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Post-Mortem Protocol for Poultry – Part 1

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Introduction

- Perform the post-mortem on freshly killed or fresh, dead birds, before autolysis compromises histopathological examination. Formalin fixative kills putrefactive bacteria and fungi and inactivates the enzymes of autolysis halting any further tissue degeneration.
- Describe all lesions with brief notes on (or attached to) the submission form according to the basic parameters of size, colour, consistency, location and distribution.
- Consider submitting digital photographic images of lesions observed.

For post-mortem examination on the farm, utilise a stable flat surface set at a suitable height in a well-lit but shaded position. Have a basic instrument set to hand (scissors, plain forceps, and shears) with water, soap and disinfectant to clean up afterwards and disposal bags for the carcass material.

Post-Mortem Procedure

- Examine birds externally for evidence of trauma, soiling of feathers, vent damage, skin lesions, eye lesions, external parasites, footpad lesions and joint swelling.
- Examine the oral cavity and conjunctiva and apply pressure to the infraorbital sinus for evidence of nasal discharge.
- Dampening the plumage with a disinfectant solution is strongly recommended if a controlled disease (avian influenza, Newcastle disease, *Salmonella enteritidis* / *gallinarum* / *pullorum*) is suspected.
- Place the bird on its back with the head away from you. Incise the skin at the thigh-body wall junction, dislocate the coxo-femoral joints (the bird will now lie flat on its back).and make a small incision through the skin between the caudal end of the breastbone and the cloaca. Pull the breast skin away from you towards the neck and examine the subcutaneous tissue and breast musculature (figures 1 and 2).

Figure 1

Figure 2

- Push strong scissors/shears through the incision and incise the right side (bird's left) coelomic (abdominal) wall, thoracic cage and coracoid bone. Repeat on the bird's right side. Reflect the breast to your left or remove completely taking care not to damage the underlying terminal trachea/tracheal bifurcation (figure 3).

Figure 3

September 2019

- The liver, lungs, heart, trachea and air sacs can now be viewed (figure 4).

Figure 4

- A longitudinal section of the trachea from the syrinx (tracheal bifurcation) to the larynx will allow careful examination of the mucosa and collection of samples by swabbing (for bacterial culture or for PCR) to evaluate for important respiratory pathogens such as avian influenza, Newcastle disease, infectious bronchitis virus, infectious laryngotracheitis virus, turkey rhinotracheitis virus, *Mycoplasma gallisepticum*, *Avibacterium paragallinarum* (figures 5 and 6).

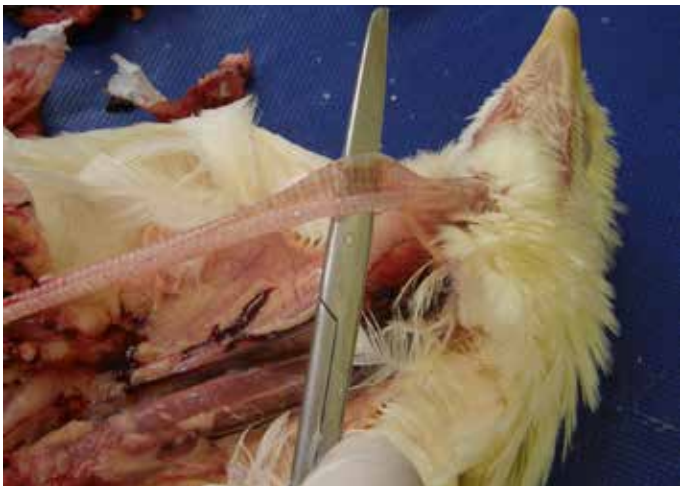

Figure 5

Figure 6

Carefully undermine and remove the bird's left and right liver lobes and gall bladder (figures 7 and 8). Rupture of the gallbladder results in release of bile into the coelomic cavity and bile has potent antibacterial properties, which can significantly interfere with bacterial culture results.

