Zuku Review FlashNotes™

Avian Influenza (AI)

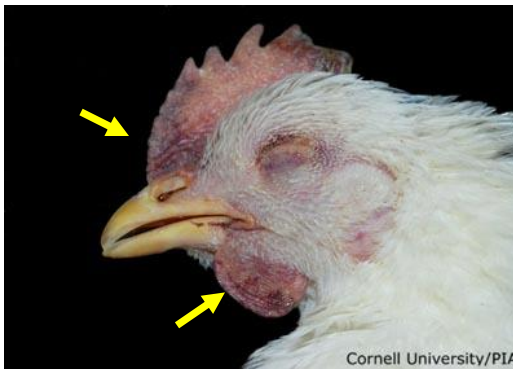
Extended version

Classic case: Chickens with sneezing, coughing, conjunctivitis, decreased egg production

Presentation:

Susceptible: Chickens, turkeys, pheasants, quail, ducks, geese, guinea fowl, free-flying species

Two Scenarios in POULTRY flocks:



HPAI comb & wattles: extensive ecchymotic lesions with multi-focal cyanosis, necrosis, & necrotic blepharitis

1) Low Pathogenic Avian Influenza (**LPAI**) virus

- **MAJORITY** of AI infections
- **Upper respiratory infection**
  - Sneezing, coughing, conjunctivitis
  - Ocular & nasal discharge
- Decreased egg production
- Minor health threat to people

2) Highly Pathogenic Avian Influenza (**HPAI**) virus: **FOWL PLAGUE**

- **MINORITY** of AI infections
- **REPORTABLE**: **ZOONOTIC POTENTIAL**
- **Peracute death**, **high morbidity, high mortality**
- **RAPID** spread through flocks
- Severe depression, anorexia
- Drastically reduced egg production, soft-shelled or misshapen eggs
- Severe upper respiratory signs
  - Sinusitis, conjunctivitis, dyspnea
  - **Cyanotic** and edematous combs, wattles, and shanks
- Neurologic signs
  - Droopy wings, incoordination, paralysis, opisthotonus, torticollis
- Greenish, watery diarrhea
- **H5** & **H7** HPAI subtypes are MOST COMMONLY IMPLICATED (see Pearls)

HPAI neurologic signs: unable to stand and abnormal posture, standing on its hocks

Clinical sx, severity & mortality **varies** w/ strain & host species

DDX:

Newcastle disease, fowl cholera, infectious bronchitis, infectious laryngotracheitis, avian pneumovirus, infectious coryza, mycoplasmosis, chlamydiosis, avian encephalomyelitis, avian pox, vitamin E & selenium deficiency, heavy metal toxicity, severe water deprivation, bordetellosis, Marek's disease, mycotoxins, Pacheco's disease

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Test(s) of choice:

AI trachea: Severe acute catarrhal tracheitis with hemorrhage with avian influenza

Presumptive Dx:

- Made in field: Hx, PE, CS, **Necropsy**
  - Edema, **hemorrhage, necrosis** of multiple visceral organs, skin, and CNS
  - **REPORT suspected outbreak to state vet**

Confirm the Dx:

- **Always follow w/ confirmatory diagnostic testing**
- **Sample** collection
  - Always collect **samples** from **multiple birds**
  - Specimens may fail to yield virus
  - Tracheal & cloacal swabs
  - Tissue samples
  - Trachea, lung, spleen, tonsils, brain
  - Blood for serum testing
- Submit samples to **accredited diagnostic laboratory**
  - **Agar gel immuno-diffusion (AGID)**
    or
    Enzyme-linked immunosorbent assay (ELISA)
    - Detect Influenza A matrix & nucleoprotein antigens
      - Does NOT distinguish between subtypes
      - May produce false positives
  - **IF positive: Do virus isolation**
  - **Subtype testing:**
    - **Hemagglutinin(HA), Neuraminidase(NA) inhibition**
    - **Real time reverse transcriptase polymerase chain reaction (rRT-PCR):**
      - Tests for influenza A-specific viral RNA
      - Very sensitive, accurate, rapid
      - **H5** & **H7** subtypes are **NOTIFIABLE Avian influenza (NAI)**

AI ovary: Acute congestion and hemorrhage with follicular atresia

Rx of choice:

LPAI

- **Supportive** care, **warm** housing environment
- Broad spectrum **antibiotics**: To control secondary infections

HPAI - CULL infected flock: H5, H7 HPAI subtypes most common form

Antiviral medications:

- **NOT** approved or recommended

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Prognosis:

Good: Most uncomplicated LPAI cases
Grave: LPAI w/ secondary complications and **HPAI** outbreaks

Prevention:

Eradication:

- Recommended strategy for controlling HPAI **H5** & **H7**

AI proventriculus (mucosa): multifocal acute hemorrhage

Vaccination:

Requires approval of **State veterinarian**

- Can prevent clinical signs & death
- Decreases viral replication
- Decreases shedding from respiratory & GI tracts

NO vaccine provides 100% protection

- Vaccines licensed in USA
  - Inactivated whole AI virus
  - Recombinant fowlpox AI-H5

- Specific protection
  - Autogenous virus vax
    - Must match field hemagglutinin subtype
    - Antibodies to homologous neuraminidase antigens (partial protection)
    - Use of **H5** & **H7** vax requires **USDA approval**

Strict biosecurity practices:

- "All-in, All-out" flock management
- Quarantine new birds before flock introduction

Personnel:

- Provide employees w/ clean clothing
- Train all personnel prior to outbreak event proper biosecurity protocols

Report all suspected cases of LPAI & HPAI to State & Federal veterinary authorities

Pearls:

Most commercially raised poultry in developed countries are **AI free**

- **Avian Influenza Virus**
  - **Type A** orthomyxovirus
    - Classified **by:**
      - Hemagglutinin (H1-H16) proteins
      - Neuraminidase (N1-N9) proteins
      - Ability to produce disease

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Pearls: (continued)

- Zoonotic potential
  - Human Fatalities
    - H5N1, H7N7
    - Treat all HPAI, NAI as potentially zoonotic
    - Primary risk factors for human infection:
      - Direct contact w/ live or dead infected poultry (COMMON)
      - Consumption of contaminated uncooked poultry products

- Transmission:
  - Direct **contact**
  - **Airborne**
  - **Fomites**

- **Natural reservoir =** **Clinically normal** **shorebirds & migrating waterfowl** (ducks, geese)

- Other sources of infection
  - Imported pet birds & ratites
  - Village / backyard flocks (Asia)
  - Live-poultry markets
  - Smuggled in birds
  - International travelers

Images and links worth a look

Avian Influenza (Fowl Plague); Cornell University Atlas of Avian Disease
Avian influenza current situation, AI in birds, AI in humans HPAI in birds US Centers for Disease Control
Global Update on HPAI H5 H7 subtypes in Animals, World Organization for Animal Health (OIE)

Refs: USDA APHIS Avian Influenza Information; Merck Veterinary Manual, 10th ed (online):Images courtesy of Cornell University and the Atlas of Avian Diseases, US Centers for Disease Control and Prevention, HPAI in humans

My Notes: