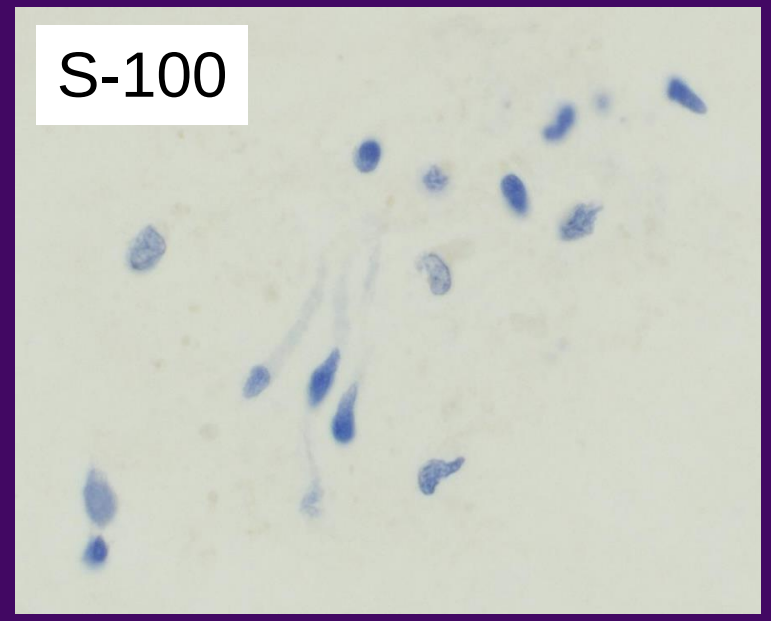
Immunohistochemistry







Others:

- AE1/AE3, desmin and SMA all negative
- MIB-1 approximately 1%

MDM discussion

- Solid component was targeted on cytology which showed a bland spindle cell lesion associated with adipocytes. No necrosis and no overtly malignant are cells seen

- In view of bland cytology and location, a spindle cell lipoma was favoured

- The patient changed their decision for surveillance and opted for surgical excision for management

Histology: Macro of tumour

74mm well circumscribed homogenously yellow tumour. No necrosis.

