Dermatology disorders of birds

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This lecture will emphasize the most common presentations of pet birds.

I. Feather Loss

A. Abnormal moults

It is important to realize that moulting is a normal process, but the number per year (1/ year in many species, 2/year in many migratory species, q2 years or poorly defined in psittacines) and the type (progressive vs non-progressive). However, a number of external factors can adversely influence moulting, resulting in poor feather quality and/or abnormal pigmentation:

1. *Nutritional deficits*: inadequate protein, decreased amino acids (lysine, choline, methionine, cysteine, cysteine); vitamin A [especially on all seed diets] or beta carotene, riboflavin
2. *Stress/fear*
3. *Reduction of light period*: especially if after prolonged periods of light may initiate moult
4. *Ectoparasites*: see below
5. *Hypothyroidism*: results in retardation of feather growth. Normal T_4 levels in birds are lower than mammals.

B. Feather Destructive Behavior [FDB] (aka Feather Picking [or in UK] Feather Plucking) *vs* Pruritus

It may be difficult to differentiate a bird that is truly pruritic due to organic causes from a bird that is feather-picking due to behavioral problems. While the presentation is most commonly due to behavioral problems, more 'organic' causes should always be investigated. It is most commonly a problem with psittacines among pet birds. It is

important to recall that virtually any disease that causes a change/diminishment in feather quality may lead to the bird trying to remove the affected feathers.

- A UK study showed that 39.4% of 137 African grey parrots and 42.4% of 92 cockatoos exhibited feather-plucking behavior at some point in their lifetime.
- Increasing sleep hours, length of ownership correlated with FDB in African greys.
- Pet shop origin, cage location against ≥1 wall and ≥1 vacation per year by owners correlated with FDB in cockatoos

Note: Birds naturally have areas of skin with no feathers between feather tracts. These featherless areas might be visible only during molt because the loss of feathers makes them visible to the owner, who might interpret these areas as indicative of feather loss.

Therefore a thorough diagnostic work up would include investigations for the following:

1. The **behavioral** causes

a. These birds are *prey species*. If they are placed next to a window where they can see crows, hawks, etc., they may compensate for their inability to 'escape' with feather-picking
b. These birds are *gregarious*. A solitary bird, without stimulation ('bored'), may compensate with feather-picking.
c. These birds in the wild spend approximately 50% of their time *foraging*. Having food readily available in the cage may again lead to a 'bored' bird. Having the bird 'work' for its food by putting it in various slightly difficult to open receptacles may be helpful.
d. *Attention seeking* – the owner may be giving unintentional positive reinforcement by interacting with the bird when it performs 'bad behavior' i.e., feather-picking. Ignoring the bird may be helpful – it is beyond the scope of this lecture to talk about behavioral modification training.
e. *Separation anxiety*. Medication such as clomipramine (0.5-1.0 mg/kg *per os* bid or fluoxetine 1-2 mg/kg *per os* bid) may help but must be combined with behavioral modification training.
f. *Overcrowding and social stress* may lead to feather-plucking and stress over territorial rights. A dominant bird may pluck a subordinate.
g. *Sexual frustration* has been thought to be an important cause of feather-picking in cockatoos, lovebirds, and African greys. Hand reared birds may become sexually active as early as 6 months.
h.*Trauma*- any externalor internal injury may be picked at by the bird.

2. The **organic** causes
a. *Ectoparasites*: these can cause pruritus and discomfort. Note: there are many, many species of lice and mites in birds. The following are the most important.

1) lice (various species) are species specific and the life cycle is completely on the host. Only *Mallophaga* (biting lice) affect birds. They are usually easy to see as they travel through the plumage. Louse infestation is a sign of poor husbandry.

2) *Knemidocoptes* spp (sometimes spelt *Cnemidocoptes*) mites affect a number of species of birds. They are found in non-feathered areas, causing 'scaly leg' in

canaries and scaly face in budgerigars, leading to beak malformations. Their life cycle is spent entirely on the bird.

3) *Dermanyssus* (red mites) feed on the bird at night but are free-living and breed in the cage or environment during the day. A white sheet over the cage helps diagnosis in the morning by visualizing the mites. These mites can attack mammals including humans. Most commonly a parasite of chickens.

4) feather mites- these usually do cause problems unless there is a heavy infestation, in which case poor husbandry should be suspected. Budgerigars have at least two species: *Protolichus lunula* on the wing and tail feathers and *Dubininia melopsittaci* on smaller body feathers.

