The nose knows and paws for thought

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Pathologists' perspective

Canine nasal planum disease

1. Differential diagnoses for nasal planum diseases in dogs can be refined significantly based on the signalment, location and identification of primary lesions.
2. However, almost all primary nasal planum disease results in secondary pyoderma by the time of clinical presentation = mucocutaneous pyoderma (MCP) which obscures underlying primary lesions.
   a. Results in misdiagnosis and/or repeat biopsies.
   b. Treat the infection first to help identify the primary process.
3. MCP is rarely a primary disease process.
   a. Suspected in German shepherds and other breeds but frequently have underlying/concurrent skin disease, e.g. allergies.
   b. Diagnosis relies on complete resolution with appropriate antimicrobial treatment.
4. Clinically and histologically MCP mimics other primary diseases, e.g. discoid lupus erythematosus (DLE) including depigmentation.
   a. Recommendations now include at least 35d parenteral AND topical broad spectrum antibiotics prior to biopsy for suspect DLE cases.
5. Any cause of nasal discharge causes MCP of the nasal planum due to maceration which reduces barrier function and allows localised microbial proliferation and inflammation.
   a. Usually ventral aspect of external nares.
   b. Erosions, crusts and depigmentation (not specific for aspergillosis).
6. Licking behaviour due to any primary nasal planum/mucocutaneous disease or nasal discharge causes maceration, microtrauma and secondary MCP of the nasal planum.
   a. Primary mucocutaneous disease can appear to involve nasal planum.
   b. Focal clinical lesions can appear more diffuse.
7. Identify MCP (primary or secondary) with cytology of impression smears.
   a. Intact or degenerate neutrophils +/- bacteria (usually cocci).
8. In cases where DLE is not suspected and biopsies are to be performed, MCP must be treated first for 7-14d with antimicrobials with biopsies taken just before finishing treatment if clinical lesions are still evident.

Table 1. Differential diagnoses for canine nasal planum and muzzle diseases.

Disease / Condition	Clinical lesions	Nasal planum (non-haired skin)	Muzzle (haired skin)	Other MC junctions	Footpads	Haired skin	Oral
Alar arteropathy (German shepherd)	CU	Y	N	N	N	N	N
Proliferative arteritis (St Bernards)	CU	Y	N	N	N	N	N
Hereditary nasal parakeratosis of Labradors	HK	Y	N	N	N	N	N
Nasodigital hyperkeratosis	HK	Y	N	N	Y	N	N
Xeromycteria / parasympathetic nose	HK	Y	N	KCS	N	N	N
Mucous membrane pemphigoid	CU	Y	N	Y	N	N	Y
Pemphigus vulgaris	CU	Y	N	Y	Y	N	Y
Dermatophytosis	CU	Y	Y	N	N	Y	N
Solar vasculopathy	CU, D	Y	Y	N	N	N	N
Discoid lupus erythematous	CU, D	Y	Y	Y	N	N	N

Mucocutaneous pyoderma	CU	Y	Y	Y	N	N	N
Uveodermatologic syndrome	D	Y	Y	Y Uveitis	N	N	Y
Vitiligo	D	Y	Y	Y	Y	N	N
Reactive histiocytosis	NO	Y	Y	Y	N	Y	N
Zinc responsive dermatosis	HK	Y	Y	Y	Y	Y	N
Pemphigus foliaceus	CU	Y	Y	Y	Y	Y	N
Epitheliotropic lymphoma	D	Y	Y	Y	Y	Y	Y
Squamous cell carcinoma	CU, NO	Y	Y	N	N	Y	Y
Mucocutaneous lupus erythematosus	CU, D	N	Y	Y	N	N	N
Hepatocutaneous syndrome	HK	N	Y	Y	Y	N	N
Eosinophilic furunculosis of the face	CU, NO	N	Y	N	N	N	N
Hypersensitivity/Malassezia	CU	N	Y	Y	N	Y	N

CU=crusting/ulcerative; D=depigmenting; HK=hyperkeratotic; N=nodular; KCS=keratoconjunctivitis sicca