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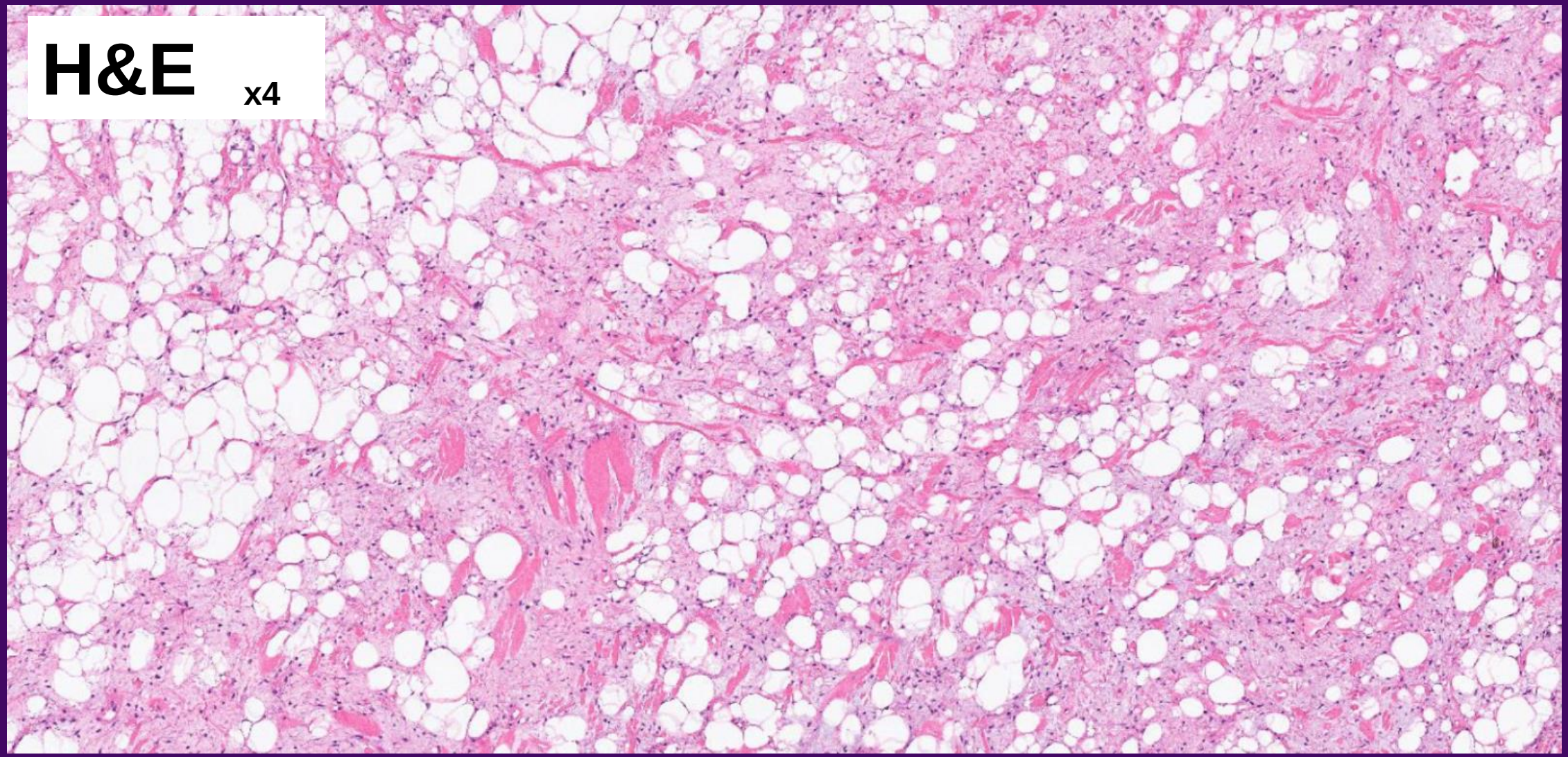
