Allergy, Bacteria & Yeasts

Learning objectives

- Review the diagnosis of allergic skin disease
- How to recognise and diagnose yeast and bacterial infection in allergic patients
- How to treat microbial infections
- How to prevent microbial infections
- Understanding the impact of these infections on diagnosis, treatment requirements

Allergy

- Allergic skin disease in the dog can be caused by:
  1. Fleas
  2. Other parasites esp. Sarcoptic mange
  3. Food allergy (food-induced atopic dermatitis)
  4. Atopic dermatitis

  Individually or in combination
Manifestations of allergy

- Irritation
  - Distinctive areas of involvement
  - Breed phenotypes
- Barrier function defects
  - Primary?
  - Secondary
- Otitis
- Yeast infection
- Bacterial infection

Canine atopic dermatitis

- History and presentation
  - Predisposed breeds
  - Age of onset (6 months to 3 years for most cAD)
  - Often intermittent start
  - Pruritus described in vast majority of dogs
    - First clinical sign (aka pruritus sine material at onset)
  - Secondary changes are common
    - Signs of self trauma – skin and hair
    - Otitis
    - Recurrent pyoderma or yeast overgrowth

- Clinical signs
  - Bilateral pruritus affecting
    - Face
    - Ears
    - Feet
    - Ventral abdomen and perineum
  - Breed specific syndromes
    - e.g. West Highland White v. JRT v. Labrador retriever
  - Wide range of secondary changes
- Bacterial infection
  - Overgrowth
  - Superficial infection
  - Deep infection
- Malassezia dermatitis
  - Localised versus generalised
- Otitis
  - Progression from inflammatory ceruminous otitis to Malassezia and Staphylococcal overgrowth and ultimately Pseudomonas
  - Secondary changes

- Even before overt signs of infection have occurred there are:
  - Increased binding sites for Staphylococci spp. on the skin
  - Increased numbers of bacteria
  - Increased numbers of yeasts
  - On the skin of dogs Staphylococci and yeast are not in competition – synergistic growth!

**Diagnostic process**

1. History and clinical signs consistent with AD
2. Rule out parasites
3. Rule out infections
4. Partial or no response or recurrence
5. Diagnosis of atopic dermatitis
**Important clinical features**

- **Pruritus**
  - An itch that rashes or a rash that itches?
- **Lesions**
- **Multifocal or bilaterally symmetrical**
  - Typical areas
  - BUT not caudal dorsum, tail or ear margins
- **Response or lack of response to steroids**

**Rule out parasites**

**COMPLETELY!**

- *Demodex canis*
- *Demodex injai*
- Scabies
- Fleas
- Other parasites (e.g. Cheyletiellosis & harvest mites)
**Microbial infections**

**Cycle of infection**

- Increased pruritus
- Bacterial and yeast infection
- Barrier function defects
- Further hypersensitivity

**With infection present**

- You cannot see the effects of:
  - Parasite treatment trials
    - e.g. scabies and fleas
  - Food trials
    - Extend these a few weeks beyond clinical cure of infection
    - Food challenge whilst maintaining consistent antimicrobial prophylaxis
    - Keep an open mind if signs of infection return quickly after a food challenge – repeat food challenge!
Anti-pruritic treatments may be deemed ineffective
  - e.g. steroids, oclacitinib and ciclosporin
And bacterial infection may interfere with immunotherapy through reducing regulatory T-cells

Bacterial infection

Bacterial overgrowth

Bacterial overgrowth
  - Increased numbers of bacteria on atopic skin
  - Associated with toxin production, inflammatory reactions and pruritus
  - May be associated with local environmental changes (e.g. intertrigo)
  - Redness, scale & lichenification – pustules and papules absent


* previously some of these were termed surface pyodermas – such pyodermas have a marked neutrophilic exudate (e.g. pyotraumatic dermatitis / wet eczema)
**Superficial pyoderma**

- Superficial pyoderma
  - Pustular / papular lesions
  - Scale and spreading collarettes in superficial spreading pyoderma
  - Neutrophilic exudate and intracytoplasmic cocci

**Deep pyoderma**

- Deep pyoderma
  - Invasion of basement membrane leads to pyogranulomatous inflammation
  - Skin is palpably thickened
  - Crusted, thickened lesions
  - Bullae and discharging sinuses
  - Biopsy may be needed for diagnosis

**Which bacteria?**

- Mostly
  - *Staphylococcus pseudintermedius*
- Also
  - Other coagulase positive Staphylococci (CPS)
    - *Staphylococcus aureus*
    - *Staphylococcus schleiferi subsp. coagulans*
    - Coagulate-negative Staphylococci (CoNS)
- All of these can be meticillin-resistant
  - n.b. In mixed infections treat the *S. pseudintermedius*
Identifying bacterial infection

- Clinical features
  - Typical lesions
  - Often marked exacerbation of pruritus
  - Failure of previously successful anti-pruritic treatments
  - Cytology

  - Culture and susceptibility testing is not very useful in identifying BO or superficial pyoderma

When to culture

- When bacterial infection known or expected
  - Treatment failure/recurrence with cocci present
  - Risk factors for MRS
  - Patient systemically ill
  - Patient requires surgery in near future

  - When rods are present
  - In all cases of deep pyoderma – consider biopsy

Cytology

- Collect material by:
  - Pricking pustule or bulla with needle and collecting pus
  - Direct application of slide to affected area
  - Direct application of adhesive tape to affected area
  - Gently rolling cotton bud on lesion and then on slide
Stain using Diff-Quik or similar
- Slides – use all three stains
  - Methanol
  - Eosin
  - Methylene blue
- Adhesive tale
  - Just methylene blue
- Bacteria are usually blue compared to DNA which is more purple
Deep pyoderma

