

Tumour or Infection? Nodular Skin Lesions in Ornamental Birds



Fig. 1: Hand-tame sun conures (*Aratinga solstitialis*)

Picture source: Adobe Stock

The skin of birds, as in mammals, is a target organ for lesions of a wide range of aetiologies. If featherless areas are affected, even minor changes are usually noticed at an early stage, whereas processes beneath the plumage often only become apparent at a later stage. The type of housing also plays a role: birds that regularly have closer contact with humans, such as many psittacines (Fig. 1), are examined much more closely than birds kept in flocks without direct human contact.

Macroscopically, lesions on the beak, eyelids, legs or around the cloaca usually present as plaque-like to nodular changes. Superficial erosions, purulent deposits or bleeding are often observed. In feathered areas, however, the first noticeable sign is often locally ruffled plumage, as the underlying mass alters the position of the feathers.

In principle, neoplastic and non-neoplastic masses can be distinguished; the latter can be further divided into infectious and non-infectious causes. However, differentiation based solely on macroscopic appearance is generally not possible, meaning that cytological and histopathological examinations are essential for further diagnosis.

Fine-needle aspiration is a minimally invasive method and in many cases already provides valuable information about the nature of the lesion. However, it should be noted that obtaining diagnostically relevant material can be difficult, particularly in the case of cavernous or very firm masses. In addition, secondary inflammation and bacterial infections can obscure the underlying process. Care must be taken when collecting cells, as cell damage (e.g. due to excessive pressure when spreading the material) or smears that are too thick (i.e. without a monolayer) can impair evaluation. This should be taken into account both when preparing impression smears and when performing aspiration.

Neoplastic Skin Lesions

Neoplastic proliferations can generally be of epithelial or mesenchymal origin or arise from round cells. It should be noted that neoplasms may develop primarily in the skin or occur secondarily as a result of metastasis.

1. Epithelial Tumours

Sites predisposed to the development of epithelial tumours include the eyelids, oral cavity, legs and uropygial gland. Squamous cell carcinoma is a commonly diagnosed malignant tumour. Even small lesions tend to ulcerate and develop secondary crusting, meaning that an inflammatory process is often initially suspected clinically. Cytological diagnosis can be complicated by these secondary changes. Histologically, however, invasive growth, atypical keratinisation and, where applicable, vascular invasion can be reliably identified (Fig. 2).

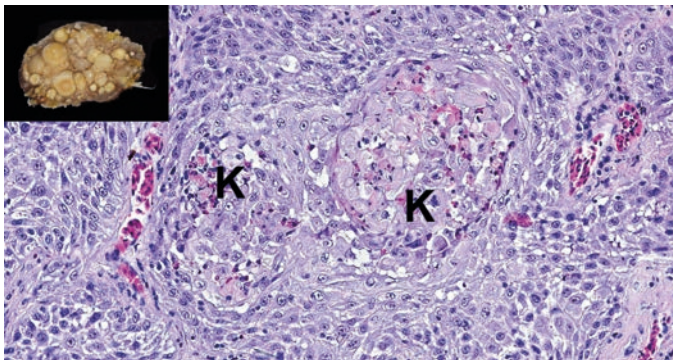


Fig. 2: Histology of a squamous cell carcinoma in the uropygial gland of a budgerigar (inset). The tumour cells show marked pleomorphism and atypical keratinisation (K)

Picture source: Laboklin

Benign epithelial neoplasms are often papillomas. These are caused by host-specific papillomaviruses, which lead to wart-like lesions of the skin or mucous membranes. Although these are benign proliferations, their rapid growth can result in mechanical impairment (e.g. in the beak). The gold standard for diagnosis is histopathological examination of the tissue and the identification of basophilic intranuclear viral inclusion bodies.

In the region of the uropygial gland, hyperplasia and adenomas can occur in addition to malignant neoplasms. Cytologically, it is not possible to differentiate between these latter two changes, as both consist of well-differentiated epithelial cells. Particularly in association with hypovitaminosis A, pronounced keratinisation with hyperplastic epithelial proliferation may also occur.