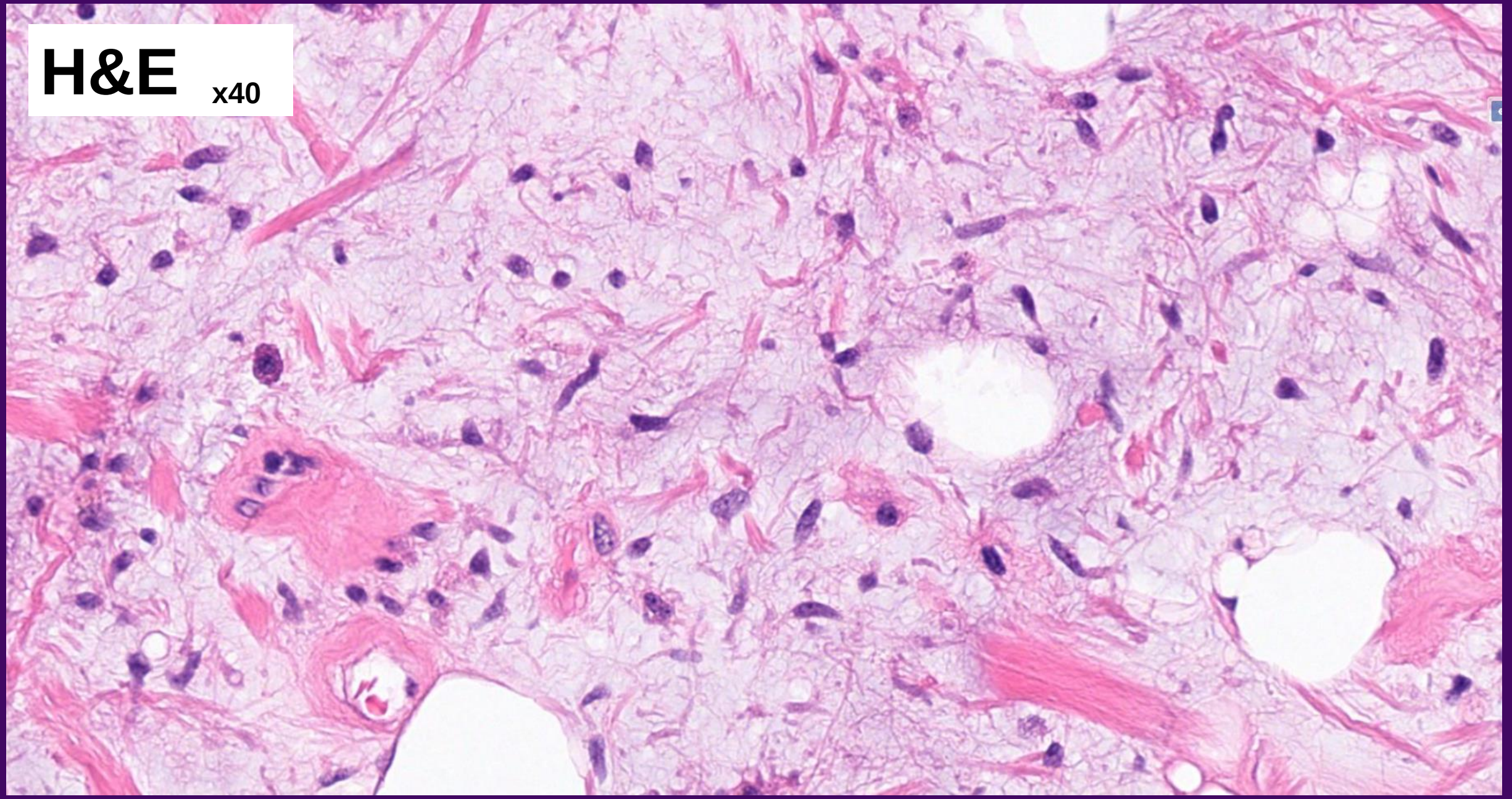
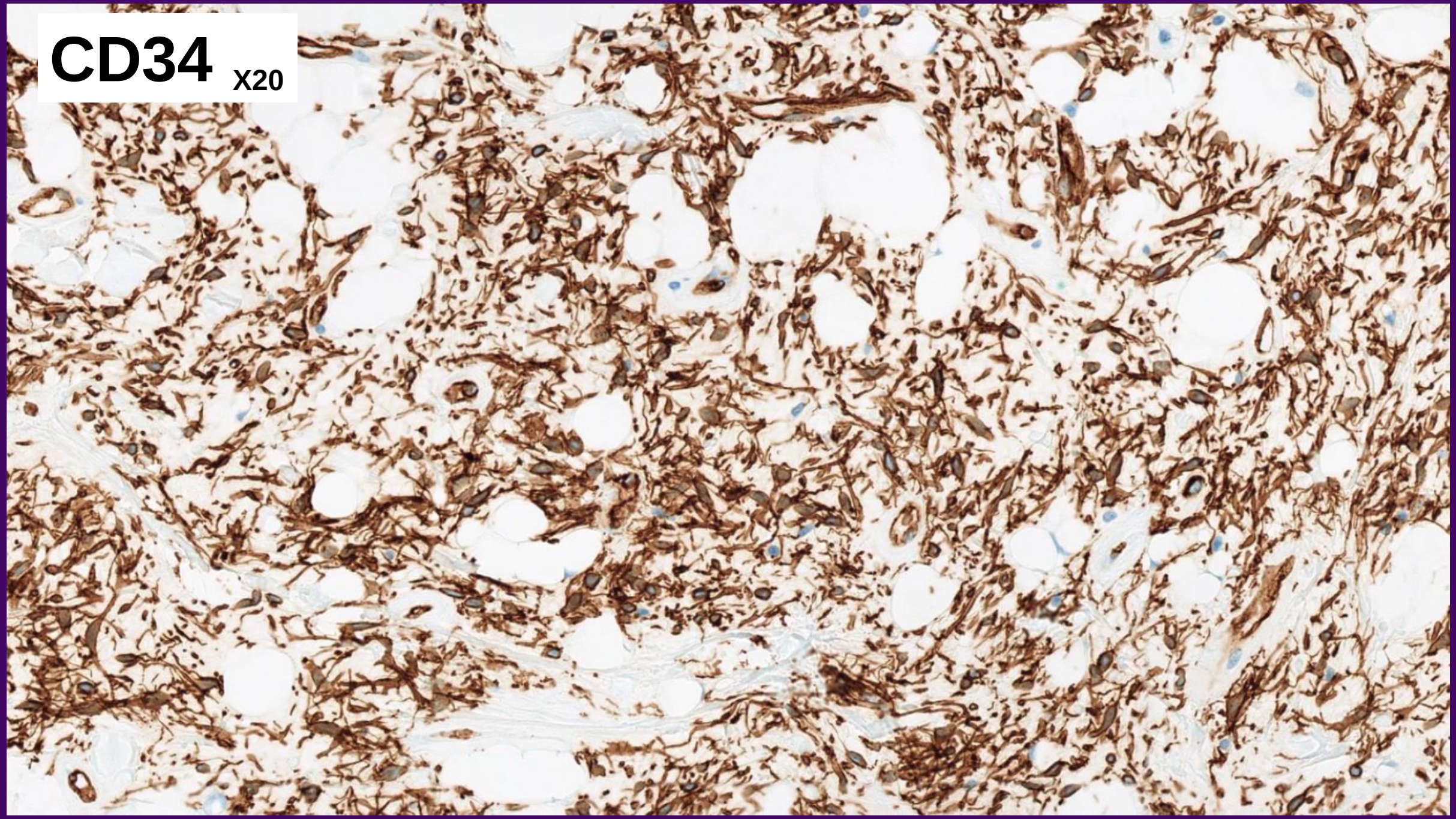
Histology