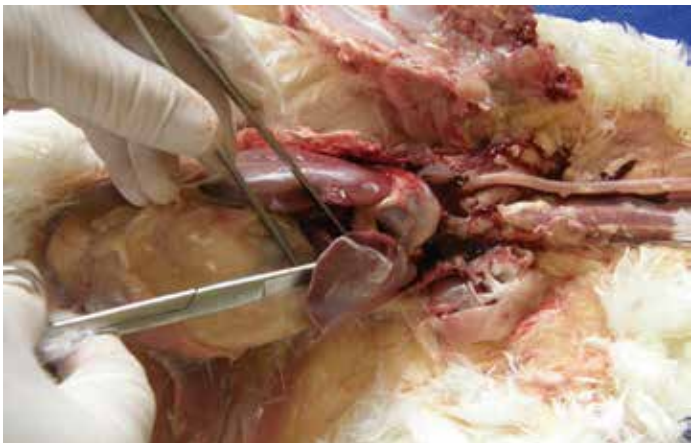

Figure 7

Figure 8

- The underlying spleen is now visible (figure 9 arrow).
- Heart is removed and examined.
- The GIT is excised between the oesophagus and the proventriculus and gently pulled towards you (figure 10). Excision of the duodeno-hepatic ligament may be necessary.

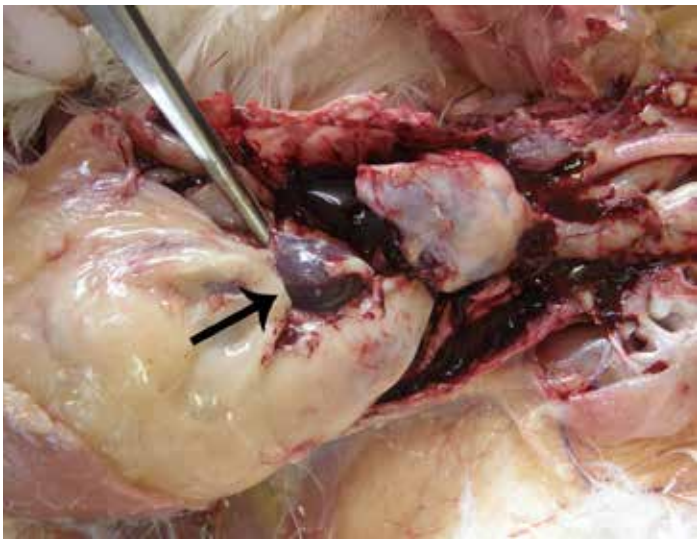

Figure 9

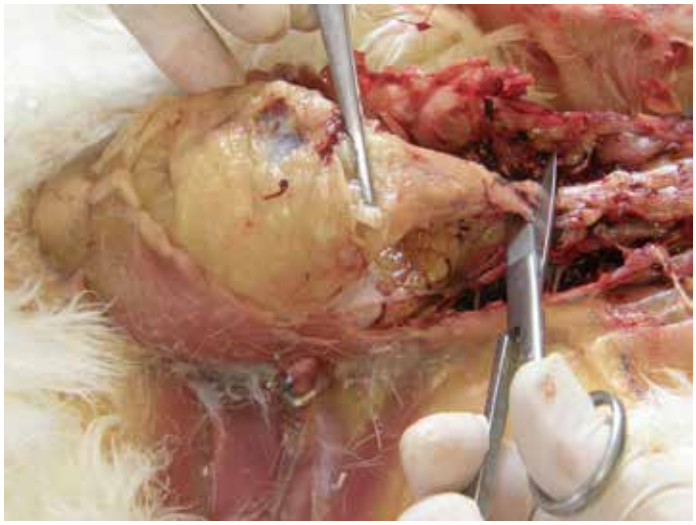

Figure 10

- The GIT is gently extended and laid out on the left of the bird for further detailed examination (figures 11 and 12).
- Helminths (roundworms) and (tapeworms) may be found, especially in the proximal part of the small intestine (from gizzard to first 30 cm or so of the intestine). Caecal worms may be seen in the caeca.