2. Mesenchymal and Melanocytic Tumours

Mesenchymal tumours are often malignant, with fibrosarcomas in particular being regularly observed. Chronic skin injuries, for example as a result of self-mutilation or injuries inflicted by other birds, are considered predisposing factors for the development of such sarcomas.

Clinically and cytologically, it is often difficult to distinguish granulation tissue from a sarcoma, particularly in the case of extensive or firm lesions. Cytology may reveal highly activated and atypical-looking fibroblasts, which can also occur as part of physiological wound healing processes. In such cases, histopathological examination is the method of choice for further investigation.

Haemangiosarcomas and melanocytic tumours are rare in ornamental birds. Here too, histopathological examination is essential for assessing malignancy.

Benign mesenchymal tumours include haemangiomas, fibromas and lipomas. The first two entities are often difficult to assess cytologically, as only a small number of cells can be obtained from cavernous and firm tissues. Lipomas, on the other hand, are readily amenable to cytological examination, as adipocytes can be easily aspirated. However, histopathological examination is also required here for a definitive assessment, particularly to distinguish the lesion from the surrounding tissue.

3. Round Cell Tumours

Malignant lymphoma is the most common round cell tumour of the skin. The diagnosis can be established by cytological or histopathological identification of an atypical lymphoid cell population. An exclusively cutaneous manifestation is rare; in most cases, systemic disease is already present at the time of diagnosis.

While a viral aetiology (Gallid alphaherpesvirus 2) is known in chickens, no corresponding association has so far been demonstrated in ornamental birds.

Non-neoplastic Skin Lesions

In addition to neoplasms, non-infectious inflammatory processes can also present as nodular lesions.

1. Non-infectious

1.1 Feather Follicle Cysts

Feather follicle cysts are non-neoplastic skin lesions that occur particularly frequently in budgerigars and certain canary breeds (Fig. 3). They often have a high recurrence rate and may occur as multiple lesions. A developmental disorder, possibly of genetic origin, is considered to be the underlying cause. Cytologically, abundant keratin can usually be aspirated, while histologically, dilated feather follicles with marked hyperkeratosis are observed.



Fig. 3: Feather follicle cysts in the skin of a budgerigar
Picture source: Laboklin

1.2 Polyps

Polyps are benign proliferations of the mucous membrane or skin, consisting of differentiated epithelium and underlying connective tissue. They often occur in association with chronic inflammation and particularly affect the oral cavity, eyelids and cloacal region.

1.3 Gout and Pseudogout

Both conditions are characterised by the deposition of metabolic products in the joints and can present clinically as nodules. Gout involves urate deposits, while pseudogout involves calcium crystals. In advanced cases, material can be aspirated and differentiated cytologically. Histological examination may only be possible to a limited extent depending on the location, but can provide additional information in easily accessible lesions.

1.4 Xanthomas

Xanthomas are focal to multifocal accumulations of lipid-laden macrophages, frequently occurring in the breast and wings. Clinically, they appear as yellowish-orange, firm thickenings. They are often associated with elevated blood lipid levels, for example as a result of a high-fat diet. Diagnosis is

made cytologically or histologically. An important differential diagnosis is mycobacteriosis, which should be investigated using special stains (see below).

2. Infectious

Infectious diseases can also be associated with nodular skin lesions.

2.1 Abscesses

Following skin injuries, bacterial infections can lead to abscess formation. Cytologically, numerous intact or degenerated heterophilic granulocytes can be observed. Histologically, the diagnosis can be confirmed by identifying a pyogenic membrane and a capsule-like boundary.

2.2 Avian Pox

Infections with avipoxviruses occur in many bird species and show a high degree of host specificity. Featherless areas of the skin are preferentially affected. A pronounced epithelial proliferation is characteristic, although secondary bacterial infections can complicate the appearance. This makes cytological assessment more difficult, meaning that histopathological examination of biopsies taken from the edge of the lesion is the method of choice. Large eosinophilic cytoplasmic inclusion bodies are diagnostically characteristic (Fig. 4); PCR testing can be used to confirm the aetiology.