Special notes

1. Diagnostic workup of nasal planum and muzzle disease in German shepherds can be particularly challenging, especially if there is secondary mucocutaneous pyoderma as they are predisposed to:
   a. Localised DLE.
   b. Mucocutaneous lupus erythematosus.
   c. Mucous membrane pemphigoid.
   d. Atopic dermatitis.
   e. Primary mucocutaneous pyoderma.
   f. Alar arteropathy.
2. Any Nordic breed, e.g. akitas, huskies, samoyeds, chows etc. with depigmenting nasal planum or mucocutaneous junctions should have an ophthalmic exam as soon as possible in case of uveodermatologic syndrome.
3. Solar vasculopathy in dogs is usually secondary to depigmenting diseases such as DLE therefore most commonly seen on the nasal planum or adjacent haired skin.
   It can also occur in unpigmented non-haired or thinly haired skin often in association with other actinic lesions e.g. actinic keratosis, furunculosis, solar elastosis and fibrosis and squamous cell in situ.
   Lesions only occur in non-pigmented skin therefore are often extremely well demarcated with the margin of pigmented skin. Lesions consist of erosions, crusts, and alopecia (if haired skin involvement).
4. Cutaneous leishmaniasis can involve the nasal planum and be clinically and histologically indistinguishable from DLE.
   a. Recent cases of Leishmania in New Zealand

Feline nasal planum disease

1. Actinic lesions.
   a. Actinic keratosis.
   b. Squamous cell carcinoma (in situ).
   c. Unpigmented skin.
      i. Nasal planum.
      ii. Pinna tips.
      iii. Eyelids
   d. Focal to bilaterally symmetrical.
2. Bowenoid disease.
   a. Papillomavirus associated.
   b. Pigmented or unpigmented skin.
   c. Usually multifocal.
      i. Viral plaques.
      ii. Basal and squamous cell in situ to invasive carcinomas.

3. Feline Herpesvirus 1.
    a. Vesicular to ulcerative dermatitis.
    b. Focal to multifocal.
    c. Often concurrent upper respiratory disease.
    d. Diagnosis
        i. PCR from dry swab from margin of ulcers.
        ii. Histology
            ◦ Neutrophilic or eosinophilic inflammation.
            ◦ Can sometimes see viral inclusion bodies.
4. Dermatophytosis
    a. Usually haired skin of muzzle – spares nasal planum compared with Trichophyton in dogs.
    b. Hypersensitivities
    c. Mosquito bite.
    d. Eosinophilic granuloma complex including indolent ulcers.
5. Cryptococcus
    a. Dimorphic fungus.
    b. Often localised to muzzle (swelling).
        i. Can become systemic.
    c. Histology diagnostic.
        i. Granulomatous to pyogranulomatous inflammation with encapsulated yeasts.
6. Nocardiosis
    a. Localised distal muzzle swelling.
    b. Variable inflammation.
    c. Can have large numbers of extracellular bacteria.
    d. Histology with culture diagnostic.
        i. Can resemble atypical mycobacteria.
7. Mycobacteriosis
    a. Usually feline leprosy.
    b. Nodular mass/swelling.
    c. Cytology / histology diagnostic.
8. Feline sarcoids.
    a. Papillomavirus associated (FeSarPV).
9. Pemphigus foliaceus.
    a. Nasal planum and muzzle.
    b. Pinna, pawpads and nailbeds.
    c. Mammillae
10. Paraneoplastic alopecia.
    a. Rare disease usually secondary to pancreatic carcinoma.
    b. Easily exfoliated coat with underlying shiny skin.
    c. Smooth shiny to targetoid hyperkeratotic nasal planum and pawpads.
11. Facial dermatitis of Persian and Himalayan cats.
    a. Haired skin especially facial folds and periorbital areas.
        i. Can affect muzzle.
        ii. Waxy adherent debris.
    b. Ceruminous otitis externa.
12. Ulcerative planum nasale in Bengal cats.
    a. Idiopathic
    b. Crusts, fissures and ulcers.
    c. Young age of onset (4-12 months).

Canine paw, claw and pad diseases – a pathologist's perspective

The most commonly biopsied dermatological conditions of the paws include:

1. Sloughed nails (onychoamadesis).
    a. Lupoid onychitis (Symmetrical lupoid onychodystrophy).
        i. Immune mediated disease that targets nailbed epidermis.

- Genetic predisposition identified in bearded collies.

ii. No other haired or non-haired skin disease.
iii. Multiple nails on multiple limbs.
- Clinically distinctive therefore don't usually need to biopsy.

b. Nailbed biopsy or amputation.
i. Target digit with intact nail but evidence of swelling, pain or discolouration.
ii. Nailbed biopsy without amputation can be done.
iii. Don't send sloughed nail.

c. Ischaemic dermatopathies including dermatomyositis.
i. Can be multiple digits on multiple limbs.
ii. Usually other cutaneous lesions, e.g. alopecia, crusts or erosions
iii. Histology required for differentiation.
- Target haired or non-haired skin, not nailbed or digit amputation.

d. Epidermolysis bullosa acquisita.
i. Vesiculobullous immune mediated disease.
ii. Can affect multiple nails on multiple feet.
iii. Usually lesions in other areas of haired or non-haired skin, e.g. pawpads.
iv. Often oral lesions (vesicles, ulcers).

e. Fungal paronychia.
i. Dermatophyte infection of nail.
ii. Usually restricted to one or two nails on same paw.
iii. Dermatophyte culture of sloughed nail can be diagnostic.
- Histology too difficult as nail keratin too hard to section without artefact.

f. Epitheliotrophic lymphoma.
i. Extremely rare cause of nail sloughing.
- Only if germinal nailbed epidermis involved in pawpad cases.

