Aspects of diagnosing diseases in birds "Much is missed through not looking!"

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These notes have been written to accompany a video presentation to help familiarise veterinary practitioners with common clinical findings in birds, often with diagnostic relevance, at least in the bigger picture. It is hoped that the video along with these notes will help some broaden some diagnostic repertoires and raise our level of professional confidence and competency re our ability to help sick birds and their custodians. Then again, there will be many among us who already know most of what will be presented. I hope you each take up the challenge of seeing where you can help me as well as others present … identify any misinterpretations and correct any misinformation, shine light upon some area of ignorance, share another perspective … but always with good humour and good intent!

Bird medicine can be fun … as well as being very challenging and interesting. It can also be profitable. So much however, depends upon our individual attitudes, our willingness to learn, our willingness to nurture an open, inquiring mind and our ability to communicate effectively with our clients.

It is important to realise that the majority of birds presented for clinical examination can be demonstrated to be subject to a variety of influences against good health, vitality and stamina. You can do much to help your customers/clients by identifying and discussing these influences.

Such influences usually include:

- sub-optimal nutrition (malnutrition, unbalanced diets, food feast, seed-glue blocks, ad lib feeding);
- insufficient exercise (clipped wings, insufficient space to fly);
- lack of companionship of own kind and opposite sex;
- lack of breeding opportunity and facilities;
- exposure to toxins (heavy metals zinc lead (galvanised wire etc) copper peeling chrome bells mercury (rear of mirrors); mycotoxins in mouldy food and cage substrate)); and
- unsuitable perches (doweling, sandpaper sleeves).

Therefore, be alert and ready to recognise these influences. Be alert for signs of the consequences of these influences on the health of the birds you examine. Evaluate and explain the contribution of these to the well-being of the birds in our custody.

At the same time conduct a systematic examination of each bird, its faeces and aspirates from its throat and crop for common signs of disease and for common pathogens. Try to gain proficiency at recognising and distinguishing the various microscopic objects seen in wet and Gram stained smears. Remember Gram stained smears facilitate recognition of differences in some features of most bacteria, "megabacteria" and some fungi but not chlamydia, viruses, most protozoa or ova, and not avian cell types. Modiefied Ziehl Nielsen (MZN) stained smears aid recognition of Mycobacteria and Cryptosporidia. Diff-Quick (DQ) stained smears aid recognition of avian cells, chlamydia (sometimes), some fungi, Mycobacteria (as "ghosts"), and megabacteria, but while DQ stained smears help reveal

the presence of bacteria they rarely help us evaluate their pathogenic relevance unless they are intracellular or spirochaetes.

Always prepare “thin” wet smears and examine them with coverslip applied and the condensor of the microscope lowered. Use sterile water for injection, warm sterile saline or Hartmann’s solution as your diluent for faecal smears, and water for injection for crop washes.

Tap water usually contains chemicals that might immobilise motile bacteria and protozoa. It sometimes contains various organisms and algae that can confuse diagnostic interpretations of the findings.

Microscopic examination of the slime lining some water containers under a separate coverslip can be very revealing and informative. Demonstrating the findings with a video-microscope to clients can help reinforce our advice re improved hygiene and management.

In my opinion Gram-stained heat-fixed thin smears of crop aspirates and ultra-fresh faeces should be prepared and examined promptly on the great majority of sick birds presented for examination. Use microscope oil and your oil-immersion lens. (Be careful to keep it clean, and be careful with what you clean it.) Most oil immersion lenses are calibrated for examining histopathology specimens secured under a coverslip. Greater clarity can often be achieved by applying microscope oil to the stained dried slide, then a coverslip, then another layer of oil with which to connect the oil immersion lens. Remember to raise the condensor for examinations under oil.

Similarly, Diff-Quick or Giemsa stained blood smears should also be prepared and examined when circumstances permit.

Haematology and biochemical investigations, blood parasites, cytology and specific antigen and antibody tests are beyond the scope of this presentation but their omission should not belittle their importance in avian medicine.

The first part of this video presentation shows various external parasites, sometimes macroscopically, sometimes microscopically, sometimes alive, sometimes dead, and not necessarily in the order listed below. Scientific names have been omitted from many in these notes. Time permitting, examples of other pathogens etc. will be illustrated.