H&E x40


CD34 X20

Diagnosis: Spindle cell lipoma [1,2]

- Spindle cell lipoma/pleomorphic lipoma (SCL/PL) are a single entity with two morphological expressions
- Uncommon benign lipomatous tumour first described by Enzinger and Harvey in 1975
- Account for 1.5% of lipomatous tumours, less common than conventional lipomas

SCL: Clinical features [1,3-4]

- Eighty percent affect the posterior neck, shoulders and the back
- Less commonly affects the face, oral cavity, scalp, chest, trunk and the upper and lower limbs
- Predominantly affects men 45 - 69; < 10% women and usually in atypical locations
- Presents as a painless, firm lesion growing over years

SCL: Diagnosis on cytology [3-6]

- Rarely seen on cytology as most are diagnosed with histology
- As for all soft tissue lesions; the frequency of the lesion, the clinical context and interpretation of morphological features should be considered when making a diagnosis
- If all cytomorphological features for SCL are present, and the tumour is present in the typical location a diagnosis of SCL can be made with cytology

Main cytological features [2]

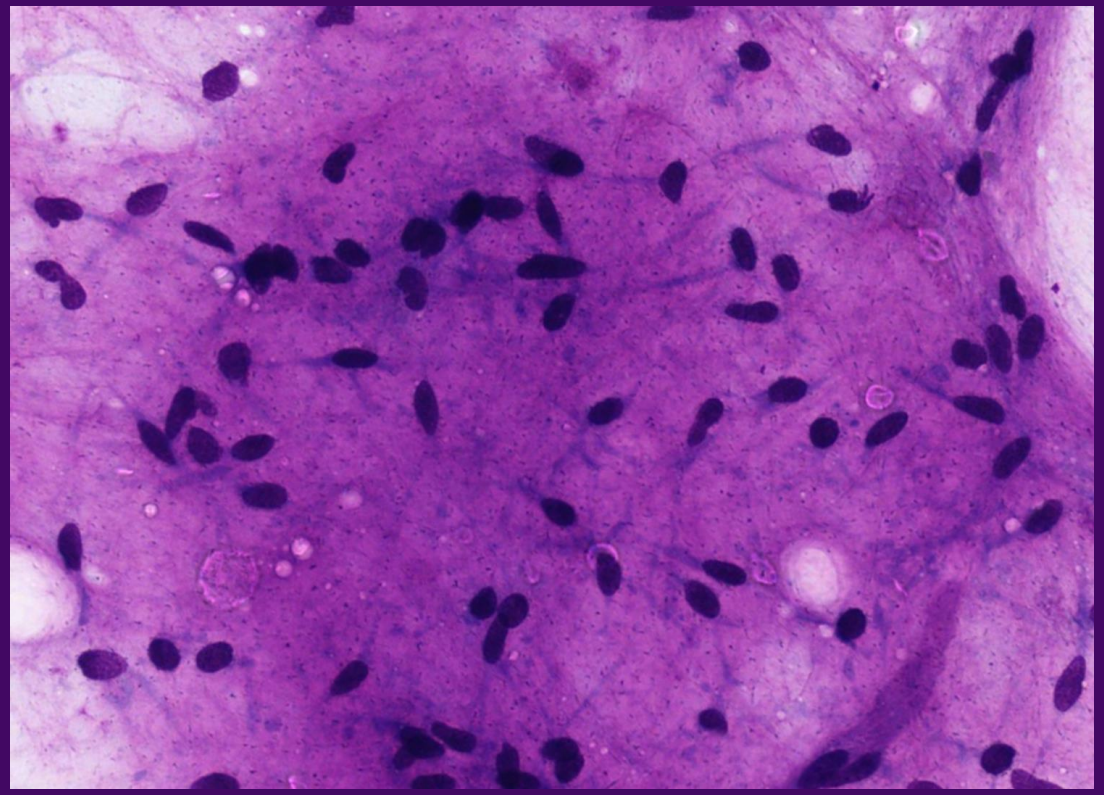
Similar to the histology there is a triad of:

