Dual Pathology in a Pleural Fluid

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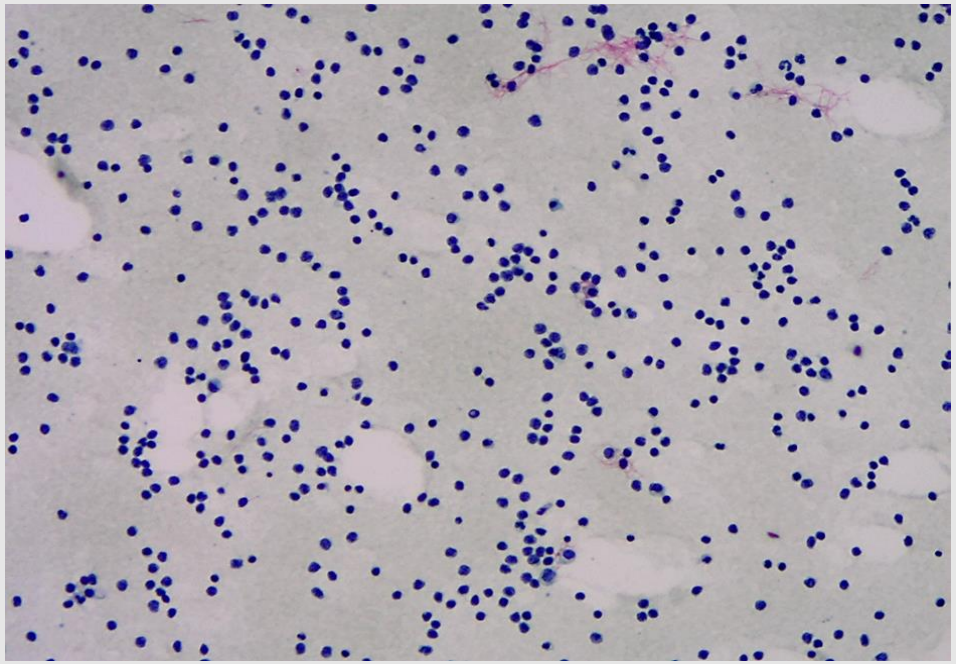
Clinical Information – First Presentation

- 77 year old male
- Worsening shoulder, back and chest pain, breathlessness as well as generalised weakness and falls
- Reviewed in pleural clinic due to CT results showing left loculated effusion and right calcified plaques following a history of falling
- Patient indicated weight loss and loss of appetite

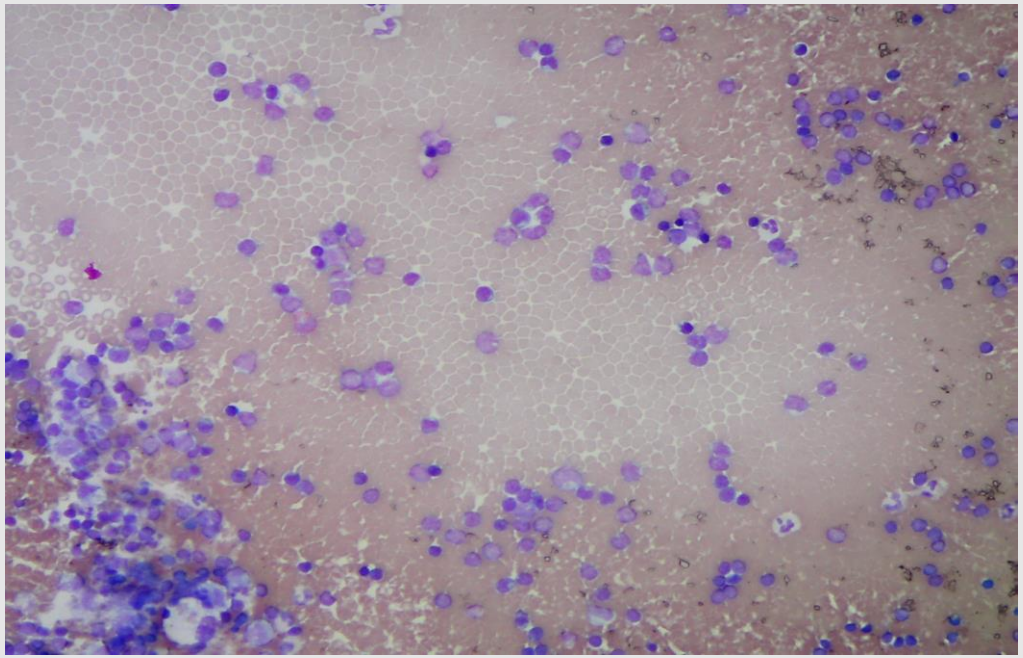
Pleural Fluid Drainage No.1 – 90ml opaque bloodstained fluid.

Lymphocytic effusion.