5) *Harpyrhynchid* spp. Several of these affect psittacines, *H serini* affects canaries. They attach to feather bases and in severe cases cause hyperkeratotic epidermal cysts.

Treatments for ectoparasites: Fipronyl spray (Frontline®) or selamectin spot-on (Revolution® [Stronghold® in Europe]) have all been recommended. If using a spray it is important NOT to soak the bird. Lately, the isoxazolines (afoxolaner, fluralaner) have been shown to be useful and safe in treating mites and lice)

Points to remember: Imidacloprid (Advantage®) is <u>toxic</u> to birds; ivermectin <u>should not be given</u> to finches.

b. *Endoparasites*: *Giardia* infection has been linked to pruritus in budgerigars, lovebirds, and cockatiels

c. *Allergies*: while there is good evidence of an atopic-dermatitis-type condition in some birds (especially large psittacines) based on intradermal testing, effective and safe treatment has not been well substantiated.

d. *Environmental*: 1) excess tobacco smoke, aerosols, building dust, low humidity (central heating turned up) lack of bathing opportunities, and abnormal photoperiods(not enough dark time) may all lead to pruritus or poor father quality which result in brittle feathers which break as the bird plucks them. Many psittacines evolved in rain forest conditions, and a dry environment may lead to poor quality feathers that the bird will try to remove. These birds may benefit from water misting.

e. *Hypothyroidism*: see above

f. *Heavy metal toxicity*: primarily lead, zinc, copper or iron, generally from new cages or toys, may cause abnormal feathers to develop that the bird tries to remove.

g. *Liver disease*: example *Chlamydophila* infection. This can cause many clinical signs, but skin-wise may cause pruritus with subsequent feather removal.

h. *Bacterial dermatitis*: folliculitis/pulpitis has been reported especially in the developing feather. *Staphylococcus aureus* and *Staphylococcus intermedius* have been isolated from birds – the frequency of these organisms causing infection and subsequent pruritus is not known. Recent studies suggest that the uropygial gland secretions may have broad anti-microbial properties.

i. *Fungal infections*: these may be underdiagnosed. *Candida* has been reported especially in gallinaceous birds in the vet area and in pet birds around the head – feather follicle involvement shows white crusting around the affected follicles. Dermatophytes may cause patchy feather loss especially on the head, neck and breast. *Malassezia* has been implicate as a cause of pruritus by some authors.

Point to remember: Itraconazole may be toxic to Grey parrots

j. *Viral infections*: see below
k. *Genetic abnormalities*: 'feather dusters' and 'straw feather' affect budgerigars. These interesting names describe the visual appearance of the affected birds. Feather cysts occur in certain lines of canaries.
l. *Neoplasia*: birds may pluck over the site of a skin cancer

II. Feather abnormalities
A. Genetics- see above
B. Viral diseases
1. *Circovirus* (aka Psittacine Beak and Feather disease – PBFD). A DNA virus which can remain in the environment for up to one year. Several strains: PBFD I is found in many species while PBFD is found in lorikeets. More common in young bird and in Old World psittacines. Several presentations:
a. Peracute (usually no skin signs)
b. acute(occurs during first feather formation and leads to rapid development of dystrophic feathers);
c. chronic (birds 6 months to 3 years old, leads to dystrophic feathers, lack of powder down, pulp cavity hemorrhage, feather fracture, hyperkeratosis, beak overgrowth or fracture, oral ulcerations. As the disease is immunosuppressive, secondary infections are common).
Diagnosis is via PCR on the blood or pulpy feathers. Treatment is supportive care. The disease in lorikeets may be less severe and full recovery may be possible.
2. *Polyoma virus*. Another DNA virus which affects all psitacines and passerines (watch for finches with beak overgrowth). Clinical signs in budgerigars include neonatal death which can cause reduced down and contour feathers. If the neonates survive, they lose tail and flight feathers and are known as 'French moulters', 'runners', 'creepers' or 'crawlers. PBFD can cause similar signs and is probably more common. This feather loss will eventually resolve but the birds are carriers. The disease is much less common in other psittacines and typically only affects very young birds. In passerines acute death is the most common presentation, but beak and feather abnormalities may also be present. Diagnosis is by PCR, but the psittacine PCR does not work in finches.

