

Marek's disease (MDV)

Extended Version

Classic case: Down, paralyzed chicken, one leg forward

Presentation:

History and signalment

- Primarily chickens
- Young flocks 2-5 months old, sexually immature
- **UNVACCINATED** birds
(backyard breeders, large commercial hatcheries)

Clinical signs:

Most commonly a lymphoproliferative syndrome.

- Mononuclear infiltrates develop in peripheral nerves and organs.
- Clinical signs depend on the location of lesions
 - Depression followed by death
 - Transient paralysis (one leg forward, one leg backward) recovery after several days
 - Distorted iris shape or color
 - Enlarged feather follicles

Various forms of Marek's disease

- **Neurologic:** paralysis, drooping wings, extended legs, torticollis
- **Ocular:** Blindness, distorted iris shape, discolored iris
- **Cutaneous:** enlarged feather follicles, leg lesions
- **Visceral:** Nodular (white "fish flesh") ± diffuse visceral lymphoid tumors
- **Subclinical:** Decreased growth rate and egg production

DDX:

Lymphoid leukosis, reticuloendotheliosis, lymphoproliferative disease, other neoplasms, avian encephalomyelitis, Genetic grey eye, Newcastle disease, riboflavin deficiency, tuberculosis



Spastic paralysis of limbs due to Marek's disease.

This chicken is also gasping, a sign associated w/ paralysis of the respiratory and digestive systems.

Image courtesy of Cornell Univ., Atlas of Avian Diseases



Torticollis, due to Marek's disease



Skin around feather follicles may become raised and roughened, due to epithelial cell proliferation.

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Test(s) of choice:

NECROPSY for gross lesions

- **Enlarged peripheral nerves**
- Loss of nerve striations
 - Vagus
 - Brachial plexus
 - Lumbosacral plexus
- **Lymphoid tumors** – diffuse or nodular
 - Lung, heart, liver
 - Spleen, kidney, muscle
 - Gonads, proventriculus, intestines
 - Skin leukosis
 - **Enlarged feather follicles**
 - Cause for **condemnation**
 - Ocular lesions due to lymphocytic infiltration of iris
 - Loss of iris function
 - Distorted pupil shape
 - Iris discoloration
- Bursa of Fabricius atrophy
- Enlarged mottled liver & spleen

Histopathology & immunohistochemistry

- Lymphocytic infiltration of organs, predominantly T-cells

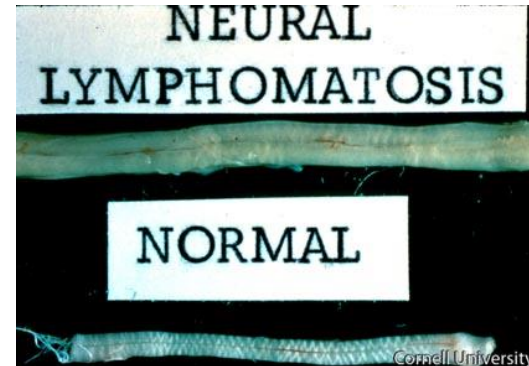
PCR: Marek's viral DNA within lymphomas

Rx of choice:

