Pathology of the Lungs of Domestic Animals

4. Airway Diseases

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Case 34. Dog, age 4 weeks; 2 affected; nasal discharge, dyspnea

- Morphologic diagnosis
- Specific cause
Case 34. Dog, age 4 weeks; 2 affected; nasal discharge, dyspnea

Cause?

1 - Adenovirus

2 - Herpesvirus

3 - Influenza virus

4 - Paramyxovirus (Morbillivirus)
Case 34. Dog, age 4 weeks; 2 affected; nasal discharge, dyspnea

Cause?

1 - Adenovirus 90%
2 - Herpesvirus 6%
3 - Influenza virus 0%
4 - Paramyxovirus (Morbillivirus) 4%
Case 34. Dog, age 4 weeks; 2 affected; nasal discharge, dyspnea

• **Morphologic diagnosis**
  Severe acute diffuse necrotizing bronchiolitis, with intra-epithelial basophilic intranuclear inclusion bodies

• **Specific cause**
  Canine adenovirus 2
Case 34

- Old English Sheepdog, 4 weeks old, litter of 7.
- Parvo vaccine at 2 weeks old, parvo distemper vaccine at 4 weeks of age (3 days ago).
- Kennel, with nose-to-nose contact with other dogs, about 15 animals in the kennel building.
- Nasal discharge, difficulty breathing, progressed. No response to enrofloxacin.
- IHC strongly positive for adenovirus (pAb), within epithelial cells and debris in airways.
- Another puppy affected (different litter) with similar signs; PM: severe pleuritis, no adenovirus infection. necrotizing bronchiolitis with INIBs.
Canine distemper 17-028559-7 what is the best evidence for bronchiolar necrosis? (this photo shows only autolysis!)
Causes of airway injury & inflammation

- Immune-mediated
  - Eosinophilic bronchopneumopathy
  - Asthma & chronic bronchitis
- Viruses (± bronchointerstitial)
- ...

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Case 47. Normal dog euthanized after “surgical exercises” lab for vet students

• Morphologic diagnosis
• Possible cause
Case 47. Normal dog euthanized after “surgical exercises” lab for vet students

If this were a “real” surgical case,

1 - Frequent occurrence, and the animal is expected to fully recover

2 - Infrequent occurrence, and the animal is expected to fully recover

3 - Infrequent occurrence, with a risk of chronic disease
Case 47. Normal dog euthanized after “surgical exercises” lab for vet students

If this were a “real” surgical case,

1 - Frequent occurrence, and the animal is expected to fully recover
   - 27%

2 - Infrequent occurrence, and the animal is expected to fully recover
   - 32%

3 - Infrequent occurrence, with a risk of chronic disease
   - 41%
Case 47. Normal dog euthanized after “surgical exercises” lab for vet students

If this were a “real” surgical case,
a) Frequent occurrence, and the animal is expected to fully recover
b) Infrequent occurrence, and the animal is expected to fully recover
c) Infrequent occurrence, with a risk of chronic disease

What complications could be anticipated?
Case 47. Normal dog euthanized after “surgical exercises” lab for vet students

- Morphologic diagnosis
  Acute tracheal erosion/ulceration with neutrophilic tracheitis
  *(vs erosive and neutrophilic tracheitis?)*

- Possible cause
  Traumatic injury from the endotracheal tube
Key points:

• Traumatic and ischemic damage to tracheal epithelium
• The trachea’s capacity for healing

Sequelae:

• Prolonged cough
• Bacterial pneumonia
• Scarring and stenosis
Case 4. Cow, age 4 years, respiratory signs, no response to antibiotic

- Morphologic diagnosis
- Specific cause
Case 4. Cow, age 4 years, respiratory signs, no response to antibiotic

Cause

1 - Ascaris suum

2 - Muellerius capillaris

3 - Dictyocaulus viviparus

4 - Protostrongylus rufescens
Case 4. Cow, age 4 years, respiratory signs, no response to antibiotic

Cause

1 - Ascaris suum | 0%

2 - Muellerius capillaris | 2%

3 - Dictyocaulus viviparous | 95%

4 - Protostrongylus rufescens | 3%
Dictyocaulus viviparus

• **Prepatent disease**: L4 larval migration, no eggs or adults, no larvae in feces

• **Patent disease**: adults; aspirated eggs and L1 larvae; larvae in feces

• **Post-patent disease**: no larvae in feces, may be no adults in airways

• **Re-infection syndrome**: severe disease with re-infection of partially immune animals
Case 4. Cow, age 4 years, respiratory signs, no response to antibiotic

- Morphologic diagnosis
  Chronic necrotizing neutrophilic bronchiolitis with (pyo)granulomas, nematode larvae & embryonated eggs
- Specific cause
  Dictyocaulus viviparus
Key points:

• Dictyocaulus: important, even where the disease is infrequent

• Adults in caudal bronchi; pneumonia in caudal lobes

• Pre-patent, patent, post-patent and re-infection syndromes

• Parasite larvae—and the inflammatory response—harm airways and alveoli
Causes of airway injury & inflammation

• Immune-mediated
  – Eosinophilic bronchopneumopathy
  – Asthma & chronic bronchitis

• Viruses

• Parasites

• Toxicants
  – Inhaled gases, direct injury
  – Ingested, metabolized

• Traumatic

(± bronchointerstitial)