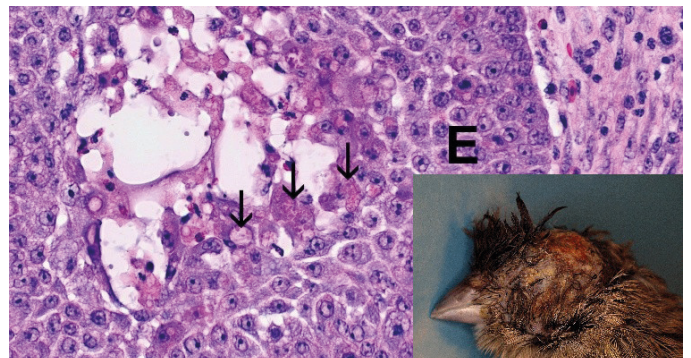


Fig. 4: Histology of a cutaneous poxvirus infection in a canary (inset). Numerous eosinophilic inclusion bodies (arrows) are present in the cytoplasm of the epithelial cells (E)
Picture source: Laboklin

2.3 Mycobacterial Granulomas

Mycobacterial infections can generally lead to systemic infections with organ involvement (lungs, liver, intestines), but local cutaneous lesions can also occur (Fig. 5). These pathogens are zoonotic, and detection in both birds and mammals is subject to mandatory notification under the German Animal

Diseases Notification Regulation (TierSeuchMeldV). Using Ziehl–Neelsen staining, acid-fast bacilli can be detected both cytologically and histologically in the cytoplasm of macrophages and in necrotic material from caseous lesions. Further differentiation of the pathogens (e.g. by culture or PCR) is of interest in order to better assess their zoonotic potential.

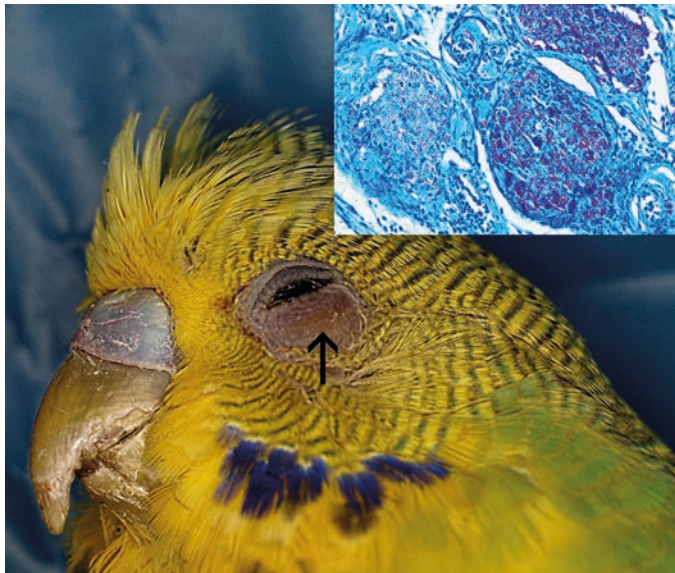


Fig. 5: Severe conjunctivitis in a budgerigar (mycobacterial infection); inset (Ziehl–Neelsen stain): severe granulomatous conjunctivitis with numerous intracellular acid-fast bacilli (red)
Picture source: Laboklin

Conclusion

A wide range of diseases can manifest as nodular skin lesions, and clinically distinguishing a neoplastic process from inflammation or infection can be challenging. When interpreted in the clinical context, cytological examination of smear preparations and histopathological evaluation of tissue samples from representative affected sites are the gold standard for differentiating these lesions.

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Services Related to This Topic

- Cytology / cytology requiring additional processing
- Histopathology / histopathology requiring additional processing
- Bacteriology (aerobic/anaerobic)
- Mycobacteria (Ziehl–Neelsen staining, culture, PCR)
- Pathogen detection by PCR (e.g. mycobacteria, avipoxvirus, herpesviruses)

Further reading

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Latimer KS, Rakich PM. Avian cytology. Vet Clin Exot Anim Pract. 2007;10(1):131–154. doi:10.1016/j.cvex.2006.10.004.