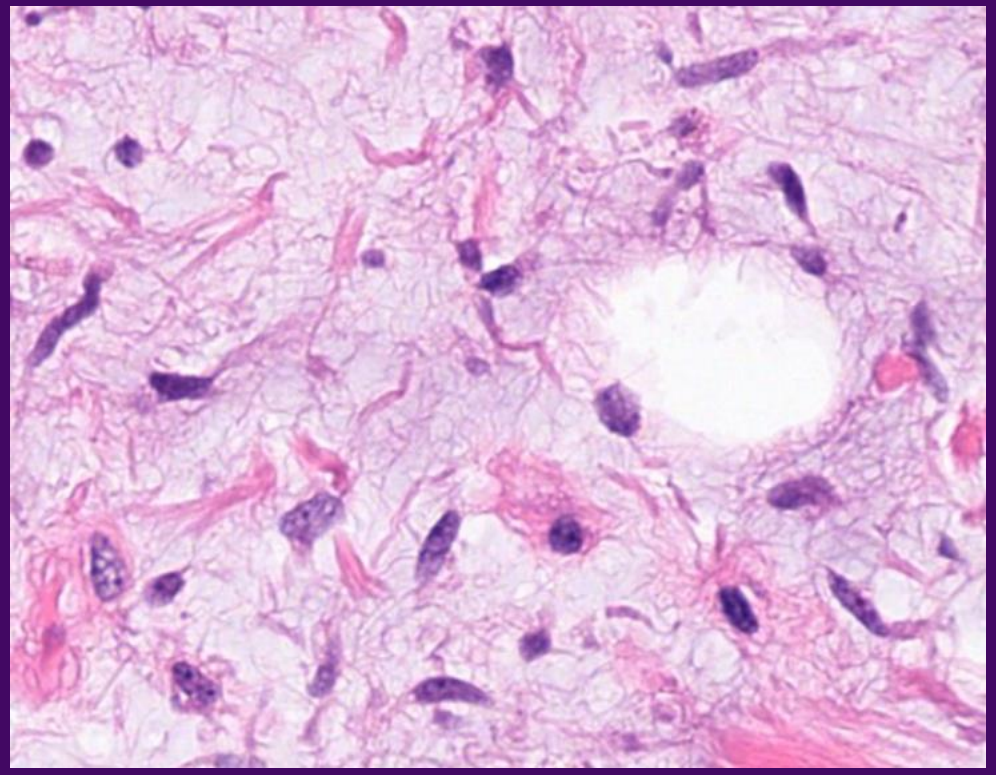
1. Spindle cells
2. Benign adipocytes of variable sizes
3. Collagen fibres

May also see:

- Myxoid stroma
- Mast cells: less common in smears compared to histology but if present usually seen within myxoid stroma