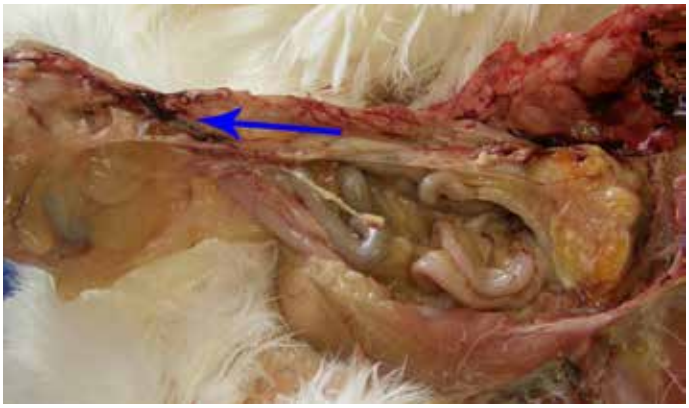

Figure 11

Figure 12

- The whole intestine (including caecae) should be opened and the mucosal wall examined for any evidence of coccidia.
  - Upper small intestine (*Eimeria acervulina*): duodenum has transverse white bands to coalescing white plaques on duodenal mucosa. Moderately pathogenic, occurring more commonly in older birds and often together with other *Eimerias*.
  - Mid small intestine (*Eimeria necatrix*): mid intestine distended with yellow / orange mucus. White spots (schizonts) and pinpoint haemorrhages. This is a severe pathogen causing high mortality.
  - Mid small intestine (*Eimeria maxima*): mid-intestine and macroscopic lesions similar to *E. necatrix*. Very large oocysts are the distinguishing feature. Moderately pathogenic.
  - Lower small intestine and rectum (*Eimeria brunetti*): fibrinous to fibrinonecrotic enteritis of lower small intestine, rectum and proximal part of the caecum, with necrotic core formation. Severe pathogen inducing high mortality in young birds.
  - Cecum (*Eimeria tenella*): caecae filled with necrotic caseous cores. Highly pathogenic in young birds.

- Examination of the thoracic and abdominal air sacs and kidneys (see annotated image below) is now possible (figure 13).

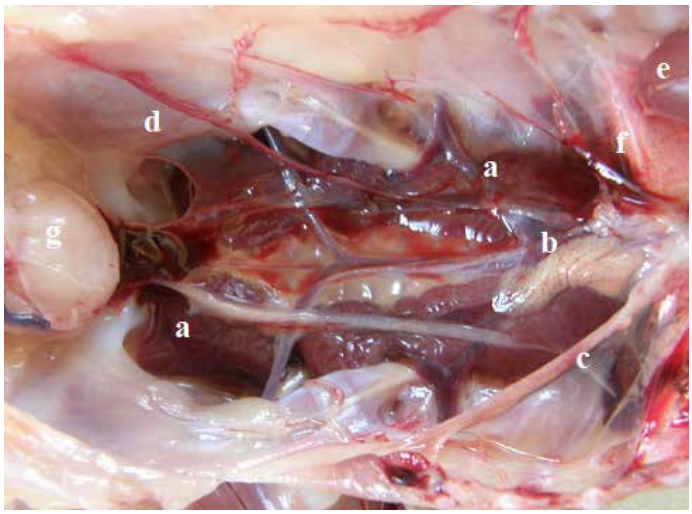

Figure 13.
Lobulated kidneys (a), immature ovary (b), thoracic air sac (c), abdominal air sac (d), heart (e), lung (f) and bursa (g).

Gonads / Reproductive Tract

- Examine the development and condition of the oviduct, ovary, ovarian follicles or testes with respect to age of the bird (figure 14, 15 and 16).

Figure 14. Normal mature ovary and succession of follicles.

Figure 15. Immature testes.

Figure 16. Collapsed ovarian follicles

Oviduct and Eggs

In layer birds, examination of the oviduct for abnormalities and any intra-coelomic eggs for deformities is routinely performed (figure 17, 18 and 19).

Figure 17. Infectious bronchitis virus (IBV) QX variant characterised by oviduct atrophy and soft-shelled eggs (bird on the left), compared to the normal oviduct (bird on the right).

Figure 18. IBV-QX shell-less egg.