- PAP



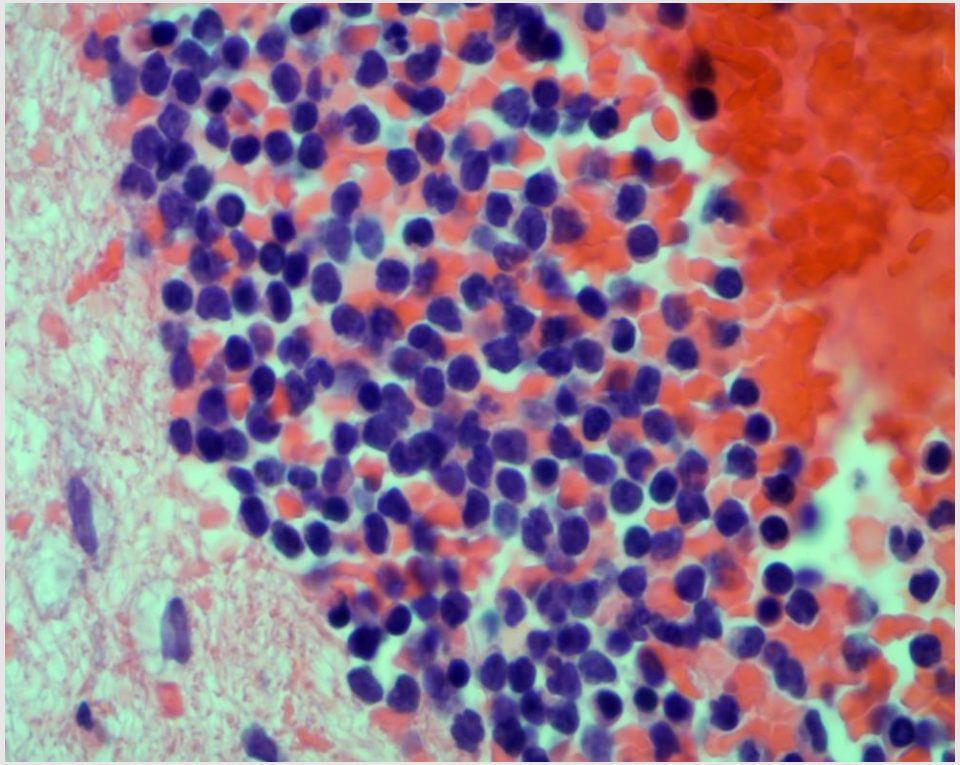
- MGG



Cellular preparation, with a predominant population of monomorphic, discohesive small to medium lymphoid cells with minimal cytological atypia. Mesothelial cells are inconspicuous.

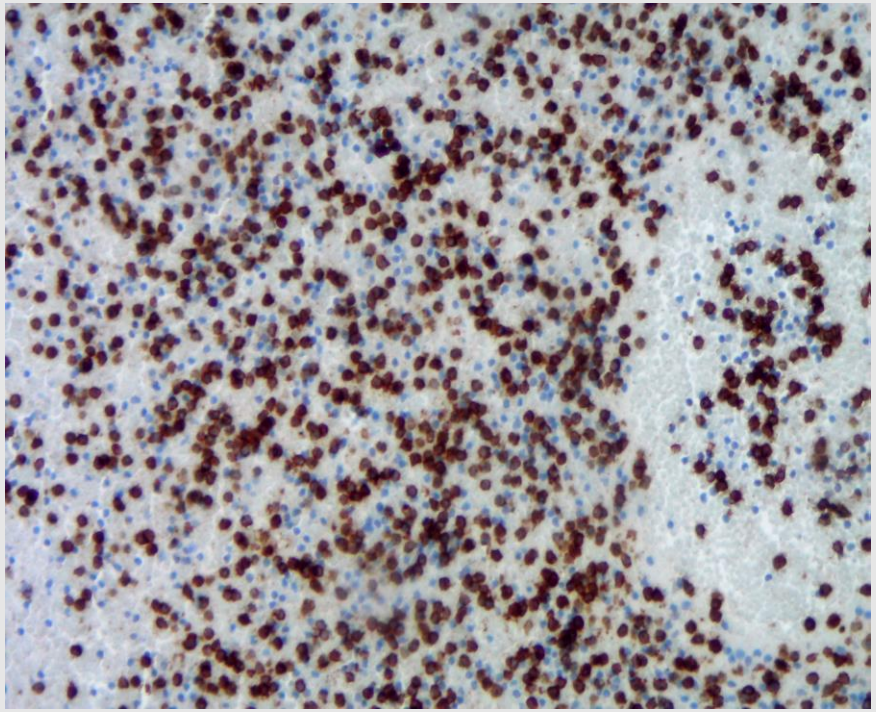
Pleural Fluid Cell Block – representative sample with numerous lymphocytes.

- H+E

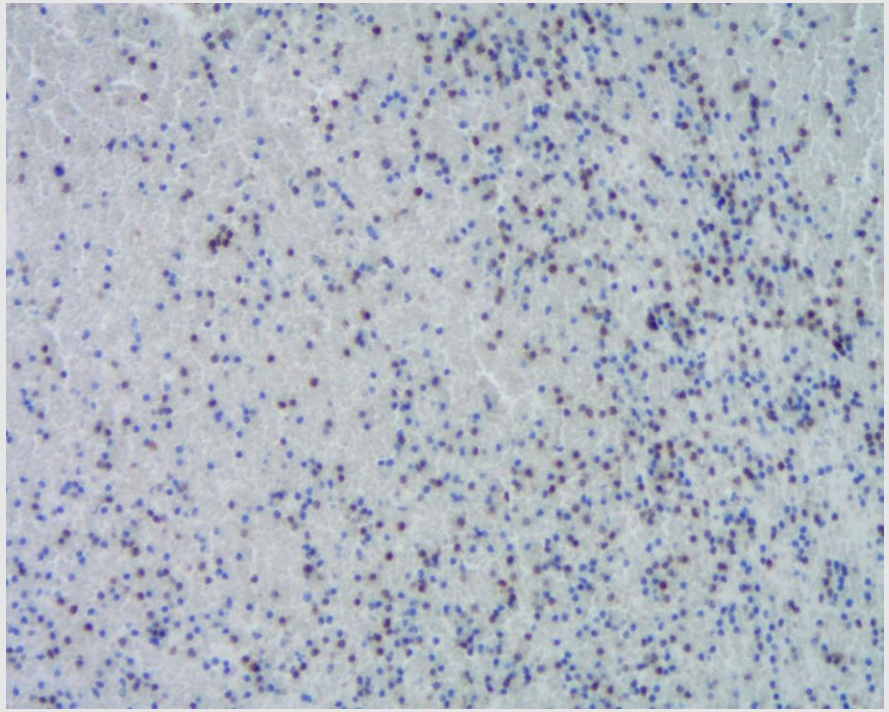


Immunohistochemistry - initial basic lymphocyte markers.

- CD20+ numerous B lymphocytes are identified.



- CD3+ very occasional reactive T lymphocytes.



In a normal effusion T cells would account for around 70% of lymphocytes present. Here the majority of lymphocytes are in fact B cells.

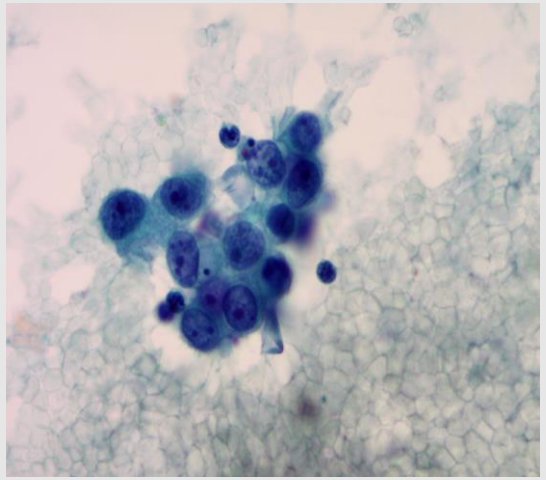
B Cell Clonality Testing

- Due to the increase of B lymphocytes the sample was sent to Kings for B cell clonality testing.
- DNA tested from the pleural fluid sample.
- Clonal IGH and IGK gene arrangements detected.
- Pleural involvement by a low grade lymphoma confirmed.
- Referred to Haematology.

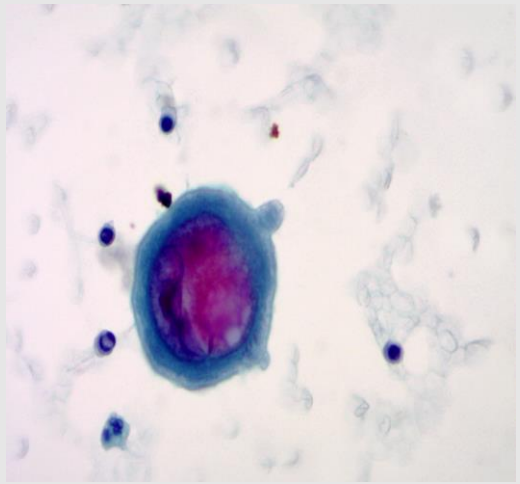
Recurrent Effusion Noted, Resulting in Pleural Fluid Drainage No.2 -115ml cloudy yellow fluid with clots.

Atypical mesothelial cells.

- PAP

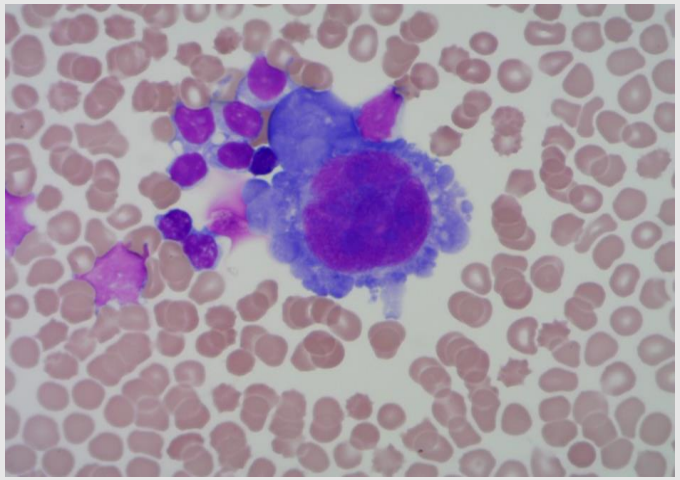


Hypercellular clusters with fine chromatin.