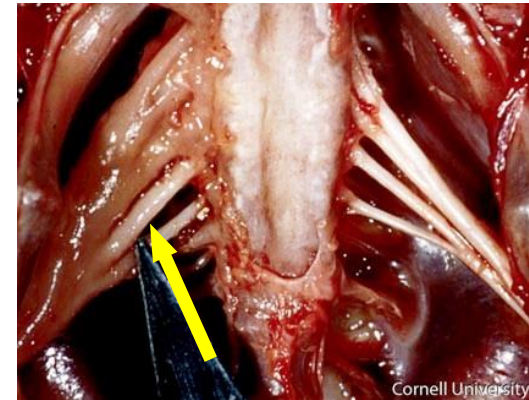
NO effective treatment

Prognosis: Varies

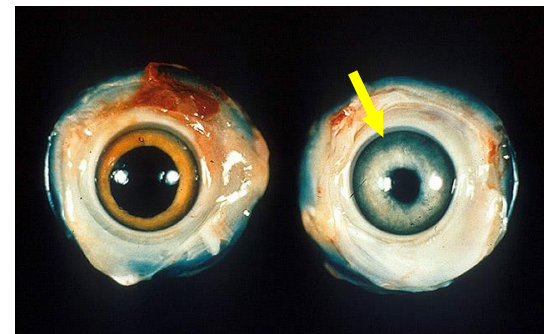
- Losses can be HIGH in effected flock
- Laying Flock: 5-10% mortality
- Broilers, Roasters: < 20% mortality (earlier slaughter at 14 wks)
- **Economically important** -
birds may be condemned at slaughter



Affected nerve is enlarged, yellowish, translucent and has lost cross-striations.



*Sciatic nerve enlargement, L. Normal on R
Images courtesy of Cornell Univ.,
Atlas of Avian Diseases*



Eye from normal chicken on left. Marek's disease, distorted iris on right. Image courtesy, USDA

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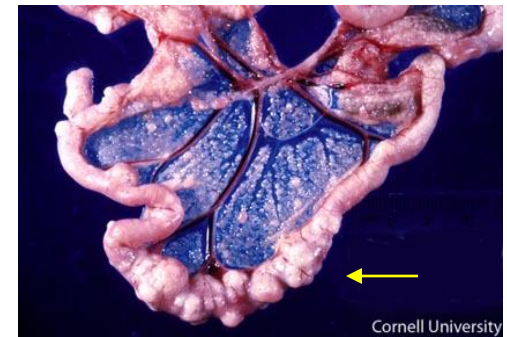
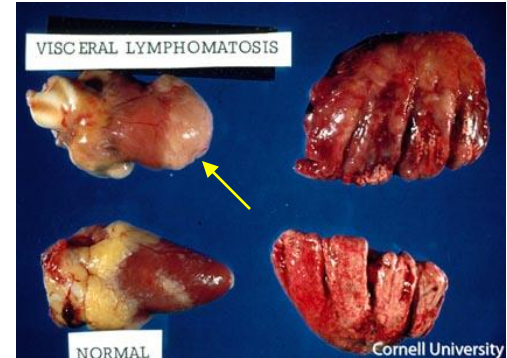
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Prevention:

- **VACCINATION**
 - > 90% efficacy
 - Proper vaccine handling, thawing, and reconstitution critical
 - Administered at hatching
 - In ovo vaccine – common in commercial broiler chickens
 - Administer 18th day of incubation by automated technology
- **Strict biosecurity**
- **Strict sanitation protocols**
- **Breed for genetic resistance**
- **Purchase from PATHOGEN-FREE flocks**
- **Backyard breeders:**
 - **Vaccinate** day old chicks
 - Purchase **ONLY** vaccinated or pathogen-free chicks

Pearls:

- Marek's disease virus: oncogenic lymphotropic *Alpha*herpesvirus
- **HIGHLY contagious, ubiquitous** in environment
- Vertical transmission does NOT occur
- Incubation period is 4-12 weeks
- Virus produced in B lymphocytes & feather follicle epithelium
- **Infected chicken carriers (latent infection, T-cells)**
 - **Virus shed for a long time**
 - Dander, feathers, desquamated skin
 - Secretions, droppings
 - Virus **persists** in litter & dust for **MONTHS**
 - Shedding **REDUCED** by prior vaccination
- Infected chickens **MAY** develop permanent immunosuppression
- Infected lymphoid cells **MAY** progress to lymphoma
- Three serotypes of MDV
 - Oncogenicity associated with serotype 1 MDV
 - Many strains of serotype 1 MDV, vary widely in pathogenicity



Visceral lymphomas, heart, lung, intestines



Liver, lungs, and spleen all showing lymphomatous **white Marek's lesions**

Images courtesy of Cornell Univ.,
Atlas of Avian Diseases

Refs: NADIS (National Animal Disease Information Service): Control of Marek's disease and other tumors, Merck Manual 10th ed online: Marek's disease in Poultry, Cornell University: Marek's disease