External parasites

- Feather lice and their eggs
- Body lice
- Feather mites and their eggs
- Scaly face/scaly leg mites (*Cnemidocoptes* spp.)
- Cutaneous myasis (burrowing maggots)
- Hippoboscid flies

Hippoboscid Fly

- An external parasite of birds
- “Louse Fly”
- common on wild birds
- blood “sucker
- can transmit some diseases
- Tx e.g. Avian Insect Liquidator (Vetafarm); Coopex

"Red Mite" (*Dermanyssus gallinae*)

- an important pest and pathogen
- sucks blood, causes anaemia, discomfort
- transmits diseases
- largely nocturnal activity pattern; Dx with white cloth
- will bite people as well as many bird spp.
- Long survival time off hosts in cracks and crevices
- Tx e.g. Avian Insect Liquidator (Vetafarm); Coopex

Body lice

- common on cockatoos, lorikeets, waterfowl, poultry
- highly mobile; blink and you miss them
- bite birds and us; you'll soon feel them
- short survival time off hosts
- Tx e.g. Avian Insect Liquidator (Vetafarm); Coopex

Feather lice on a budgerigar

- usually not plentiful
- usually almost motionless underside of major flight feathers
- big enough to see without magnification, dark coloured
- long and narrow
- Tx e.g. Avian Insect Liquidator (Vetafarm); Coopex

Feather Mites (suborder *Astigmata*)

- Much smaller and difficult to see unless mating or adults
- Often numerous on underside of major flight and tail feathers (e.g. *Protolichus lunula*) Usually "parked" along rachis
- Pale to mid brown
- Smaller body feathers (e.g. *Dubininia melopsittaci*)
- Eggs further out on proximal vane of feathers

Feather mites

- extremely common budgies and canaries (Australia)
- transilluminate primary flights, coverts and tail
- ask to sample a piece of feather
- examine under low power
- if video microscope, leaving playing until clients scratching!
- Not blood suckers
- Spray at 3-6 week intervals Avian Insect Liquidator (Vetafarm)

Scaly face and scaly leg mites

- *Cnemidocoptes* sp. Also spelt *Knemidocoptes* sp.
- Carrier birds common

- Clinically affected birds probably chronically immunosuppressed: malnutrition, viral, metal poisoning?
- Budgerigars, canaries, Princess Parrots, Kakarikis, others
- Most local Tx of temporary benefit
- Need systemic Tx all birds e.g. ivermectin, moxidectin

Cutaneous myiasis (?Tabanid Fly larvae)

- Mostly seen in nestlings of wild birds
- Maggots easily overlooked
- Ends of maggots resemble large feather follicles
- Adult flies usually have striped hairy bodies
- Tx e.g. Avian Insect Liquidator (Vetafarm)
- Physically pluck/express each maggot
- Antibiotics and nutritional support

Some internal parasites of birds (the more common ones!)

- Tracheal and air sac mites
- Round worms
- Capillaria (thread worms, caecal worms)
- Gizzard worms
- Tapeworms
- Spiruroid worms
- Gapeworms
- Trichomonas sp.
- Giardia sp.
- Cochlosoma sp.
- Coccidia

Tracheal and Air Sac Mites

- *Sternostoma* spp.
- Major respiratory pathogen canaries and Gouldian Finches
- Occasionally recognised in budgerigars and others
- Mouth breathing, respiratory wheeze and clicks
- Transillumination of moistened neck/trachea
- Dark grey often slowly motile dots within trachea cf. Skin
- Positive finding diagnostic, negative finding not a “rule-out”

Roundworms

- Similar to but smaller than dog and cat roundworms
- Various ascarid species
- Eggs thick shelled, usually irregular surfaced, large, oval, brown
- Common in many parrots especially budgerigars, cockatiels, princess parrots.
- Occasionally seen in non-psittacine birds, especially poultry
- Tx e.g. Avitrol (levamisole), oxfendazole, fenbendazole, not piperazine
- Association with “black-head” (histomoniasis) in peafowl and turkeys

Capillaria

- Many species of birds, many body locations
- Bipolar green or pale brown pigmented eggs
- Often very pathogenic, emaciation and diarrhoea
- Adult nematodes often very small
- Tx e.g. moxidectin, levamisole, fenbendazole, oxfendazole
- Many repeat treatments say monthly

Spiruroid worms

- Throat worms especially in juvenile magpies, butcher birds
- White coiled nematodes attached firmly into nodules
- Not “gapeworm” though many confuse the two.
- Debilitating and choking effects
- Tiny almost transparent eggs easily overlooked
- Tx e.g. topical and systemic moxidectin, ivermectin, ? with DMSO
- Manually pluck adult nematodes

Gapeworms *(Syngamus trachea)*

- Uncommon in practice in Sydney, larger birds
- Large female in permanent copulation with small female form a red blood filled Y within trachea.
- Choking effect
- Tx e.g. levamisole, fenbendazole

Gizzard worms

- Recognised mostly in Passerine birds, finches
- Grossly visible seed particles in faeces
- Enlarged gizzard +/- proventriculus and wt loss
- Look like tiny meat fibres under koilin layer of gizzard
- Eggs small and easily overlooked
- Tx’s often fail; moxidectin.
- Control intermediate and transport hosts; ? Coopex

Tapeworms

- Many species of tapeworms, often very pathogenic
- Many species of birds, especially finches and insectivorous
- Intermediate hosts
- Tx e.g. praziquantal (Avitrol-Plus)

***Trichomonas* spp**. (Motile protozoa)

- Pathogenicity varies
- Trichomoniasis and “canker” especially pigeons and budgerigars

- Choking, “vomiting”, dysphagia, diarrhoea, dyspnoea, wt loss, deaths, lumps in neck, crop, thoracic oesophagus
- Wet crop aspirates with throat smears: not tap water
- Beware: avoid treating asymptomatic ducks
- Tx eg. Carnididazole (Spartrix), Ronidazole (Ronivet, Vetafarm), Dimetridazole (not finches)
- Flock tx, exclude pigeons etc, hygiene sanitation quarantine

***Cochlosoma* spp.**

- Highly motile 6-flagellate protozoa in digestive tract
- Especially finches, also ducks, geese, turkeys, coots
- Immature birds often fluffed up, moist bulky droppings, death
- Adult birds usually asymptomatic
- Tx’s e.g. Metronidazole, Ronidazole flock treatment

Coccidiosis

- Many species of coccidia, many anatomical locations
- Pathogenicity varies with species and species and concurrent diseases
- Many species of birds
- Sudden deaths, diarrhoea, unthriftiness, wt loss
- Oocysts usually in faeces
- Acute deaths: examine intestinal scrapings
- Tx’s Toltazuril (Baycox, Bayer); Amprolium

Giardia

- Highly motile protozoa of digestive tract
- Suspected *Giardia* sp. Very common in Cockatiels
- Itchiness, irritability, weight loss, bulky pale loose faeces
- Immediate exam of “hot steamy” faecal sample warm water for injection, saline, Hartmans, not tap water.
- Repeat exams, repeat txs
- Tx Ronidazole (Ronivet, Vetafarm) high doses, Metronidazole (Flagyl), Carnidazole (Spartrix, Janssen), others

Fungal infections

- Candidiasis
- Aspergillosis
- Cryptococcosis
- Dermatophytosis

Candidiasis

- Budding yeasts with or without pseudohyphae
- Alimentary canal usually
- Immunosuppressed and stressed birds
- Differentiate from cooked dietary yeasts; bread, toast

- Psuedohyphae resemble megabacteria; = systemic Tx
- Tx local e.g. nystatin (Nilstat, Mycostatin); amphotericin B (Fungilin, Megabac-S); chlorhexidene
- Tx systemic eg. Fluconazole (Diflucan); ketoconazole (Nizoral); itraconazole (Sporanox)
- Remember supportive and other treatments and management

Aspergillosis

- Immunosuppressed birds mostly respiratory system
- Cere abscesses and sinus infections
- Granulomas lungs and air sacs, and elsewhere
- Tx: prolonged systemic and topical and sometimes surgical
- Fluconazole currently favoured

Cryptococcosis

- Association with River and Forest Red Gums
- Upper respiratory tract, sinuses, beak
- Granulomas can be misdiagnosed as cancer
- Zoonotic risk
- Tx complex.

Dermatophytosis

- Thickened scaly scabby skin
- Feather loss and sometimes feather deformity
- Feather structural changes
- Gouldian heads especially
- Skin scrapings and culture
- Tx Griseofulvin systemically, and a topical Iovone, Chloramine (Nycex or Halamid), miconazole (Conofite), thiabenzole.