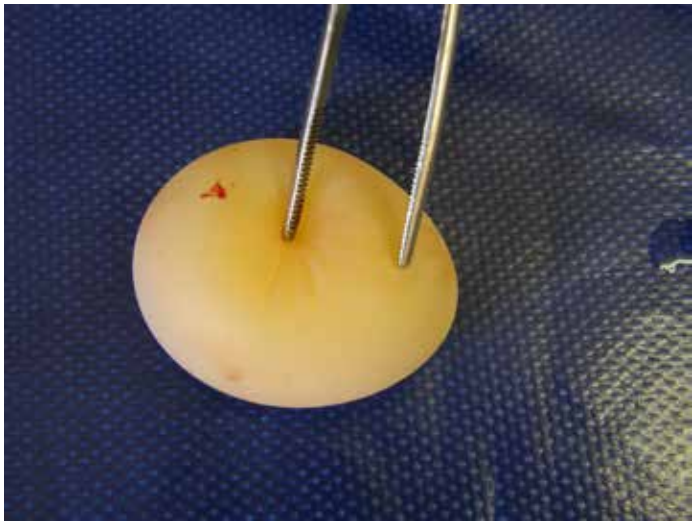

Figure 19. IBV-QX soft-shelled egg.

Bursa of Fabricius

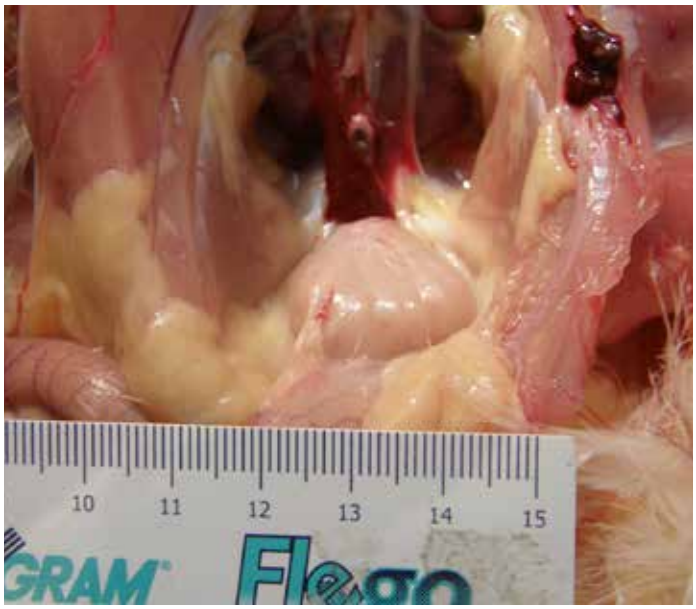

Figure 20. In young birds the bursa of Fabricius is clearly visible dorsal to the terminal rectum.

Gross Scoring Systems for Bursas

Bursa weight: Body weight ratio (expressed as a percentage).

- Excellent > 0.2%
- Average 0.18 - 0.2%
- Questionable 0.15 – 0.18%
- Poor < 0.15%

Bursa size:

Age (Days)	Bursameter Score (Target)
1	1
7	2
14	3 or >
21	4 or >
28	5 or >
35	6 or >

Figure 21: Bursal diameter (Bursameter®) and bursal weight: body weight ratios are used in conjunction with gross examination to more critically evaluate bursal size and condition.

The gross bursal scoring should be correlated to the histological scoring, with the EU histopathology scoring system currently being the preferred system.

Thymus

Figure 22: Lobulated thymus gland alongside neck

The lobulated thymus gland lies alongside the young bird's left neck and is examined for evidence of atrophy. The major causes of thymic atrophy in poultry is infection with chicken anaemia virus (CAV), infectious bursal disease virus (IBDV) or Mareck's disease virus (MDV).

To be continued in Part 2

EU Scoring Method

Score	Description
0	No lesion, normal bursa.
1	1-25% of the follicles show lymphoid depletion (i.e., less than 50% depletion in 1 affected follicle) influx of heterophils in lesions.
2	26-50% of the follicles show nearly complete lymphoid depletion (i.e., more than 75% depletion in 1 affected follicle), affected follicles show necrosis and severe influx of heterophils may be detected.
3	51-75% of the follicles show lymphoid depletion; affected follicles show necrosis and severe influx of heterophils is detected.
4	76-100% of the follicles show nearly complete lymphoid depletion, hyperplasia and cyst structures are detected; affected follicles show necrosis and severe influx of heterophils is detected.
5	100% of the follicles show nearly complete lymphoid depletion; complete loss of follicular structure, thickened and folded epithelium, fibrosis of bursal tissue.