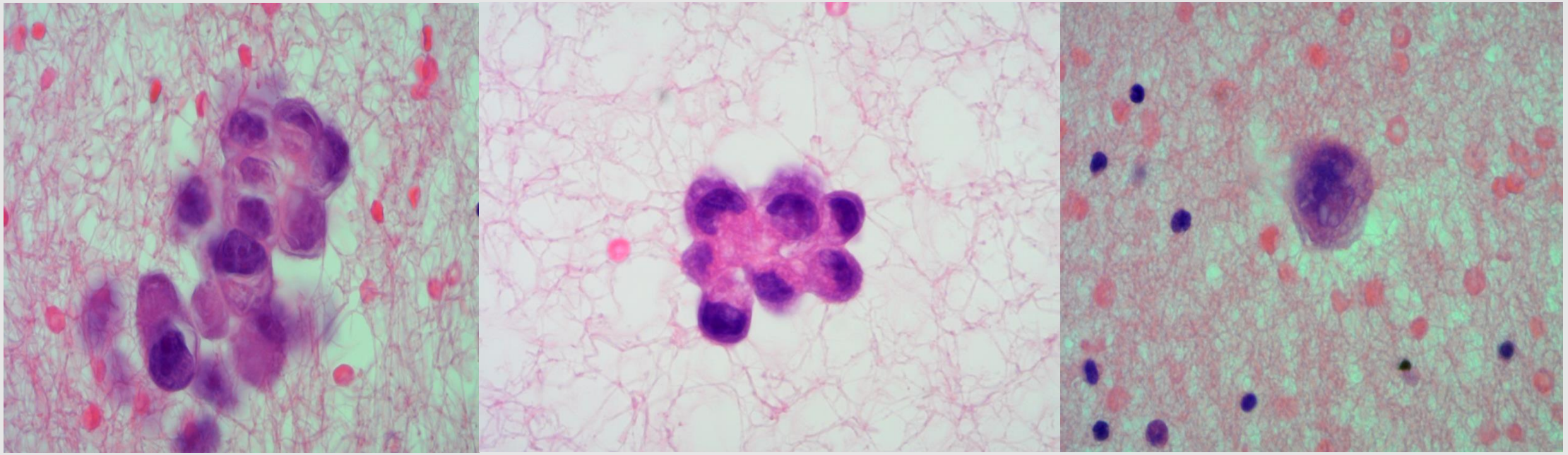
Single atypical cell with two tone cytoplasm and prominent nucleoli.

- MGG



Peripheral cytoplasmic blebs around the cell border.

Pleural Fluid No.2 H+E



Clusters of atypical cells – prominent nucleoli, pleomorphic nuclei and abundant cytoplasm.

Single multinucleated atypical cells.

