Case # 12-0503
(SEVPAC Case 66)

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Signalment

Adult, castrated, Maine Coon cat
“Bunny”

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History

- Urinary tract infection diagnosed recently at the rDVM
  - Hematocrit 32%
  - Clavamox started
- No improvement of clinical signs and acute progression to recumbency and minimally responsive → brought to VMRCVM
  - Hematocrit 21%
  - Increased ALT
  - Decreased albumin
  - Fluid support overnight
  - Temperature and heart rate decreased followed by respiratory arrest the next morning
Histopathology - Spleen

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Histopathology - Spleen

200 µm
Histopath – Liver and LN

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Histopath - Intestines
Histopath - Lungs

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Histopath – Special Stains

PAS

Acid-Fast

Gram

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Morphologic Diagnoses

1. Lymph nodes, Peyer’s patches, and spleen:
   Marked, multifocal to coalescing lymphoid necrosis and minimal granulomatous inflammation

2. Liver:
   Moderate, acute, multifocal, necrosuppurative hepatitis

3. Lungs:
   Mild, acute, multifocal necrosuppurative pneumonia
Possible Etiologies

1. Tularemia (*Francisella tularensis*)
2. Pseudotuberculosis (*Yersinia pseudotuberculosis*)
3. Plague (*Yersinia pestis*)
4. Toxoplasmosis (*Toxoplasma gondii*)
5. Histoplasmosis (*Histoplasma capsulatum*)

Gross differentials also included:
- Feline Infectious Peritonitis
- Lymphoma
Additional Testing

• Culture of liver and spleen (chocolate agar):
  – Heavy contamination
• PCR for Types A and B *Francisella tularensis*:
  – Positive for Type A
• Sequencing of the PCR product = 92% homology
Tularemia

**F. tularensis (Type A)**

- Facultative intracellular coccobacillus
- Gram-negative
- Capsulated
- Category A select agent
- Zoonotic
- Relatively wide host range
  - Mostly lagomorphs and rodents
  - Sheep and cats are the most common domestic species affected
- Transmission
  - Tick vectors (*Dermacentor andersoni, D. variabilis, D. occidentalis, and Amblyomma americanum*)
  - Eating infected rabbits or rodents
  - Inhalation
  - Exceedingly low infectious dose (10 organisms)
Most common in the south central United States, the Pacific Northwest, and parts of Massachusetts, including Martha’s Vineyard.
Tularemia

Enters phagocytic cells (macrophages) via phagocytosis, then alters bactericidal processes

- Resides in membrane-bound compartment that fails to fuse with lysosomes
- Prevents induction of respiratory burst
- Alters phagosome maturation
- Alters host cell trafficking by escaping from phagosome and entering host cell cytosol where it rapidly replicates

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Tularemia

Virulence factors

1. *Capsule* – mediates resistance to various stresses

2. *LPS* – elicits relatively low immunobiological activity compared to other Gram (-) bacteria

3. *Type IV pili* – important for association with host cell surfaces and protein secretion

4. *FPI (Francisella pathogenecity island)* – 17 open reading frames that confer various factors involved in pathogenesis.
What I Learned:

• **Be aware of your hospital’s protocol for dealing with select agents!!!**
• Know who to contact at the local health department for reportable diseases and which diseases should be reported
• *Francisella tularensis* in a cat is not reportable to the CDC’s select agent program, but identification of a select agent in a specimen taken from the cat is reportable (whether or not the material is subsequently destroyed).
  – Identification of a select agent must be immediately reported to the CDC and Form 4A must be completed and submitted within 7 calendar days after identification: [http://www.selectagents.gov/CDForm.html](http://www.selectagents.gov/CDForm.html)
Tularemia

Recent publications:


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Thank You!

- Thomas Inzana Laboratory
  - PCR
  - Sequencing
- VMRCVM Clinical Microbiology Lab
  - Suzanne Charles
- VMRCVM Histopathology Lab
  - Jennifer Rudd
  - Barbara Wheeler
- Page Borderline at Montgomery County Department of Health
- Dr. Bill Pierson, VMRCVM Hospital Director
- Charlotte Waggoner, Biosafety Officer at Virginia Tech
- Senior Pathologist (Geoffrey Saunders) and Clinicians (Lauren Aderholdt, Thomas Blaszak)