1. Bland spindle cells

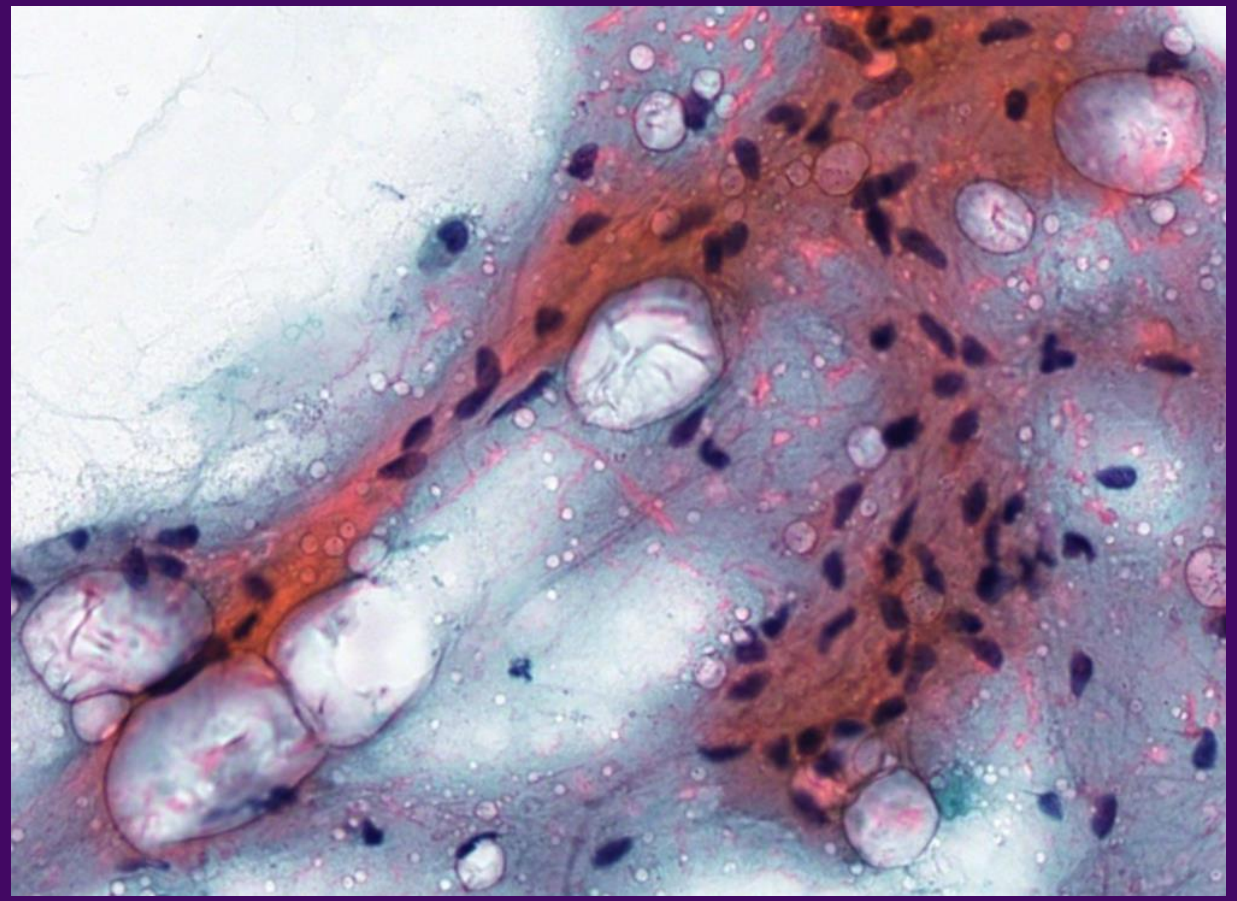


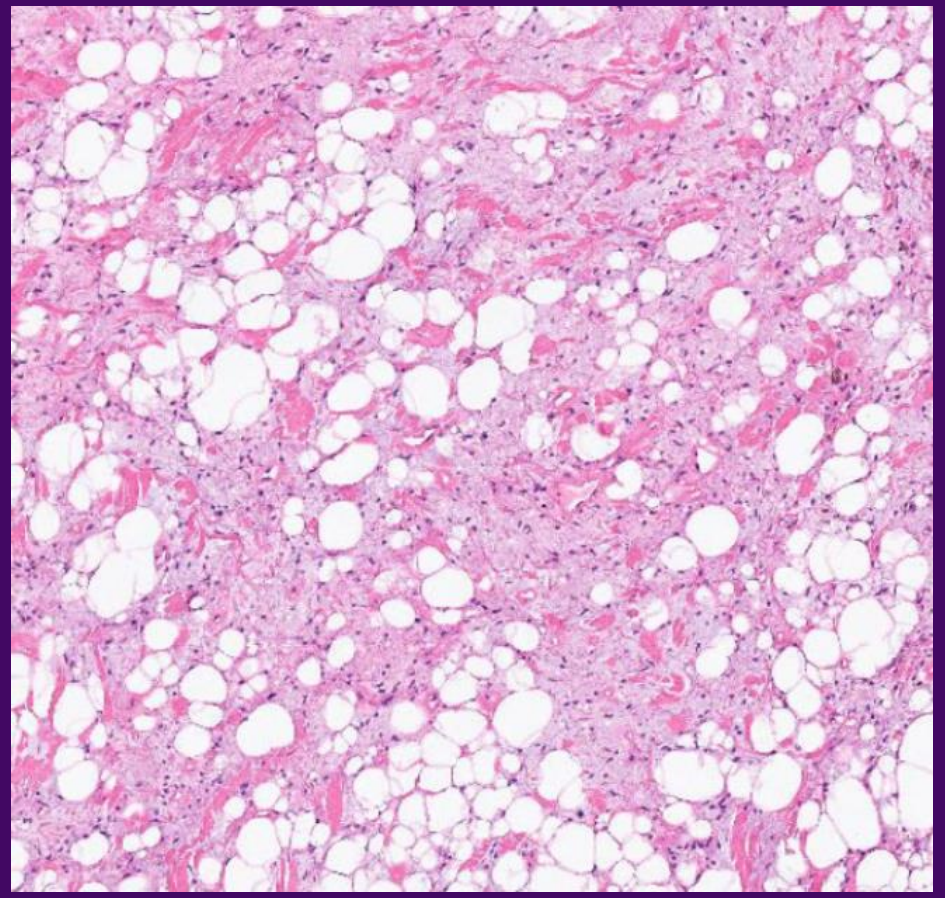


MGG smear vs H&E histology

Bland, uniform, elongated cells with bipolar eosinophilic processes. Can be arranged loosely or in a fascicular pattern

