Veterinary aspects of the turkey breeding.

Summer term 2010
January 2007 First outbreak HPAI H5N7 in turkey farm in Europe
June 2007  HPAI in turkey flock in Czech Republic
Fowl Pox

**Turkeypox virus**

- Possibility of transmission of poxvirus by insemination
- Cutaneous form
- Diphtheric (wet) form

- Prevention by vaccination
Hemorrhagic Enteritis of Turkeys

Hemorrhagic enteritis is an acute GI disorder affecting young turkeys. In its most severe form, it is characterized by depression, bloody droppings, and substantial mortality.

The etiologic agent is a nonenveloped, icosahedral DNA virus, 70-90 nm in diameter. It is a member of the family Adenoviridae and has recently been assigned to the new genus *Siadenovirus*. 
Hemorrhagic Enteritis of Turkeys

The usual route of infection is oral, and virus is often introduced onto previously uninfected premises via personnel or equipment contaminated with infectious feces.

Turkey poults <4 wk of age are resistant to infection due to age-related resistance or, more commonly, the presence of maternal antibody.
Hemorrhagic Enteritis of Turkeys

- In commercial operations, hemorrhagic enteritis typically affects turkeys 6-12 wk of age.
- In outbreaks involving highly virulent pathotypes, clinical signs can include depression, pallor, and bloody droppings.
- Acute mortality ranges from <1% to 60% with an average of 10-15% over a 2-wk period.
- Birds that survive the acute phase experience a transient immunosuppression related to the lymphotrophic, lymphocytopathic nature of the virus.
Hemorrhagic Enteritis of Turkeys

Necropsy of moribund or dead birds infected with hemorrhagic enteritis virus reveals gross congestion and intraluminal hemorrhage in the proximal small intestine. The spleen is usually enlarged, friable, and mottled, except in birds that have hemorrhaged extensively.
Hemorrhagic Enteritis of Turkeys

Histopathologic changes in the duodenum include congestion, hemorrhage, and necrosis of the intestinal epithelium. This lesion in particular is thought to be the result of a virally induced, cytokine-mediated anaphylactic reaction, with the GI tract being considered the target shock organ in the turkey.

Basophilic intranuclear inclusions can be found in lymphocytes and macrophages in a variety of tissues but predominantly in the spleen where lymphoreticular hyperplasia and lymphoid necrosis are noted.
Trasmisible enteritis of turkey

Etiology

- turkey coronavirus
  - is not related with infection bronchitis virus

ID: 1-5 dní
PEMS and Spiking Mortality of Turkeys

Poult Enteritis and Mortality Syndrome (PEMS) was first identified in high density turkey producing areas of the South Eastern USA in 1991.

It is an infectious and transmissible cause of sudden increases in mortality in turkeys between 7 and 28 days of age. A less acute form of the disease appears to produce more of a lingering mortality.
Probable cause

Astrovirus

( RNA virus)

By investigation was found to coronaviruses and rotaviruses.
PEMS and Spiking Mortality of Turkeys

In both cases mortality can be high and can be associated with a marked depression in growth. A range of viruses have been isolated from affected flocks. To replicate the condition in full it appears to be necessary to include bacteria in the inoculum. This syndrome is clearly distinguished from typical viral enteritis in young turkeys because of the high mortality and severe growth depression.
Poult Enteritis Mortality Syndrome (PEMS)
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PATHOGENESIS

STRESSES (HEN, INCUBATION, BROODING, SUMMER, TRANSPORTATION, ETC).

SUSCEPTIBLE POULT

1-2 CYCLES

INFECTIOUS AGENTS
- INTRODUCED
  - e.g. OLDER FLKS
  - ENVIRONMENT

IMMUNOLOGIC STRESS

BODY TISSUES USED

STUNTING

DECL. FEED INTAKE

DEHYDRATION

VIRAL ENTERITIS

DISEASE STRESS

IMPAIRED IMMUNITY

INC. SUSCEPTIBILITY

TOXEMIA

INC. AVAILABLE MOISTURE

DIARRHEA

BACTERIAL INFECTION

INC. BACTERIAL GROWTH

TEMPERATURE

HUMIDITY

MORTALITY

ENVIRONMENT
PATHOGENESIS

STRESSES (HEN, INCUBATION, BROODING, SUMMER, TRANSPORTATION, ETC).

INFECTIONOUS AGENTS
  - INTRODUCED e.g. OLDER FLKS
  - ENVIRONMENT

IMMUNOLOGIC STRESS

BODY TISSUES USED

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INC. AVAILABLE MOISTURE

MORTALITY

STUNTING

INFECTIONS

TOXEMIA

INCREASED BACTERIAL GROWTH

INCREASED ENVIRONMENTAL

INCREASED HUMIDITY

INCREASED TEMPERATURE

BACTERIAL INFECTION

DISEASE STRESS

IMPAIRED IMMUNITY

INC. SUSCEPTIBILITY

INC. AVAILABLE NUTRIENTS

MORTALITY

STRESSING

INTERVENTIONS:
  - MANAGEMENT
  - NUTRITION
  - ANTIBIOTIC
Ceca distended with watery brown liquid and gas.