Evaluate
  - clinical examination
  - ear, skin surface and pustule cytology

Treat pyoderma aggressively

Prevent further disease through
  - Shampoos
  - Ear cleaners
  - Good control of the underlying irritation
  - Measured use of immunosuppressive agents

Treatment policy for pyoderma

Recurrent infection/otitis & flares

Indicates poor control of the disease
  - Flare factors
    - Fleas, change in season / environment / allergen load
  - Inadequate treatment
    - Over-ambitious treatment reduction
      - Cost
      - Concern over drug side-effects
  - New disease
    - e.g. Demodicosis, hypothyroidism or HAC

New disease
Antibiotic therapy

- Clindamycin 5.5–11mg/kg twice daily
- Clavulanate-amoxicillin 20mg/kg twice daily
- Cephalexin 20-30mg/kg twice daily
- Cevopecin 8mg/kg every 14 days
- TMS 30mg/kg twice daily

- Marbofloxacin 2-5.5mg/kg once daily
- Enrofloxacin 5-10mg/kg once daily
- Pradofloxacin 3.0-4.5 mg/kg once daily

Use only when indicated by culture and susceptibility. For mild to moderate superficial pyoderma consider intense topical treatment.

Topical antibiotics

- Fucidic acid creams
  - Fuciderm® and Fusidin®
- Mupirocin
  - Bactroban®

Should we be using these medications as used for MRSA in people?
Role of antibiotics in atopic disease

- In man there has been debate as to whether antibiotics can halt/slow the development of atopic eczema in very young children. The so-called ‘atopic march’


Should all atopic dogs have antibiotics early in treatment?

NO

- Only when bacterial infection demonstrated!

Change of view over last 20 years

Antibiotics safer to use than prednisolone

Prednisolone / ciclosporin / oclacitinib safer to use than antibiotics!
Much better use
- Shampoos
  - Chlorhexidine
  - Ethyl lactate
  - Piroctone olamine
  - (Benzoyl peroxide)
- Wipes
  - Chlorhexidine
  - Boric acid / Acetic acid
  
  Continue these for prophylaxis of infection

Shampoos & wipes used consistently with antibiotics (when indicated) will minimise the development of MRS
- Two pronged approach
- If need to stop baths for practical reasons consider continuing at least 2 weeks beyond antibiotic use.

Bracken – Labrador cross
- Presented at 2 ½ years with 4-5 month history of severe pruritus
  - Treated with prednisolone, chlorphenamine and intermittent antibiotic/steroid creams
- Owner complaint – recurrent pyoderma with mild pruritus
**Long term plan**

- Chlorhexidine wipes twice weekly for the abdomen and axillae
- CLX wipes twice weekly for the ears
- Occasional chlorhexidine baths (6 per annum)
- Improved flea control using an oral agent- Fluralaner 1000mg every 12 weeks
- Skin support diet – high in EFAs

**Yeast infection**

**Types of yeast infection**

- Overt infection
  - Malassezia pachydermatis
  - Erythema, alopecia, greasiness and hyperpigmentation
  - Often in intertriginous areas
  - Smell!
- Hypersensitivity
  - Marked IgE response to Malassezia present in many atopic dogs
**Identifying yeast infection**

- Cytology as for bacteria
  - Adhesive tape technique most appropriate for many sites
  - Single methylene blue method
  - Fast and easy to do in the consulting room
- Demonstrate hypersensitivity
  - In definite cAD cases
  - Serology for Malassezia specific IgE
  - Intradermal allergen testing with Malassezia

**Treatment for yeast infection**

- Degreasing baths
  - E.g. Sebolytic (Virbac)
- Anti-fungal/malassezia baths
  - Miconazole/chlorhexidine
  - Chlorhexidine
  - Enilconazole (not licensed for cats)
- Antiseptic / cleaning baths
  - E.g. Sebomild P or Malacetic shampoo

- Acetic and boric acid wipes
  - Dechra Malacetic cleansing wipes
  - Chlorhexidine wipes
    - ICF CLx Wipes
  - Local application of clotrimazole (Canestan) or miconazole (e.g. Surolan® [Elanco])
Ketoconazole (Nizoral) at 10mg/kg daily initially
- Liver enzymes may become elevated
- Beware when used concurrently with phenobarbitone or ciclosporin
- High incidence of gastro-intestinal upsets

Itraconazole (Sporanox/Itrafungol) at 5mg/kg daily initially
- Lower incidence of side-effects
- Potentially lethal vasculitis in dogs if given at ≥ 10mg/kg in 7.8% of dogs

Try shampoos & wipes first if possible

Immunotherapy
- Possible to include Malassezia in ASIT
- Seems very successful in some cases, but always used concurrently with antifungal baths and/or oral therapy
Inca- Irish Water Spaniel X Labrador

- Presented at 18 months old with 6 month history of Malassezia otitis, ventral pyoderma and irritation
- Clinical examination confirmed massive yeast overgrowth over chin and in ears and between toes and in the axillae
- Completely controlled on
  - Topical chlorhexidine wipes
  - Twice weekly chlorhexidine bath
  - Malassezia immunotherapy
  - Appropriate ear cleaning
    - replacing previous prednisolone & ciclosporin use!

Daisy – West highland white terrier

- Presented at 1 year of age with severe generalised pruritus – marked grease & odour
  - Cytology showed massive Malassezia overgrowth
  - Despite complete resolution of yeast infection on itraconazole, baths and wipes, owner reported that little reduction in pruritus!
  - Owner unwilling to perform baths more than once a week – small amounts of yeast found at rechecks
- Atopica used long-term

Summary

- We have briefly reviewed the diagnosis of canine allergic disease
- The correct identification and treatment of bacterial and yeast infection is key to success in many cases