Bacterial infections

- Coliform infections
- Staphylococcal infections
- Streptococcal infections
- Clostridial infections
- Mycobacterial infections
- Spirochetosis
- Megabacteria-associated disease
- Atypical megabacteria-like “bacteria”
- Chlamydiosis, psittacosis and ornithosis

Coliform infections

- Gram-negative (stain red with Gram stain) bacteria
- Many species, e.g. Salmonella, Proteus, Pseudomonas, Escherichia coli, Pasteurella, Klebsiella
- Rule of thumb: most healthy psittacine birds, canaries and most finches have > 95% Gram-positive bacteria along digestive tract
- Rule of thumb: more than 5% Gram negative bacteria in crop or faeces of these birds suggests bacterial component of disease process
- Omnivorous and carnivorous species normally have many coliforms in digestive tract
- Wide range of clinical signs and disease
- Tx systemic bactericidal antibiotic on basis of culture and sensitivity test
- Some zoonotic
- Rodents, “kissy-kissy disease”

Staphylococcal and Streptococcal infections

- Staphs Gram-positive blue staining spheres in clusters
- Streps Gram-positive spheres in chains
- Mostly skin and digestive system
- Rule of thumb > 10% = probable bacterial disease component
- Tx systemic bactericidal antibiotic on basis of culture/sensitivity test +/- topical

Mycobacterial infections and avian tuberculosis

- Zoonotic, notifiable
- Gram-positive, Diff-Quick “ghost”, Acid-fast small curved rods
- Granulomas anywhere, intestinal disease, weight loss
- Tx complicated and prolonged, cure possible vs. euthanasia

Clostridial infections

- Clostridium spp. = Gram large positive rods sometimes with spores
- Not often recognised in live pet birds
- Summer outbreaks some years in wild rainbow lorikeets associated with obstructive necrotic enteritis and peritonitis (I think!)
- Tx bactericidal systemic antibiotic eg Clavulox, Kefvet, poor prognosis.

Spirochaetosis

- Typical wave form elongated bacteria easily recognisable in both wet and stained smears from crop and faeces
- Often highly motile in wet smears
- Crops of cockatiels, faeces of poultry and ducks, others
- Tx bactericidal systemic antibiotic eg. Clavulox

Megabacteria-Associated Disease (MAD) (Proc. 221)

- Wet faeces>crop aspirate giant green tinged often cigar shaped bacteria often with vacuoles and collarettes
- Y forms rare but characteristic
- Gram variable granular short to long cigar shaped "giant" rods
- Probably multiple species and strains of megabacteria
- Spreading, being found in more and more species
- Asymptomatic to severe acute to chronic wasting insidious disease with vomiting slow or acute haemorrhage from proventricular-gizzard junction, maldigestion, seed fragments in faeces
- Tx Amphotericin B (Fungilin, Megabac-S) intense prolonged oral tx must be combined with intense hygiene, sanitation and attention to details. Few second "chances' for Tx.

Megabacteria-like bacteria

- Several morphological groups of these being found more commonly
- I suspect they are "emerging pathogens"
- Importation of budgerigars appears linked to their "emergence"
- "Fireman's hose group"
- Short and long highly collared highly segmented group
- "Mini to Mega group"
- pathogenicity studies very preliminary I have yet to study affected birds by necropsy
- Tx trials very preliminary: amphotericin B usually effective in clearing follow up faecal smears of the organisms.

"Gotcha tricked" findings in microscopic smears

- Feather barbules
- Powder down powder
- Plant hairs
- Plant cells
- Pollen grains
- Spermatozoa
- Macroconidia
- Stain precipitates
- Fungi growing on microscope slides

Additional reading and learning

- Association of Avian Veterinarians local and international proceedings and Journals. Contact Prof Garry Cross
- Birdmed chat group on Internet. Contact Shane Raidal
- PGCVSc Uni of Sydney Proc 55, 178, 221, 2789 etc and Vade Mecums 2 and Series A No. 21
- Ritchie Harrison and Harrison: Avian Medicine, principles and application
- Altman *et al*: Avian Medicine and Surgery
- Perry: Caring for Birds with Love