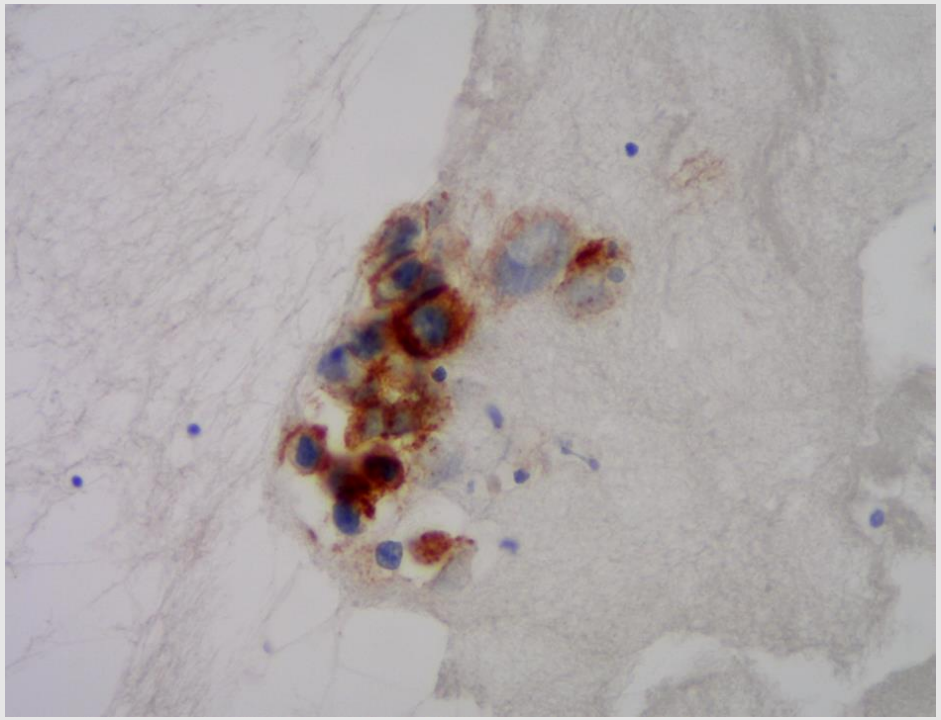
Immunohistochemistry markers –

Mesothelioma Vs Adenocarcinoma

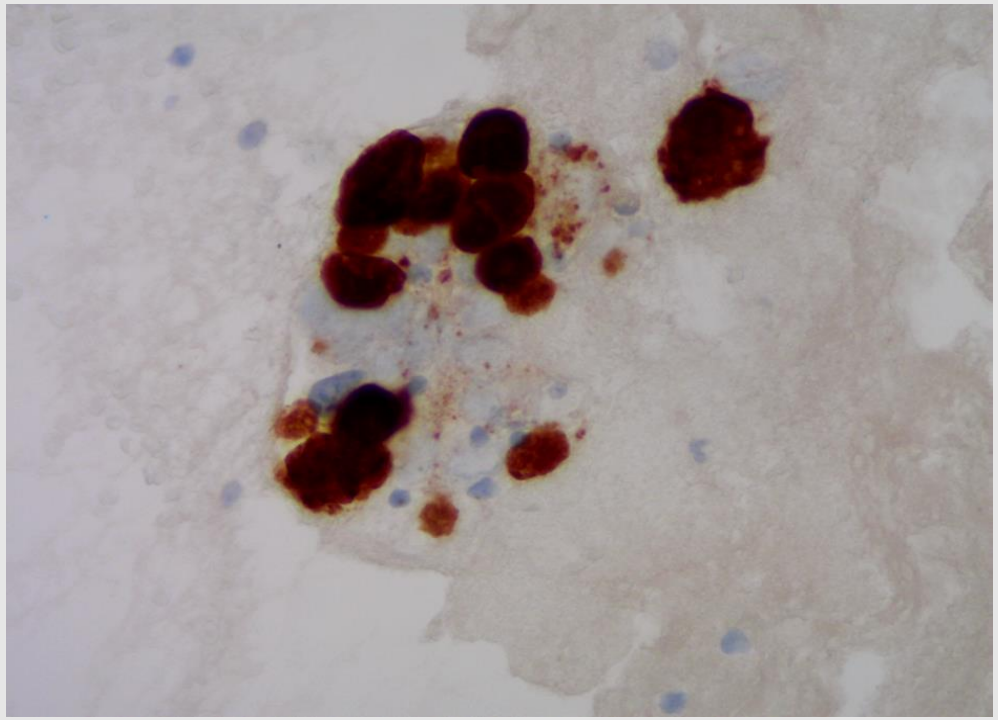
Immunohistochemistry Stain	Mesothelioma	Adenocarcinoma	Staining pattern in positive cells
Calretinin	Positive	Negative	Cytoplasmic and nuclear
D2-40	Positive	Negative	Membranous
WT-1	Positive	Negative	Nuclear
CK5/6	Positive	Negative	Cytoplasmic
BerEp4	Negative (in the majority of cases)	Positive	Membranous
MOC31	Negative	Positive	Membranous
CEA (monoclonal)	Negative	Positive	Cytoplasmic with membrane enhancement

