Pathology of the Hematopoietic System - Lab

http://people.upei.ca/smartinson/
Case #1

Signalment: 96 kg gilt

History: Pig from minimal disease herd. Sudden death
Case #1

External postmortem exam: Red discoloration of the skin (limbs, rump, snout and ears)
Case #1

Gross Description
Gross Description
The lymph nodes are enlarged (up to 3 x the normal size), soft to firm and mottled red and tan (light brown and dark brown in the fixed specimen) on section.

What is the general term for lymph node enlargement?
Lymphadenopathy (or lymphadenomegaly)
Case #1

Gross Description
The lymph nodes are enlarged (up to 3 x the normal size), soft to firm and mottled red and tan (light brown and dark brown in the fixed specimen).

What are the differentials for lymphadenopathy?
### Case #1

#### Differentials

**Enlarged lymph nodes**

<table>
<thead>
<tr>
<th>Condition</th>
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<tbody>
<tr>
<td>Lymphadenitis</td>
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<tr>
<td>Lymphoid hyperplasia</td>
</tr>
<tr>
<td>Primary neoplasia (lymphoma)</td>
</tr>
<tr>
<td>Secondary neoplasia</td>
</tr>
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<td>Hyperplasia of the monocyte/macrophage system</td>
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[Image of tissue samples]
Case #1

What is (are) your top differentials in this case?

I would be most suspicious of lymphadenitis because of the red color (hyperemia). Lymphoid hyperplasia would be a good differential (and may occur concurrently). Neoplasia (even lymphoma) would not typically be restricted to the LNN.

Need histology

Differentials
Enlarged lymph nodes

Lymphadenitis
Lymphoid hyperplasia
Primary neoplasia (lymphoma)
Secondary neoplasia
Hyperplasia of the monocyte/macrophage system
Differentials for enlarged lymph nodes

- Lymphadenitis
- Lymphoid hyperplasia
- Primary neoplasia (lymphoma)
- Secondary neoplasia
- Hyperplasia of the monocyte/macrophage system

How about a possible etiology?
- In this case with the reddening of the skin:
  - Bacterial sepsis
  - Viral disease
    - Porcine Circovirus type 2

What would you submit to a lab if you did this as a field postmortem?
- Formalin fixed tissues for histology (make sure you include LNN!)
- Fresh LNN for bacteriologic culture and virology
Signalment: 1.5 year old, laying hen

History: The bird has been down for a day and has not been eating.
Case #2

Spleen

Liver

Bone
Case #2

Gross Description – Spleen
Case #2

Gross Description – Spleen

The spleen is markedly enlarged and misshapen with coalescent yellow-tan nodules scattered throughout.
Case #2

Gross Description

These extend into the parenchyma on cut surface replacing most of the normal architecture.
Case #2

Differential Diagnosis
Case #2

Differential Diagnosis

Neoplasia (lymphoma)
Abscess
Granuloma (gran. splenitis)

Need histology!
Histologic Description
Discrete eosinophilic nodules are present within the spleen.
The nodules are composed of central regions of necrosis surrounded by a thick cellular rim.
Case #2

Histologic Description

The nodules are composed of central regions of necrosis surrounded by a thick cellular rim.
Histologic Description

The cells consist primarily of **epithelioid macrophages**. Admixed with these cells are occasional lymphocytes, plasma cells and fibroblasts and **multinucleated giant cells**.
Case #2

Morphologic Diagnosis
Morphologic Diagnosis

Splenitis, granulomatous, multifocal to coalescing, chronic, marked
Case #2

Acid-fast stain

Etiology and Disease Name
Etiology and Disease Name

Etiology: *Mycobacterium avium*

Disease Name: Avian tuberculosis
Avian Tuberculosis

- *Mycobacterium avium* complex (serotypes 1, 2 and 3)
- Can infect an extensive range of species
- In birds – usually chickens, captive wild birds and turkeys
- Free range farming systems and keeping breeders for several years are conducive to the spread of this disease.
- Main sources of infection are infected individuals and the contaminated environment (water and soil)
- Affects multiple organs

Also had granulomatous osteomyelitis and hepatitis
**Signalment:** 1 yr old intact female DLH cat

**History:**
- Found as a stray kitten
- Never vaccinated
- Respiratory difficulty, lethargy, and unable to rise
Case # 3

Gross Description
Case # 3

Gross Description

The mediastinum and thymus are infiltrated and replaced by a large (10 x 5 x 4 cm) firm irregular mass. The mass is homogenous and tan on section. It extends to involves the pericardial sac and displaces the lung and heart caudally.

Two Differentials?
Case # 3

Gross Description
The mediastinum and thymus are infiltrated and replaced by a large (10 x 5 x 4 cm) firm irregular mass. The mass is homogenous and tan on section. It extends to involves the pericardial sac and displaces the lung and heart caudally.