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Dr. Scherk is a private practitioner who founded Cats Only Veterinary Clinic, in Vancouver, BC in 1986 working there fulltime until June 2008 when she "retired" from active practice. She graduated from the University of Guelph in 1982 with a DVM from the Ontario Veterinary College. In 1995 she became board certified in the specialty of Feline Practice by the American Board of Veterinary Practitioners (ABVP). After many years of serving on the Board of the American Association of Feline Practitioners she was honoured to be its President in 2007. Since its inception in 1995, she has been a member of the AAFP Feline Vaccine Guidelines Panel, most recently having the responsibilities of being its Chair for the 2013 version.

PROGRAMME

08:00	What's all the FUSS? It hurts when I pee: Advances in the Management of Feline Lower Urinary Tract Disorders
10:00	Tea
10:15	Understanding Feline Chronic Kidney Diseases: New Thoughts
11:45	Recurrent Diarrhea in the Cat
12:45	Lunch
13:15	Obesity: Winning the battle of the bulge - more than a bag of food
14:00	Interactive Feline Cases
15:00	Tea
15:15	Recent Compelling and Clinically Relevant Journal Updates
16:15	Feline Eosinophilic Granulomas: complex or not?

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QUESTION 1

For which of the following suspected conditions, would it be considered VITAL to dampen the feathers of the birds with disinfectant prior to opening?

a. Infectious bursal disease
b. Infectious laryngotracheitis
c. Avian influenza
d. Infectious bronchitis virus
e. Avian encephalomyelitis

QUESTION 2

Which of the following conditions would NOT be considered an important respiratory pathogen of poultry?

a. Newcastle disease
b. *Mycoplasma synoviae*
c. Avian influenza
d. *Avibacterium paragallinarum*
e. Infectious laryngotracheitis

QUESTION 3

What is the RISK of gallbladder rupture during the post-mortem procedure?

a. Discolouration of visceral organs making them unsuitable for gross examination
b. There is no risk to the post-mortem examination
c. Bile has strong virucidal properties interfering with virus isolation
d. Bile has strong bacteriosidal properties interfering with bacterial culture
e. Bile has strong tissue digestive properties rendering histological samples unsuitable for histopathological examination

QUESTION 4

What is the PRIME gastrointestinal location for most roundworms?

a. Proximal small intestine
b. Distal small intestine
c. Crop
d. Proventriculus/gizzard
e. Cecum

QUESTION 5

Which of the following coccidia species are MOST COMMONLY encountered in older birds?

a. *Eimeria necatrix*
b. *Eimeria acervulina*
c. *Eimeria maxima*
d. *Eimeria brunetti*
e. *Eimeria tenella*

QUESTION 6

What is the PRIME gastrointestinal location for *Eimeria tenella* infestation?

a. Crop
b. Proventriculus
c. Proximal small intestine
d. Distal small intestine
e. Caecum

QUESTION 7

What are the PRIMARY gross abnormalities of infectious bronchitis virus – QX variant infection in laying birds?

a. Necrotic tracheitis
b. Gizzard ulcerations
c. Myocardial necrosis
d. Oviduct atrophy
e. Discoloured eggs

QUESTION 8

Which of the following bursal weight to body weight ratios are considered AVERAGE?

a. 0.14
b. 0.15
c. 0.16
d. 0.17
e. 0.19

QUESTION 9

What is the TARGET bursameter size 21-day-old broiler chickens?

a. 1
b. 3
c. 4
d. 6
e. 7

QUESTION 10

Which of the following conditions are COMMONLY associated with thymic atrophy in young birds?

a. Chicken anaemia virus
b. Newcastle disease
c. Astrovirus infection
d. Infectious bronchitis virus
e. *Salmonella enteritidis*

SAVC Accreditation Code: AC/2072/19. To answer the questions visit www.sava.co.za and log into the members section. Click on CPD and log in. VetCPD web system code: a97683 for this article.