Pleural Fluid No.2- Immunohistochemistry

- BerEp4+



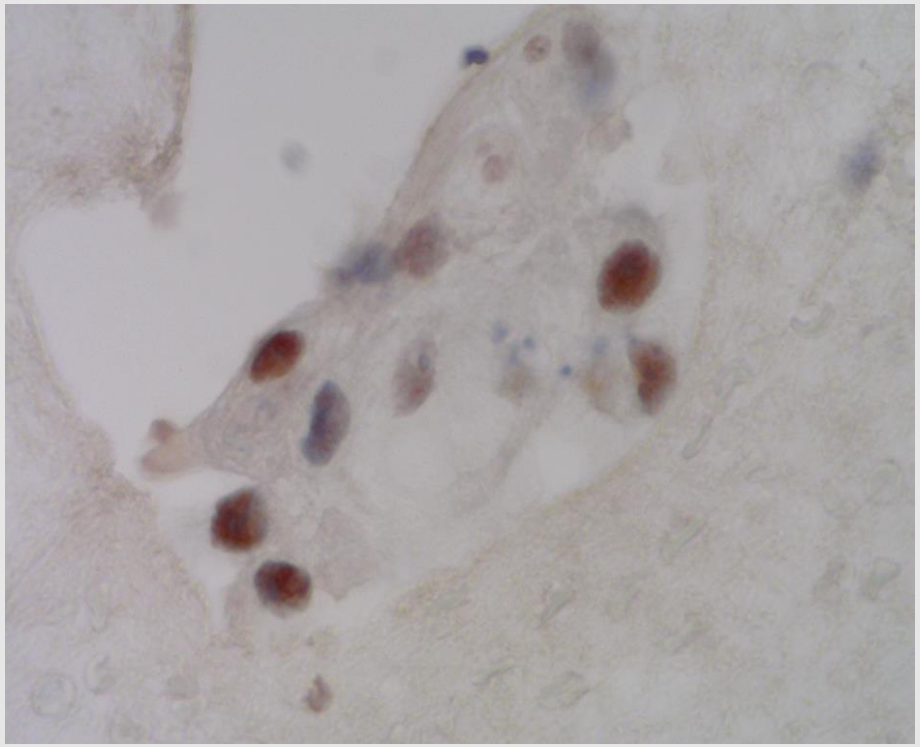
- Calretinin+



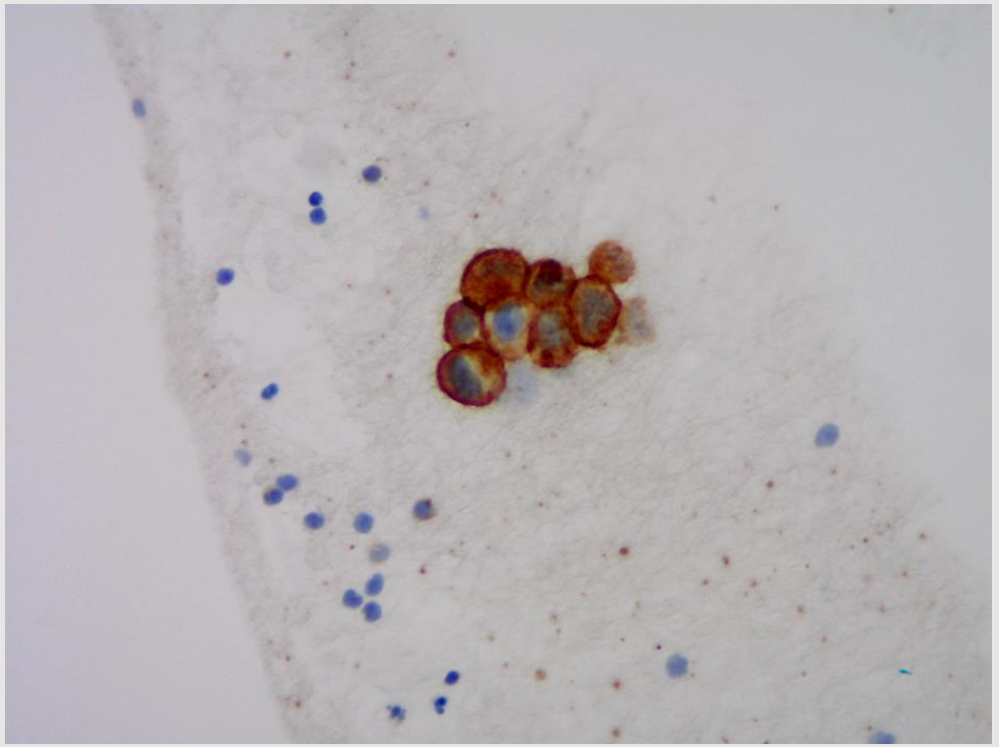
Positive in a low percentage (15%) of mesothelioma cases.

Pleural Fluid No.2- Immunohistochemistry

- WT-1 +

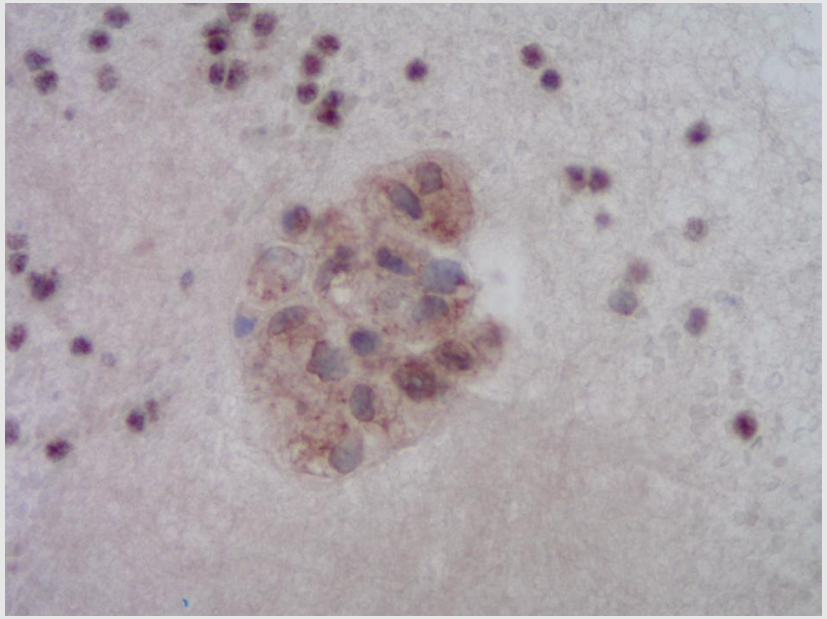


- EMA membranous staining



Pleural Fluid No.2- Immunohistochemistry

- BAP1 Loss supports mesothelioma diagnosis – Pleural mass biopsy recommended due to scanty nature of cells. Loss of BAP1 staining is seen in 55-80% of malignant mesothelioma.