III. Cutaneous Neoplasia
A. *Poxvirus* A DNA virus. Pox viral infections can affect the oral cavity, the trachea, and can cause a septicemia. In the skin, the virus causes nodules, papules, or vesicles. This cutaneous form is most common in songbirds and raptors affecting the feet, eyes and face. Canaries and finches, in addition to the skin lesions, will often develop severe pulmonary complications. Lovebird pox causes lesions on the face, oral and nasal cavities, axilla, shoulder and abdomen – lesions are discolored, pruritic and often infected secondarily with bacteria. The form affecting Amazon parrots is self-limiting for skin lesions but often fatal with the diptheric (oral cavity and trachea) form. Diagnosis is through histology or impressions smears demonstrating the intra-cytoplasmic eosinophilic inclusion (Bollinger) bodies. As pox virus is spread via insect vectors, control of pests is important.

B. *Papilloma virus*. Yet another DNA virus, this one causes benign epithelial tumors, often affecting the cloaca, oral cavity or skin. Usual treatment is surgical removal if practical. Spontaneous remission has been described.

Final thoughts

If a biopsy is to be performed, the following protocol has been suggested (for Langlois I, reference below):
Use punch biopsy technique using tape to prevent the skin from rolling or balling up. Apply nontranslucent self-adhesive tape on the skin of the chosen sites before performing the biopsy. Perform biopsy through the tape by applying gentle force to the biopsy punch as it is twisted clockwise and counterclockwise. Once the tape is punched through, only minimal pressure is required to go through the skin.

Psittacines are prone to high cholesterol and atherosclerosis. Do not feed them all-seed diets, as seeds are high in fats but low in most other nutrients, and therefore may facilitate artherosclerosis; human food like cheeses and eggs should also be avoided.

Avocados are poisonous to birds, as they contain persin, which is toxic to the heart. Common signs of persin toxicity in birds are collapse, lethargy, heavy breathing, and sudden death.

Quotes from Dr. Krista Keller, DVM, Dipl ACZM Assistant Professor, College of Veterinary Medicine, University of Illinois:
“A bird that has ingested avocado should be rushed to the nearest emergency veterinary facility.”
“TeflonTM gas is a silent, but rapid killer”
“Lead and zinc, which are toxic to birds, are heavy metals commonly found in household items’ (watch out for metal bells and other metal toys sold for birds).

Psittacines have psittacofulvins, which are pigments similar to the carotenoids that produce red, yellow, and orange in other bird species.

References

Bauck L, Orosz S, Dorrestein G. Avian Dermatology; in *Avian medicine and surgery*. WB Saunders Company; 540-562

Briscoe JA, Morris DO, Rosenthal KL, et al. Evaluation of mucosal and seborrheic sites for staphylococci in two populations of captive psittacines. *J Am Vet Med Assoc* 2009;234:901-905.

Chitty JR. Avian Ectoparasites. . *Proceedings of the British Veterinary Dermatology Study Group* Spring Meeting 2002. pp21-26

Colombini S *et al.* Intradermal skin testing in Hispaniolan parrots (*Amazona vetralis*). *Veterinary Dermatology* 2000; 11: 271-276.

Cooper J, Hariston G. Dermatology; in Ritchie, Harrison and Harrsion (eds) *Avian medicine; principles and applications*. Wingers Publishing; 607-639.

Forbes NA. Clinical approach to feather plucking. *Proceedings of the British Veterinary Dermatology Study Group* Spring Meeting 2002. pp35-43.

Gao G, Xu M, Bai C, et al. Comparative genomics and transcriptomics of *Chrysolophus* provide insights into the evolution of complex plumage coloration*. Gigascience*. 2018;7(10).

Haupaix N, Curantz C, Bailleul R, et al. The periodic coloration in birds forms through a prepattern of somite origin. *Science*. 2018;361(6408).

Höfling E, Abourachid A.The skin of birds' feet: Morphological adaptations of the plantar surface. *J Morphol;* 2021;282:88-97.

Holthaus KB, Eckhart L, Dalla Valle L, et al. Review: Evolution and diversification of corneous beta-proteins, the characteristic epidermal proteins of reptiles and birds. *J Exp Zool B Mol Dev Evol* 2018;330:438-453.

Huynh M, Carnaccini S, Driggers T, Shivaprasad HL. Ulcerative dermatitis and valvular endocarditis associated with *Staphylococcus aureus* in a Hyacinth Macaw (*Anadorhynchus hyacinthinus*). *Avian Diseases*; 58: 223-227

Jayson SL, Williams DL, Wood JLN. Prevalence and risk factors of feather plucking in African grey parrots (*Psittacus erithacus erithacus* and *Psittacus erithacus timneh*) and cockatoos (*Cacatua* spp.). *J Exotic Pet Med* 2014; 23: 250–257.

