Cytology of Lymph Nodes

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Indications
- Lymph node enlargement
- Suspect metastasis
- Normal sized lymph nodes are Normal – Do NOT aspirate

Causes of lymphadenopathy
- Hyperplasia/ Reactive (Antigenic stimulation)
- Lymphoma
- Lymphadenitis
- Metastatic neoplasia

Lymphadenopathy- CELLS
- Hyperplasia/ Reactive
- Lymphoma
- Lymphadenitis
- Metastatic neoplasia
- PLASMA CELLS
- LYMPHOBLASTS
- NEUTROPHILS
- GROUPS OF NEOPLASTIC CELLS
Reactive vs. Lymphoma

- Small lymphocytes #1 cell
- Lymphoblasts < 20%
- Numerous plasma cells
- Other cells present

- Lymphoblasts #1 cell
- Lymphocytes <50% of nucleated cells
- Few to no plasma cells
- Few or no other cells

In most cases you do NOT find the cause for the reactive node in the cytologic specimen. The “antigen” stimulating the node is outside the node but in its field of drainage.

Types of cells seen in lymph nodes

- Small lymphocytes
- Intermediate-sized lymphocytes
- Lymphoblasts
- Plasma cells
- Macrophages
- Eosinophils
- Mast cells
- Abnormal cells (metastatic neoplastic cells)
Indications for FNA of lymph nodes

- Lymph node enlargement
- That was easy
- DO NOT ASPIRATE NORMAL SIZE LYMPH NODES!!!!!
  - Lymphoma search
  - Metastatic neoplasm search

Normal lymph nodes:

Lymphoblasts:
- < 20% - 3 in this photo
- Larger than a neutrophil
- Often up to 4x size of a RBC
- Chromatin less dark
- Nucleoli often visible
- More cytoplasm (blue)

Normal lymph nodes:
Lymphoblasts:
- -- < 20% -- 33 in this photo
- -- Larger than a RBC
- -- Chromatin less dark
- -- Nucleoli often visible
- -- More cytoplasm (blue)

LYMPHOMA

LYMPHOSARCOMA

- >50% Immature (large) lymphoblasts high N:C ratios
- Many cases are 100% blasts = easy diagnosis
- Large nuclei, +/- prominent nucleoli, basophilic cytoplasm

LYMPHOMA

- May have numerous lymphoglandular bodies (cytoplasmic remnants)
- Presence of mitotic figures variable
- Key is lymphoblasts inc., lymphocytes dec. and no or rare plasma cell
- Each photo below has one mature lymphocyte surrounded by lymphoblasts
Reactive lymph node. Note plasma cells with deep blue cytoplasm and prominent Golgi. Neutrophil and Mott cell (arrow).

**REACTIVE LYMPH NODES:**

- Enlarged lymph node due to proliferation of lymphoid cells
- Predominately small lymphocytes
- **Plasma cells** increased to 5-20% KEY to this diagnosis
- Medium and large lymphocytes inc. but lymphoblasts still < 20%
- Macrophages, neutrophils, mast cells variable
- Common in lymph nodes draining GI

Lymph node. What do you see? What is your interpretation?

**LYMPHADENDITIS:**

- Purulent – increased neutrophils, low numbers to 100% of the nucleated cells; degenerative features depends if bacteria are in the node.
- Other cases may have increased eosinophils
- Granulomatous – inc. macrophages
- Specific agents may be identified in these nodes

Plasma cells (small arrows), lymphoblast (large arrow), small lymphocytes (small arrowhead), and Mott cell (large arrowhead). Diagnosis = Reactive lymph node
Be able to recognize same events at low mag; saves time and see more areas

**METASTASIS TO LYMPH NODE(S):**
- Presence of cells **not normally found** in lymph nodes
- Metastasis of any malignant tumor is a possibility
- Epithelial cells – Easy to confuse with macrophages or accidental aspiration of submandibular salivary gland
- Cytology is as accurate as histopathology in predicting presence or absence of metastasis

Lymph node with metastatic carcinoma. Note clusters of large epithelial cells (large arrows) that you may confuse with macrophages, small lymphocytes (large arrowheads), rbcs and macrophage (small arrowhead) to left.

Carcinoma cells (large arrows) are large and have no cytoplasmic vacuoles while the macrophages (small arrowhead) have cytoplasmic vacuoles due to cytophagic activity characteristic of macrophages.

Cat, enlarged lymph node draining leg mass. Diagnosis? Or...what do you see? Thoughts?
Missed node, entered mass?
Regardless = giant cell, fibrosarcoma vs injection site sarcoma

“TRICKS”
- Missed lymph node
- Fat
- Salivary gland
- Understained slides!!!
- Look for etiologies in reactive nodes, but uncommon to find them

Aspirate from a normal salivary gland, aspirated by mistake when attempting to aspirate the mandibular lymph node. Note the large cells, adhered together, abundant foamy cytoplasm and NO lymphocytes.

Lipoma vs “missed” lymph node/tissue
Clear, globs = MISS

Salivary epithelial cells
Hematoidin crystal = rbc break down pigment, indicates prior hemorrhage
Large finely vacuolated cells = salivary cells
Example of lymph node aspirate that is too thick and staining poorly (lightly). Note that the nuclei are staining light blue, and the nucleoli are staining darker blue. How do you fix this?

Dip slide twice more in blue solution (jar number 3), re-examine and repeat in small increments until cells are stained well. Also examine cells in thinner areas, they may be stained fine. DO NOT DX these slides!

The cells look immature and may be mistaken for lymphoma.

Lymph node aspirate from a dog with blastomycosis.

Understained smears

Understained slide on left; same smear on right but dipped a few more times (becareful) in the polychrome (blue) stain. The cells are now clearly visible.

Lymph node aspirate from a cat with cryptococcosis.

Cryptococcal organisms (arrows) are variable in size and surrounded by a large clear mucopolysaccharide capsule. India ink preparation.

Summary

Reactive lymph node vs Lymphoma

>plasma cells vs > lymphoblasts

Cytology is as good as excisional biopsy and histopathology for metastatic neoplasms

Missed the lymph node – fat; salivary gland

Understained hypercellular samples!!!

Look for etiologies but......reactive without cause is most common
Cytology specimen

- KEEP AWAY FROM FORMALIN
- Air dry specimens
- Don’t even put cytology slides in same box that may contain jars with tissues in formalin
- Formalin destroys cytologic features

Cytological Diagnosis of those “tricky ones”:

- Don’t hesitate to ask for a second opinion...

  Mmmm..., Why don’t you ask those lab guys?