2. Non-neoplastic masses, furunculosis and fistulae.
a. Fibroadnexal dysplasia.
i. Non-neoplastic mass of dysplastic adnexa and fibrosis.
ii. Usually forms at places of localised trauma or chronic irritation.
iii. Entrapped hair follicles become cystic and rupture.
- Leads to severe inflammatory response (furunculosis).

iv. Digital masses occur most commonly due to abnormal weight bearing on haired skin adjacent to pads.
- Poor conformation.
- Lameness
- Alopecic and thickened skin (false pad) +/- fistulae (can be dorsal interdigital webs due to path of least resistance).

b. Interdigital furunculosis.
i. Occurs in interdigital webs in dogs with short-bristle like coats.
- Often also breeds with poor conformation e.g. Boxers, bulldogs so may be similar pathogenesis
- Primary lesions are dilated hair follicles which rupture causing furunculosis that can appear cystic clinically.

c. Demodicosis
i. Intrafollicular mites predispose to furunculosis.
ii. Haired skin only.
- Can be localised to the paws including interdigital areas.
- Difficult area to skin scrape.
- Hair plucks or biopsies.

d. Dermatophytosis
i. Folliculitis and furunculosis.
ii. Can be difficult to visualise dermatophytes on histology with furunculosis.
iii. Culture crusts and associated hair shafts.

Note: Regardless of the cause of furunculosis, free keratin and hair shafts act as highly irritant, sterile microscopic foreign bodies resulting in self-trauma, recurrent fistulation and secondary bacterial and yeast infections.

   iv. Can take up to nine months for free keratin and hair shaft fragments to be completely removed by macrophages.
e. Metatarsal/metacarpal fistulation of German shepherds – rarely other breeds.
   i. Bilaterally symmetrical. Metatarsal>metacarpal.
   ii. Deep pyoderma/panniculitis with fistulation– initially sterile but secondary infection common.
   iii. Clinically distinctive.
   iv. Histology non-specific.
      ◦ Resembles foreign body reactions or furunculosis.
f. Foreign bodies.
   i. Also cause pyogranulomatous inflammation with or without furunculosis
   ii. Differential diagnosis for other causes of pyogranulomatous inflammation identified cytologically or histologically.

3. Pawpad hyperkeratosis.
   a. Familial
      i. Restricted to footpads, e.g. Dogue de Bordeaux, Irish terrier.
   b. Nasodigital hyperkeratosis.
      i. Nasal planum and footpads.
      ii. Middle age to older dogs – possible senile change.
      iii. Footpads have peripheral rim of hyperkeratosis in non-eight-bearing areas.
   c. Ichthyosis
      i. Heritable condition – Jack Russell terriers, bulldogs, Cavalier King Charles spaniels (concurrent keratoconjunctivitis sicca).
         ◦ Golden retrievers have milder form of disease.
      ii. Generalised hyperkeratosis including footpads and nasal planum.
   d. Hypoxia
      i. Epidermal response to hypoxia is epidermal hyperplasia and hyperkeratosis.
      ii. Most commonly due to vasculopathies.
         ◦ Pad hyperkeratosis often centrally located.
   e. Altered weight-bearing.
      i. Leads to asymmetrical hyperkeratosis.
      ii. Can be seen in conjunction with false pad on opposite side of pad.
   f. Metabolic
      i. Hepatocutaneous syndrome.
      ii. Zinc responsive dermatosis.
   g. Split pawpad disease.
      i. Heritable disease – recently identified mutation in KRT5 gene in German Shepherds.
      ii. All pawpads affected.
      iii. Early age of onset 6–12 months.
      iv. Developmental deficit in keratin synthesis.
         ◦ Predisposes to weakness and separation.
   h. Distemper (Hardpad).
      i. Worth considering in New Zealand given recent cases of vaccine-associated canine distemper.
      ii. Pawpad and nasal hyperkeratosis is a more chronic manifestation in infected dogs.
         ◦ Could be preceded by neurological, respiratory or gastrointestinal signs.

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