Effusion cytology

- Review clinical history and additional fluid findings
- Algorithmic approach
- Practical tips
- Review illustrative cases
- Present model answer
Clinical history & other findings

- Large unilateral effusions in elderly – malignant until proven otherwise
- Malignant effusions – may show reactive features only. Ask for repeat, at least 50ml. (P124)
- If persistent, have a low threshold for performing immunocytochemistry
- Transudate (<3g/dl), systemic problem e.g. cardiac, liver, renal failure
- Exudate (>3g/dl), inflammatory V neoplastic
Algorithmic approach

- Low power view (?hypercellular ?other abnormal elements i.e. mucin)
- If hypercellular, is it mesothelial or is there a second population?
- Identify nuclear atypia if mesothelial – can be subtle
- Assess 2nd population if present, is it cohesive – epithelial or discohesive- lymphoid or melanocytic?
- Formulate immunopanel (calretinin, EMA, desmin, Ber-EP4 & MOC31, CD45, melan-A, S100) with more specific panels to assess for metastatic disease
Practical tips

● If suspicious of an atypical population, perform immunostains

● Large papillary groups (>50 cells) in pleural fluid should always raise concern of a neoplastic process

● Necrosis & apoptosis abnormal, look for viable atypical cells

● Beware of hypercellular single cell appearance of mesothelioma

● Always perform calretinin, EMA & desmin to assess for an atypical mesothelial proliferation with follow up biopsy to confirm invasion
Practical tips

- If the atypical population is wildly pleomorphic, unlikely to be mesothelioma, think poorly differentiated carcinoma, high grade lymphoma, melanoma, sarcoma

- Beware of settling for a diagnosis of reactive lymphocytic effusion without ruling out a lymphoproliferative disorder (CD3, CD5, CD20, MIB-1). Correlate with flow cytometry results
Neutrophilic Effusion

- Empyema
- Infarction
- Fistula (broncho/oesophageal) – beware squamous cell carcinoma
- SBP
- Bowel perforation
Lymphocytic Effusion

- Chronic pleurisy
- TB
- Viral pneumonia
- Malignancy (haematological/solid organ)
Eosinophilic Effusion

- Recurrent pleural intervention
- Allergy
- Autoimmune disorders
- Pneumonia
- Pulmonary infarction
- Infection (parasitic/fungal/mycobacterial)
- Haemo/pneumothorax
- Neoplasms
Differential for 2nd benign population

- Endosalpingiosis/endometriosis
- Fallopian tube epithelium
- Ruptured cysts
Metastatic melanoma
Model Answer

- MICROSCOPY: Moderately cellular sample with dispersed atypical single cells displaying anisonucleosis with rare multinucleate forms. There is moderate amounts of cytoplasm containing coarse pigment.

- DIAGNOSIS: METASTATIC MALIGNANT MELANOMA

- COMMENT:
  - Make a clot preparation and confirm diagnosis with immunostaining (melan-A, S100, SOX10)
  - Perform BRAF V600E IHC:
    - If positive eligible for combined vemurafenib (TKI) and MEK inhibitor
    - If negative proceed to NGS to assess for other targetable BRAF mutations
CLL/SLL

CD3

CD5

CD20

CD23
DLBCL

CD79a

MiB1
Plasma cell neoplasm

CD138
Metastatic small cell lung carcinoma
Metastatic ovarian carcinoma
Metastatic lung adenocarcinoma
Metastatic breast carcinoma
Metastatic pleomorphic rhabdomyosarcoma

Desmin

Thigh Bx
Metastatic urothelial carcinoma

CK7

CK20
Atypical mesothelial proliferation

Calretinin

EMA

Desmin
Empyema
Sarcina ventriculi – oesophageal perforation
Eosinophilic effusion
Pseuomyxoma peritonei
Vacuolated cells