Foamy droppings
Turkey Rhinotracheitis

A disease of turkeys caused by the viruses of the *Avipneumovirus* genus, family *Paramyxoviridae*. Morbidity is 10-100% and mortality 1-30%.

Rapid transmission occurs laterally, possibly involving fomites; vertical transmission is uncertain, maternal antibody may protect.
Turkey Rhinotracheitis

**Signs**

- Decreased appetite, weight gain and feed efficiency.
- Loss of voice.
- Ocular and nasal discharge.
- Conjunctivitis.
- Snick.
- Dyspnoea.
- Sinusitis.
Swelling of the infraorbital sinuses in a 2 weeks old poult
Swollen head and sub-madibular oedema

Extreme swelling of the infraorbital sinuses in an adult turkey with TRT
Turkey Rhinotracheitis

Post-mortem lesions

- Serous rhinitis and tracheitis, sometimes pus in bronchi.
- If there is secondary *E. coli* infection then pneumonia, airsacculitis and perihepatitis.
Turkey Rhinotracheitis

Diagnosis
• Clinical signs, serology (using an Elisa test to demonstrate rising titre), isolation and identification of the ciliostatic virus.

Treatment
• Antibiotics are not very effective, control respiratory stressors, chlorinate drinking water.

Prevention
• All-in/all-out production. Vaccination at day-old seems to be most effective.
Turkey meningoencephalitis (TME) is a viral neuroparalytic disease of turkeys, which can lead to mortality, usually of about 15-30%.

The clinical signs include incoordination, unwillingness to move and extended or twisted necks.

The causative agent is a virus belongs to the family: Flaviviridae
Infectious Sinusitis - Turkeys

A slow onset chronic respiratory disease of turkeys often with severe sinusitis and associated with *Mycoplasma gallisepticum* infection. It is seen worldwide, though in many countries this infection is now rare in commercial poultry. Morbidity is low to moderate and mortality low.

The route of infection is via the conjunctiva or upper respiratory tract with an incubation period of 6-10 days. Transmission may be transovarian, or by direct contact with birds, exudates, aerosols, and fomites. Recovered birds remain infected for life; subsequent stress may cause recurrence of disease.
Infectious Sinusitis - Turkeys

**Signs**

- Coughing.
- Nasal and ocular discharge.
- Swollen sinuses.
- Slow growth.
- Leg problems.
- Stunting.
- Inappetance.
Infectious Sinusitis - Turkeys

Swelling of the paranasal sinuses
Infectious Sinusitis - Turkeys

Post-mortem lesions

• Swollen infraorbital sinuses, often with inspissated pus.
• Airsacculitis.
• Pericarditis.
• Perihepatitis.
Infectious Sinusitis - Turkeys

**Diagnosis**

- Lesions, serology, isolation and identification of organism, demonstration of specific DNA (commercial kit available).
  
  **Serology**: serum agglutination is the standard screening test, suspect reactions are examined further by heat inactivation and/or dilution. HI may also be used.

- Suspect flocks should be re-sampled after 2-3 weeks. Some inactivated vaccines induce 'false positives' in serological testing. PCR is possible if it is urgent to determine the flock status.

- **Differentiate** from viral respiratory disease, especially Turkey Rhinotracheitis.
Propagating *Mycoplasma*

- Culture of swabs taken from the trachea or lesions requires inoculation in mycoplasma-free embryos or, more commonly, in Mycoplasma Broth followed by plating out on Mycoplasma Agar. Suspect colonies may be identified by immunofluorescence.
Infectious Sinusitis - Turkeys

Treatment
- Tilmicosin, tylosin, spiramycin, tetracyclines, fluoroquinolones. Effort should be made to reduce dust and secondary infections.

Prevention
- Eradication of this infection has been the central objective of official poultry health programmes in most countries. These are based on purchase of uninfected poults, all-in/all-out production, and biosecurity.

In some circumstances preventative medication of known infected flocks may be of benefit.
Riemerella anatipestifer - cerebral infection in young turkeys.
Arizona infection, Arizonosis

- Caused by the bacterium *Salmonella arizonae*. It affects turkeys, mainly in North America, and is not present in the UK turkey population.
- Mortality is 10-50% in young birds, older birds are asymptomatic carriers. Transmission is vertical, transovarian, and also horizontal, through faecal contamination of environment, feed etc, from long-term intestinal carriers, rodents, reptiles.
Arizona infection, Arizonosis

**Signs**

- Dejection.
- Inappetance.
- Diarrhoea.
- Vent-pasting.
- Nervous signs.
- Paralysis.
- Blindness, cloudiness in eye.
- Huddling near heat.
Arizona infection, Arizonosis

Post-mortem lesions

- Enlarged mottled liver.
- Unabsorbed yolk sac.
- Congestion of duodenum.
- Cheesy plugs in intestine or caecum.
- Foci in lungs.
- Salpingitis.
- Ophthalmitis.
- Pericarditis.
- Perihepatitis.
Arizona infection, Arizonosis

**Diagnosis**
- Isolation and identification, methods as per *Salmonella* spp. Differentiate from salmonellosis, coli-septicaemia.