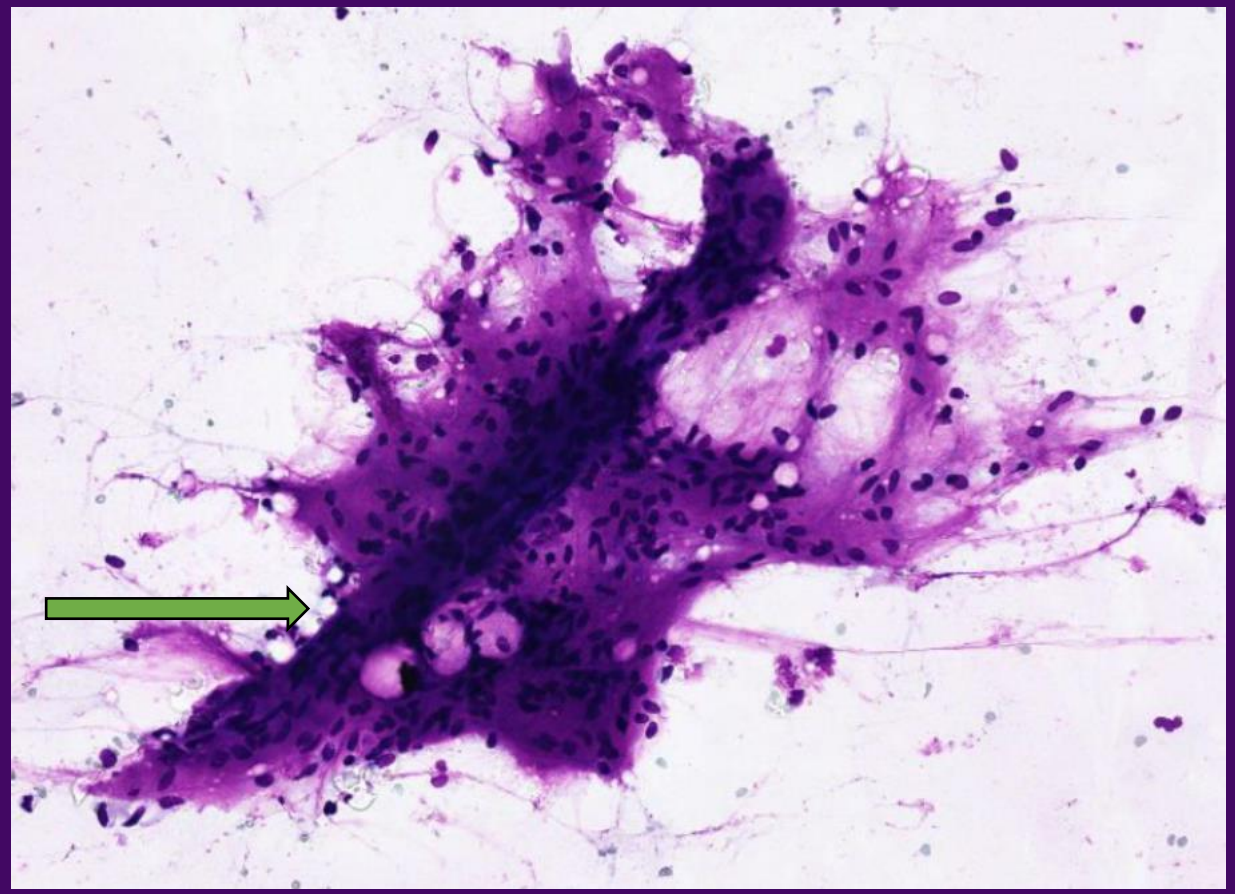
2. Adipocytes

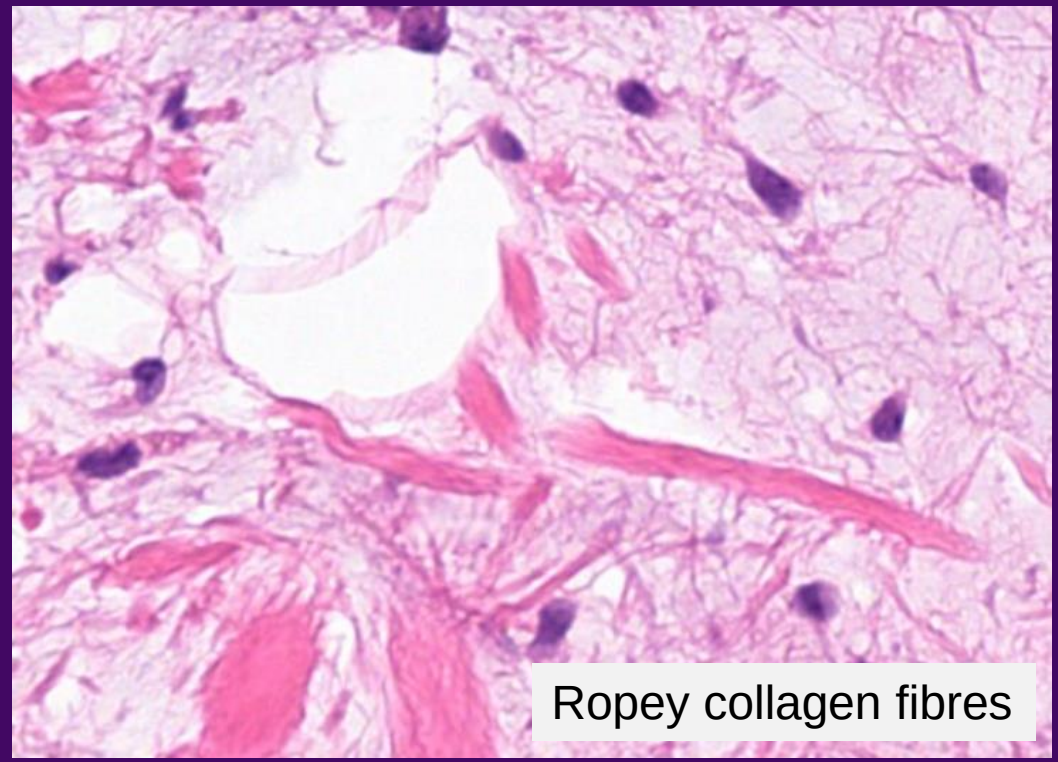




MGG smear vs H&E histology
Mature adipocytes of variable sizes

3. Collagen fibres





MGG smear vs H&E histology

The ‘ropey collagen fibres’ seen on histology usually display as long fibres in cytology smears