Two Differentials?
1. Mediastinal (thymic) lymphoma
2. Thymoma

How do these two diseases differ?
Thymic Lymphoma

Neoplastic proliferation of T-lymphocytes
Often younger animals (cats, calves, and dogs)
Malignant behaviour

Thymoma

Neoplastic proliferation of Epithelial cells
Less common – dogs, sheep, goats
Slow growing, encapsulated
Case # 3

Could the vaccination history be pertinent in this case?

Yes! The cat is unvaccinated and young with mediastinal lymphoma → this is likely Feline leukemia virus-associated lymphoma
Signalment: 15 yr old, MC, Border Collie

History: Weight loss noted by owner

Physical exam: Hepatic masses noted on abd. palpation

Ultrasound: Splenic and liver masses detected
Case # 4

Gross Description
Case # 4

Gross Description

7 - 8 smooth nodular dark red masses are present randomly within the spleen. They range in size from 0.5 to 3.0 cm in diameter.
Case # 4

Differentials
Hemangiosarcoma
Splenic nodular hyperplasia
Lymphoma?
Metastatic neoplasia?
**Case # 4**

**Differentials**
- Hemangiosarcoma
- Splenic nodular hyperplasia
- Lymphoma?
- Metastatic neoplasia?

**Splenic hemangioma and hematoma would be a single mass**

**Splenic infarcts may be multiple, but aren’t quite so nodular**

**How would achieve a definitive diagnosis?**

**Histology**
The masses are composed of irregular branching vascular spaces lined by single to multiple layers of neoplastic spindle cells with marked anisocytosis and anisokaryosis.
Morphologic diagnosis
Morphologic diagnosis
Hemangiosarcoma, multifocal, spleen
What are some other commonly affected sites?
Case # 4

What are some possible sequellae?

- Possible sequelae: Splenic rupture and hemoabdomen, peritoneal seeding/metastasis, Rupture of the right auricle with hemopericardium and cardiac tamponade. Sudden collapse is a common presentation....
Signalment: 5 year old Holstein cow

History: Bilateral exophthalmia, hind limb paresis

Physical exam:
- Enlarged peripheral LNN
- Rectal palpation: Enlarged firm uterus
Case # 5

Gross Description
The heart is distorted by multifocal to coalescing, tan, firm, ill defined masses.
Gross Description

The masses are often present within the epicardium and occasionally extend through the myocardium to the endocardium. Necrosis is present in the larger masses.
Case # 5

Gross Description
Case # 5

Gross Description

Similar tan firm tissue surrounds the dura of the spinal cord filling the spinal canal (forming an extradural mass)
Possible Diagnosis?

- Lymphoma would be the top differential
- Other forms of metastatic neoplasia – eg Uterine carcinoma are possible...

Histology can confirm the diagnosis
Sheets of neoplastic round cells comprise the mass. They have scant cytoplasm and medium sized central round nuclei with granular chromatin and occasional distinct nucleoli. Mitoses are noted.
Probable Etiology and Disease Name?
Probable Etiology and Disease Name?

- Bovine leukosis virus (retrovirus); Enzootic bovine lymphoma

Methods of Transmission?

Probable Etiology?

- Bovine leukemia virus (retrovirus); Enzootic bovine lymphoma

Methods of Transmission?

- Transfer of virus infected lymphocytes – needles, arthropods, rectal sleeves, breeding
What are the 4 most common sites

Heart

Uterus

Spinal canal

Abomasum

Case # 5
Signalment: 7 year old ewe

History: Noted by owner to be very thin and missing a few incisors. Opted to cull from herd and donated to AVC.

Physical exam: NSF other than ↓ BCS
Case # 6

Postmortem findings: Fibrous adhesions between the parietal and visceral pleura
Case # 6

Postmortem findings: Multifocal abscesses in the pleural adhesions, mediastinum and liver
Case # 6

Abnormal Lymph nodes
Case # 6

Gross Description

The lymph nodes are moderately to markedly enlarged (3-4 cm in diameter) and firm. Replacing the normal architecture are discrete round nodules that are composed of amorphous to concentrically laminated friable dry tan material surrounded by a thick fibrous capsule.
Case # 6

Morphologic Diagnosis:
Morphologic Diagnosis:
Lymphadenitis, suppurative (or granulomatous),
diffuse, chronic, severe (= lymph node abscesses)
**Case # 6**

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<th>Etiology and Disease Name:</th>
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<td>Corynebacterium pseudotuberculosis; Caseous Lymphadenitis</td>
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What would you submit to a lab if you did this as a field postmortem?

- Formalin fixed tissues for histology (make sure you include LNN!)
- Fresh LNN or a swab for bacteriologic culture
Case # 6

Typical pathogenesis

• Entry of *Corynmbacterium pseudotuberculosis* through shear wounds/ mucosal wounds, or inhaled

• Drainage to regional lymph nodes

• Lymphadenitis +/- systemic spread

• Progressive suppurative inflammation, caseous necrosis and fibrosis

• Characteristic concentric “onion skin” laminations
Questions?