Jacob S, Sallé L, Zinger L, et al. Chemical regulation of body feather microbiota in a wild bird. *Mol Ecol* 2018 27:1727-1738.

Joshi LR, Bauermann FV, Hain KS, et al. Detection of Fowlpox virus carrying distinct genome segments of Reticuloendotheliosis virus. *Virus Re*s. 2019;260:53-59.

Lamb S, Sobczynski A, Starks D, et al. Bacteria isolated from the skin of Congo African grey parrots (*Psittacus erithacus*), budgerigars (*Melopsittacus undulatus*), and cockatiels (*Nymphicus hollandicus*). *J Avian Med Surg* 2014;28:275-279.

Langlois I. Medical Causes of Feather Damaging Behavior.*Vet Clin North Am Exot Anim Pract*; 2021;24:119-152.

Lawson B, Robinson RA, Fernandez JR, et al. Spatio-temporal dynamics and aetiology of proliferative leg skin lesions in wild British finches. *Sci Rep* 2018; 8:14670.

Meredith A, Pickavance S. Welfare of caged birds. *Vet Rec* 1995;137:571.

Meredith A. Skin Diseases of birds and fish. *Proceedings of the 24th Annual Congress of the ESVD-ECVD* 2010;165-172.

Michael NP, Torres R, Welch AJ, et al. Carotenoid-based skin ornaments reflect foraging propensity in a seabird, *Sula leucogaster*. *Biol Lett* 2018;14.

Paterson S (ed) *Skin Diseases of Exotic Pets*. Blackwell Publishing. 2006 First 5 chapters.

Petersen I, Johannhörster K, Pagot E, et al. Assessment of fluralaner as a treatment in controlling *Dermanyssus gallinae* infestation on commercial layer farms and the potential for resulting benefits of improved bird welfare and productivity. *Parasit Vectors* 2021;14:181.

Preziosi DE, Morris DO, Johnston MS, et al. Distribution of *Malassezia* organisms on the skin of unaffected psittacine birds and psittacine birds with feather-destructive behavior. *J Am Vet Med Assoc* 2006;228:216-21.

Price- Waldman R, Stoddard MC. Avian Coloration Genetics: Recent Advances and Emerging Questions. *J Hered* 2021;112:395-416.

Sadar MJ, Sanchez-Migallon Guzman DLV, Mete A, et al. Mange Caused by a Novel *Micnemidocoptes* Mite in a Golden Eagle (*Aquila chrysaetos*). *J Avian Med Surg*, 2015;29:231-7.

Sioutas G, Minoudi S, Tiligada K, et al.Case of Human Infestation with *Dermanyssus gallinae* (Poultry Red Mite) from Swallows (*Hirundinidae*). *Pathogens* 2021;10(3):299.

Van Poucke S, Creighton R, Baker AS. *Megninia ginglymura* feather mite infestation in a Hamburg poultry flock in the United Kingdom. *Vet Dermatol* 2016;27:127-e35.

van Zeeland YRA, Spruit BM, Rodenburg TB. Feather damaging behaviour in parrots: A review with consideration of comparative aspects. *Appl Anim Behav Sci* 2009; 121:75–95.

Van Zeeland YRA. Skin diseases of brids. Webinar: https://wavd.org/continuing-education/webinars/.

Yarto Jaramillo E, Romero Núñez C, Álvarez Zavala MLÁ, et al. Use of afoxolaner for the treatment of lice (*Goniodes pavonis*) in different genera (*Chrysolophus* spp, *Lophura* spp, *Phasianus* spp, and *Syrmaticus* spp) and species of pheasants and West Mexican Chachalacas (*Ortalis poliocephala*). *Vet Parasitol* 2020 Apr;280:109065. doi: 10.1016/j.vetpar.2020.109065. Epub 2020 Feb 27. PMID: 32203695

Yarto Jaramillo E, Osorio Marquez R, Rangel Díaz J, et al. Effect of oral afoxolaner on naturally occurring infestations of peacocks by the louse *Goniodes pavonis*. *Vet Dermatol* 2019;30:167-e50.

Zehnder AM, Swift LA, Sundaram A, et al. Clinical features, treatment, and outcomes of cutaneous and oral squamous cell carcinoma in avian species. *J Am Vet Med Assoc* 2018;252:309-315.

Zepeda Mendoza ML, Roggenbuck M, Manzano Vargas K, et al. Protective role of the vulture facial skin and gut microbiomes aid adaptation to scavenging. *Acta Vet Scand* 2018;60:61.