**Treatment**
- Injection of streptomycin, spectinomycin, or gentamycin at the hatchery is used in some countries. Formerly in-feed medication with nitrofurans was also used.

**Prevention**
- Eradicate from breeder population, fumigation of hatching eggs, good nest and hatchery hygiene, inject eggs or poults with antibiotics, monitor sensitivity.
Erysipelas

A sudden onset infection with the bacterium *Erysipelothrix insidiosa* (*E. rhusiopathiae*) seen in turkeys and increasingly in free-range chickens, rarely in geese, ducks, pheasants.

It is also seen in some mammals.

It may be transmitted by faecal carriers for 41 days, in soil, water, fishmeal and semen and by cannibalism.
Erysipelas

• Signs
  – Inappetance.
  – Depression.
  – Sleepiness.
  – Swollen snood.
  – May be diarrhoea and respiratory signs.
  – Perineal congestion.
  – Chronic scabby skin, especially snood.
  – Sudden death.
Erysipelas

Post-mortem lesions

• Carcase congestion.
• Liver, kidney, spleen swollen.
• Haemorrhages in fat, muscle, epicardium.
• Marked catarrhal enteritis.
• Joint lesions.
• Endocarditis.
Endocarditis: inflammatory process around valves (Turkey 15 wks old)
Erysipellos

Diagnosis

- Isolation on blood agar, and identification; the demonstration of the organism in stained impression smears from tissues.

Vaccination or natural infection may cause false positive reactions in the *Mycoplasma gallisepticum* and *M. synoviae* plate tests for a few weeks.

Differentiate from pasteurellosis, salmonellosis, colibacillosis, and acute Newcastle disease.
Erysipelas

- **Treatment**
  - Penicillin - a combination of the procaine and benzathine salts may be injected, often along with bacterin. Tetracyclines in feed may also be helpful.

- **Prevention**
  - Good biosecurity to prevent spread from other susceptible species, vaccine at 16-20 weeks if the condition is enzootic.
Erysipelas on an arm
Histomononiasis

Etiology

*Histomonas meleagrisidis*
Histomononiasis

- **Species affected:** Mostly turkeys, occasionally in chicken, quail, pheasants, grouse, chukar partridges, guinea fowl.

- **Effects:** Enterohepatis has a 7-12 day incubation period. Morbidity (to 100%) occurs, a cyanotic head and bloody caecal diarrhoea. In turkeys, signs include drowsiness, drooping of wings, stilted gait, closed eyes, head down and anorexia. Mortality occurs up to 100%.
Histomononasia

• It is called blackhead because birds may have a dark discoloured head. Young turkeys, chickens, quail, pheasants, grouse, chukar partridges and guinea fowl are susceptible to this acute to chronic disease. Enterohepatitis is caused by *Histomonas meleagridis*, a highly pleomorphic amoeboid protozoa with a stout flagellum and pseudopodia.
Histomonosis

Mode of transmission

• Chicken caecal worm (*Heterakis gallinae*) engulfs and packages Histomonas oocysts in its egg.

• Earthworms also consume Histomonas oocysts. Birds become infected by eating caecal or earthworms or caeca worm egg, which contains oocysts. Oocysts can also develop (sporulate) in worms and histomonads enter the tissues of the worm.
Histomononasis

*Postmortem lesions*

The caeca have an ulcerated (cheesy core) or haemorrhagic exudates.

Crater-like liver lesions (bulls eye) and an enlarged green coloured liver can also be seen.
Histomononasis

Treatment and control:

• **Prevention**
• Enterohepatitis is controlled by controlling the spread of the helminths, which spread disease. This is done by changing the litter or using antihelminthic drugs in the feed or water. Chickens and turkeys should always be kept separate to prevent introduction of caecal worms.

• **Treatment**
• Dimetridazol (0.015%), Carbasone (0.025%), Ipronidazole (0.00625%), Nitarsonone (0.01875%) or Furazolidone (0.011%), are effective drugs, though not licensed in Western Europe.
Coccidiosis of Turkeys

- Infection of turkeys with *Eimeria* spp.
- This disease is not very common in commercially reared turkeys though most turkey growers receive preventative medication for at least part of their lives.
- Five species of *Eimeria* have been identified that cause lesions in turkeys, of which two are associated with significant disease effects.
Coccidiosis of Turkeys

- *E. meleagrimitis* affects the upper small intestine
- *E. adenoides* affects the caeca and rectum.
- *E. gallopavonis* lower small intestine rectum and caeca
- *E. meleagridis* lower small intestine rectum and caeca
- *E. dispersa* in the small intestine
Turkey coccidiosis of the upper small intestine caused by *E. meleagrimitis*. The intestines are dilated, show some spotty congestion and have abnormal contents due to the sloughed epithelium.
Turkey caecal coccidiosis caused by *E. adenoides*. The exudate can range from semi-liquid to solid white cores.