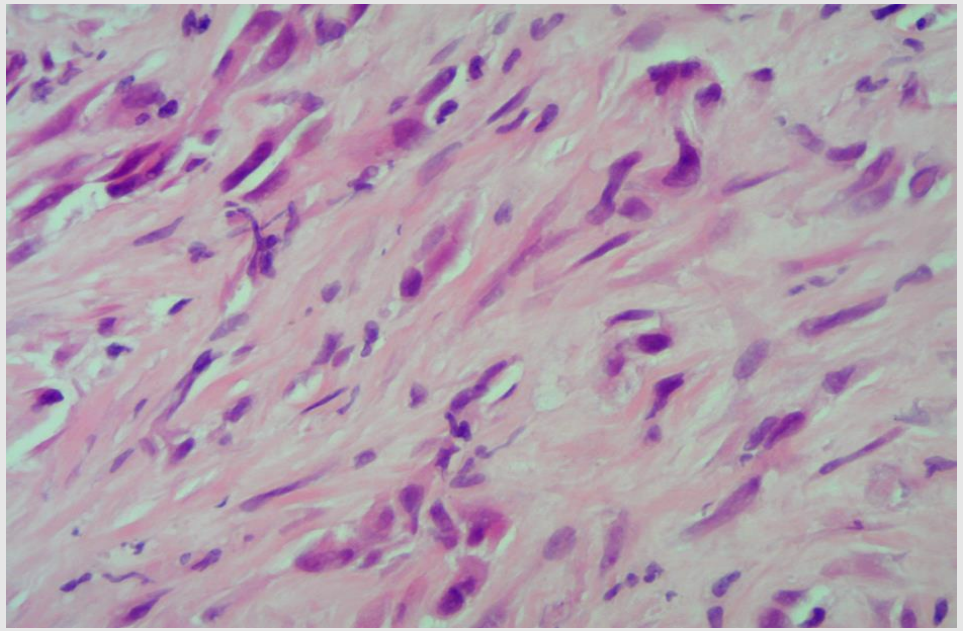


Lung and Haematology MDM Discussion

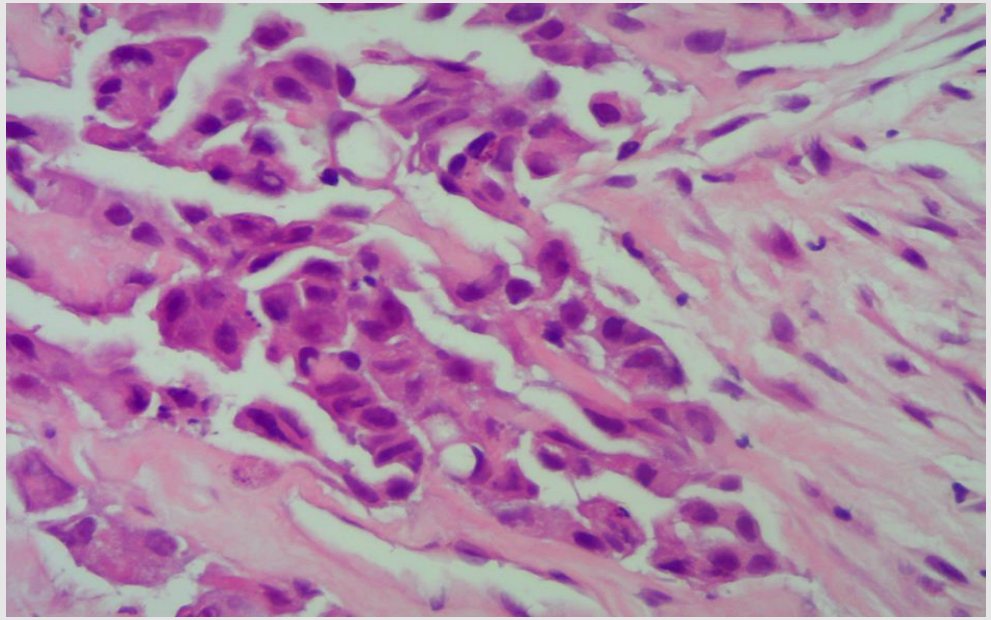
- Noted previous exposure to asbestos
- Likely mesothelioma infiltrating chest wall
- PET radiologically in keeping with pleural based malignancy
- Incidental low grade B-cell lymphoma

Proceed to Pleural Biopsy

- H+E – cores are infiltrated by atypical spindle cells.

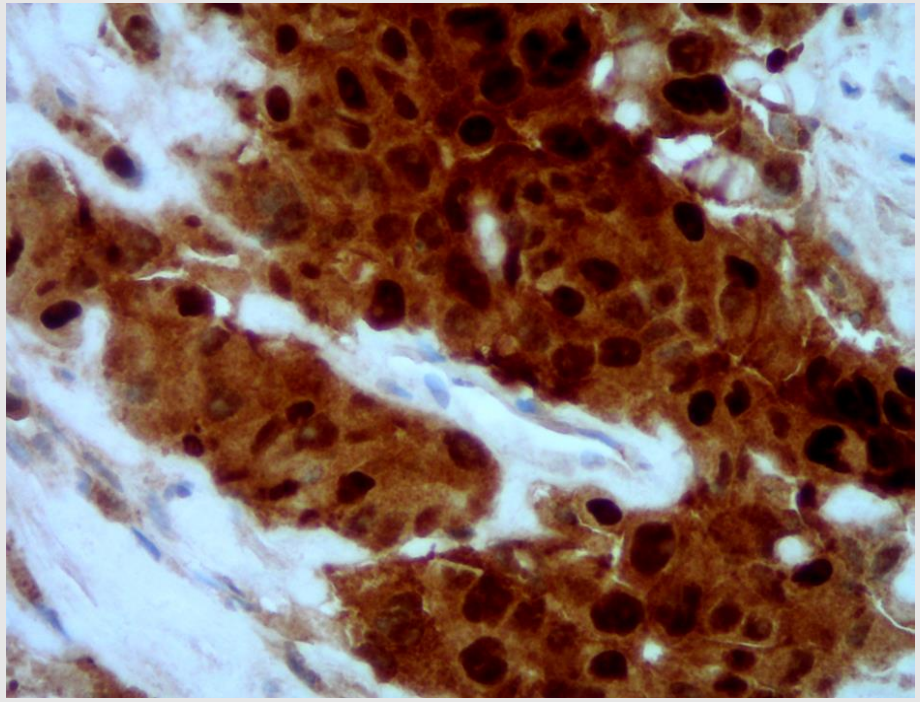


- H+E – Focally epithelioid cells with nuclear atypia and focal necrosis.