SCL: Ancillary testing [1]

- CD34 IHC is positive in spindle cells, although not specific it is usually not expressed in other lipomatous lesions
- Cytogenetic characterised by loss of 13q14 (13q14), including RB1 loss (also present in cellular angiofibroma, mammary and soft tissue myofibroblastomas)
- MDM2 and CDK4 is usually absent compared to positive expression in atypical lipomatous tumour/well-differentiated liposarcoma (ALT/WDLPS)
- Genetics support SCL/PL are different entity to lipoma and ALT/WDLPS

Challenges diagnosing with cytology [3-5]

- Spindle cell lesions can be difficult to diagnosis on cytology and dependent on sampling of the different features
- Myxoid variant of SPL can be difficult to distinguish from other myxoid tumours e.g. myxofibrosarcoma and myxoliposarcoma
- Can have ‘fat poor’ SPL which can be difficult to distinguish from spindle cell lesions with cellular morphology such as DFSP
- If not enough material on cytology a core biopsy for more material is advised

Differential diagnosis [1-5]

Spindle cell lesion	Clinical features	Cytomorphology	Other features	CD34	S100/ SOX10	STAT6	Molecular analysis
DFSP (cellular)	Nodular cutaneous mass Slow growing	Compact clusters in fibrillary matrix Variable atypia	Cellular Cells can be discohesive and can see bare nuclei	+	-	-	COL1A-PDGFB
Schwannoma	Variable sites and sizes Painful on sampling Usually a long history	Elongated nuclei, small rounded nuclei, tapered end arranged in fascicles Nuclear pleomorphism and inclusions in degenerative lesions	Variable cellularity Degenerative atypia Verocay bodies may be present	-	+	-	Not relevant for diagnosis
SFT (extrapleural)	Slow growing Deep soft tissue, head and neck, proximal extremities	Elongated, ovoid, rounded with scant/wispy cytoplasm arranged in fascicles	Cellular or moderate May have stripped nuclei in background	+	-	+	*NAB2-STAT6*
Nodular fasciitis	Superficial mass extends into subcutis Rapid growing (<2-3 months) Usually <5cm	Moderate to marked pleomorphism spindled, angulated, rounded cells Can have bland chromatin	Cellular May have some mitoses and ganglion cells	-	-	-	USP6 gene rearrangement
Myxoid background							
DFSP (myxoid)	Nodular cutaneous mass Slow growing	Compact clusters in fibrillary or myxoid matrix Variable atypia	Cellular Can have discohesive cells and bare nuclei	+	-	-	COL1A-PDGFB
Myxofibrosarcoma	Affects extremities Slow growing and painless Mostly in the elderly	Abundant myxoid matrix Variable pleomorphism and mitotic activity	Arborising blood vessels	**+ (focal)**	-	-	Not relevant for diagnosis
Myxoid liposarcoma	Deep location Extremities rarely in subcutis	Cells appear more rounded within myxoid matrix	Thin walled blood vessels	-	+	-	DDIT3 rearrangement (*FUS-DDIT* or *EWSR1-DDIT3*)

Learning points

- SCL not commonly seen on cytology but has similar morphological features to histology
- Can be relatively straightforward on cytology if the triad of features are present and is in context of the typical location of the tumour
- Can be a challenging diagnosis if a myxoid or fat poor-SCL
- If not adequate on cytology a core biopsy is recommended

References

1. WHO Classification of Tumours Editorial Board. Soft tissue and bone tumours [Internet]. Lyon (France): International Agency for Research on Cancer; 2020 [cited 2023 Feb 6]. (WHO classification of tumours series, 5th ed.; vol. 3). Available from: https://tumourclassification.iarc.who.int/chapters/33.

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3. Domanski HA, Carlén B, Jonsson K, Mertens F, Akerman M. Distinct cytologic features of spindle cell lipoma. A cytologic-histologic study with clinical, radiologic, electron microscopic, and cytogenetic correlations. *Cancer.* 2001;93:381–9.

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6. Domanski HA, Gustafson P. Cytologic features of primary, recurrent, and metastatic dermatofibrosarcoma protuberans. *Cancer*. 2002 Dec 25;96(6):351-61.