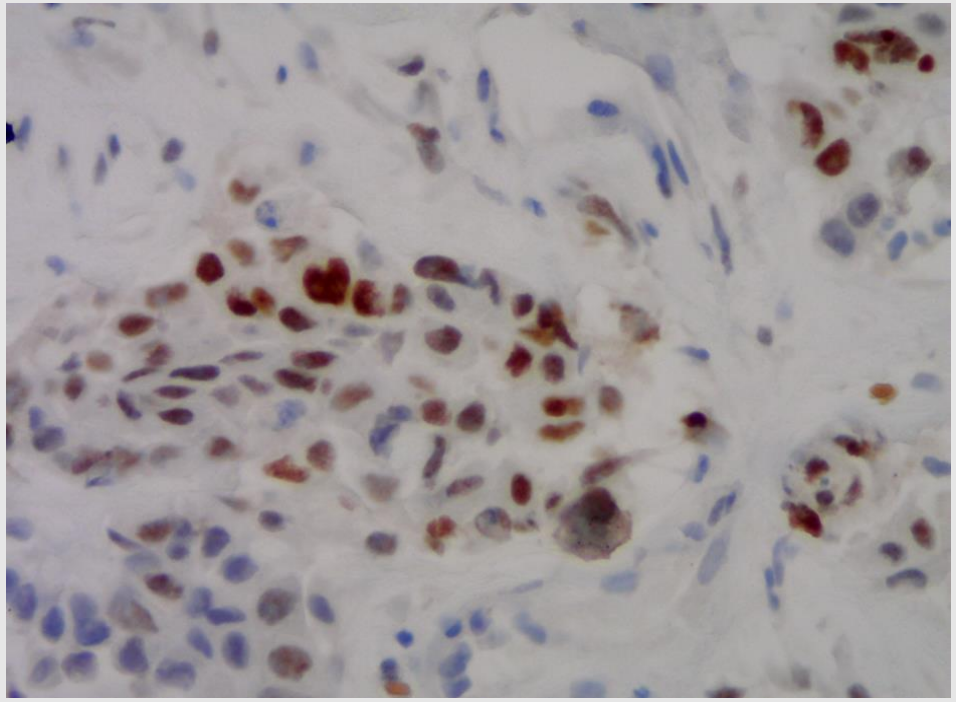


Pleural Biopsy – Immunohistochemistry identifying atypical mesothelial cells.

- Calretinin +

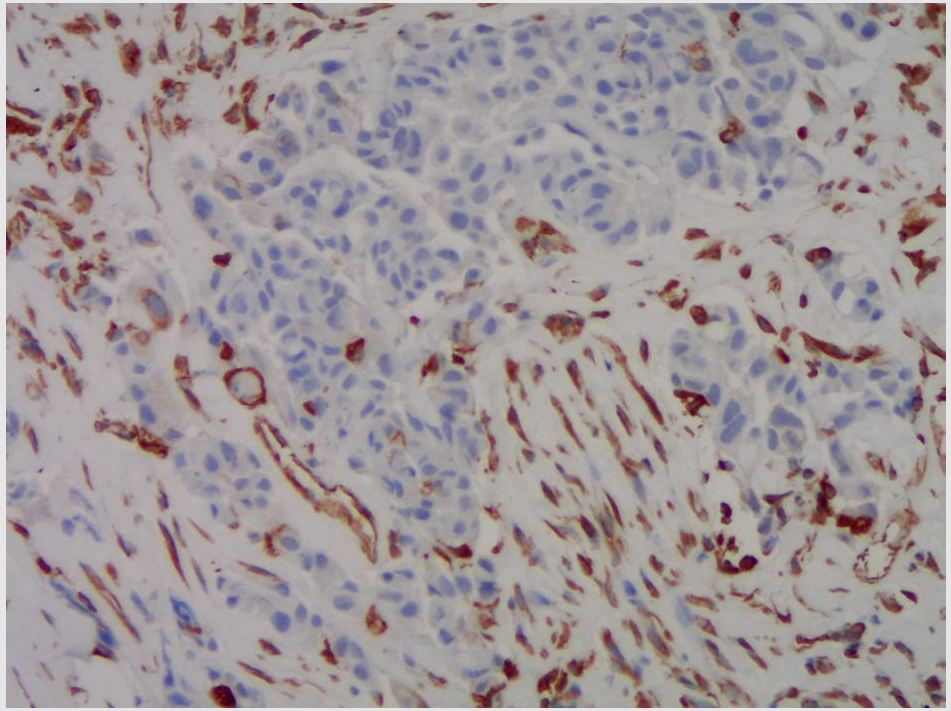


- WT-1+



Pleural Biopsy - Immunohistochemistry

- Vimentin – positive in spindle cells



Pleural Biopsy Conclusion

- Mesothelioma – mixed components of atypical spindle cells and atypical epithelioid cells.

- Supports the 2nd pleural fluid diagnosis.

Summary

- Lymphoma diagnosis was incidental and not considered significant.
- Low grade lymphomas are very difficult to diagnose on Cytology and flow cytometry / PCR testing is recommended.
- The atypical mesothelial cells from the 2nd sample were positive for BerEp4 and Calretinin – this would represent the epithelioid component.
- 80% of mesotheliomas are asbestos related – this patient had previous exposure.
- Numerous cases in which malignant mesothelioma and associated lymphoproliferative lesions have been reported.
- Asbestos may induce important changes in the immune system and immune impairment is recognized as a favouring factor in the development of lymphomas.

References

- 1. International Reporting System for Serous Fluid Reporting
- 2.https://www.pathologyoutlines.com/topic/pleuramesovsadeno.html
- 3. Claudio BIANCHI and Tommaso BIANCHI. Non-Hodgkin Lymphoma and Pleural Mesothelioma in a Person Exposed to Asbestos. Turkish Journal of Pathology. 2018, Vol 34, Num, 2(Pages: 190-193).