

# Ectoparasites

## Sarcoptic Mange



### Basics

#### OVERVIEW

- A nonseasonal, intensely pruritic, highly contagious parasitic skin disease of dogs caused by infestation with the mite *Sarcoptes scabiei* var. *canis*
- Mites burrow through the stratum corneum and cause intense pruritus by mechanical irritation, production of irritating byproducts, and secretion of allergenic substances that produce a hypersensitivity reaction in sensitized dogs.

#### SIGNALMENT

Dogs of all ages and breeds

#### SIGNS

- Nonseasonal, extremely intense pruritus
- Alopecia and erythematous rash—elbows, hocks, ventral abdomen, and chest
- Lesions on ear margins—vary from barely perceptible scaling to alopecia or crusts; ear canals not affected
- Chronic—periocular and truncal alopecia; secondary crusts, excoriations, and pyoderma
- Possible peripheral lymphadenopathy
- Frequently bathed dogs—chronic pruritus but no skin lesions
- Dogs—often minimal or no response to anti-inflammatory doses of steroids
- Multiple dog households—more than one dog usually shows signs.

#### CAUSES & RISK FACTORS

- Exposure to a carrier dog 2–6 weeks before development of symptoms
- Living outside (roaming dogs)
- Boarded at kennel
- Visits to veterinarian's office
- Visits to groomer
- Residence at animal shelter



### Diagnosis

#### DIFFERENTIAL DIAGNOSIS

- Food allergy
- Atopy
- *Malassezia* dermatitis
- Flea-allergic dermatitis
- *Cheyletiella*
- Pyoderma
- Demodicosis

- Contact allergy
- *Pelodera* dermatitis
- Pruritic impetigo

#### **CBC/BIOCHEMISTRY/URINALYSIS**

N/A

#### **OTHER LABORATORY TESTS**

- ELISA technique—identify *Sarcoptes*-infested dogs; early studies show good results
- Commercial tests not available

#### **DIAGNOSTIC PROCEDURES**

- Positive pinnal-pedal reflex—rubbing the ear margin between the thumb and forefinger should induce the dog to scratch with the ipsilateral hind leg; occurs in 75%–90% of cases
- Superficial skin scrapings—positive in only 20% of cases
- Fecal flotation—occasionally reveals mites or ova
- Favorable response to scabicial treatment—most common method for tentative diagnosis
- Any dog with nonseasonal pruritus that responds poorly to steroids should be treated with a scabicide (even if skin scrape results are negative) to definitively rule out sarcoptic mange.



### **Treatment**

- Scabicial dips—the entire dog must be treated; treatment failures often linked to owner's reluctance to apply dip to the patient's face and ears; do not let the patient get wet between treatments.
- All in-contact dogs—should be treated, even those with no clinical signs; may be asymptomatic carriers
- Thoroughly clean and treat environment; *Sarcoptes* mites can survive for up to 3 weeks.



### **Medications**

#### **DRUGS**

- Ivermectin—highly effective; 0.2–0.4 mg/kg SC or PO every 1–2 weeks for 2–4 treatments; do not use in herding breeds.
- Milbemycin (Interceptor)—effective when used at 0.75 mg/kg PO q24h; may be effective at 2 mg/kg PO every week for 3 weeks
- Amitraz (Mitaban) dip—250 ppm; may be effective at every 1–2 weeks for 3 treatments; make sure entire body is covered, including the face and ears.
- Whole-body rinse solution—2%–3% solution of lime sulfur (LymDip) or organophosphate (Paramite) dip; apply for 5–6 weeks; make sure entire body is covered, including the face and ears.
- Topical antiseborrheic therapy in conjunction with scabicial therapy helps speed clinical resolution of the lesions.
- Systemic antibiotics—may be needed for 21 days or longer to resolve any secondary pyoderma

- Antihistamines or low-dose glucocorticoids (0.5 mg/kg q12h for 1st week of treatment), if mites were identified; may pruritus diminish more quickly.

#### **CONTRAINDICATIONS/POSSIBLE INTERACTIONS**

Ivermectin—use with extreme caution in collies, Shetland sheepdogs, old English sheepdogs, Australian shepherds, and their crossbreeds; toxicity is more likely to occur in herding-type breeds.



#### **Follow-Up**

- It can take as long as 4–6 weeks for the intense pruritus and clinical signs to resolve, owing to the hypersensitivity reaction.
- Topical treatments are prone to failure, owing to incomplete application of the treatment solution.
- Reinfection can occur if the contact with infected animals continues.



#### **Miscellaneous**

##### **ASSOCIATED CONDITIONS**

- Always consider sarcoptic mange as a possible cause of pruritus in allergic dogs that cease to responsive to steroid therapy.
- Approximately 30% of dogs with *Sarcoptes* infections will also react to house dust mite antigens.

##### **ZOONOTIC POTENTIAL**

People who come in close contact with an affected dog may develop a pruritic, papular rash on their arms, chest, or abdomen; human lesions are usually transient and should resolve spontaneously after the affected animal has been treated; if the lesions persist, clients should seek advice from their dermatologist.

##### **ABBREVIATION**

 ELISA = enzyme-linked immunoadsorbent assay

## **Demodicosis**



#### **Basics**

##### **DEFINITION**

- An inflammatory parasitic disease of dogs and rarely cats that is characterized by an increased number of mites in the hair follicles, which often leads to furunculosis and secondary bacterial infection
- May be localized or generalized in dogs

##### **PATHOPHYSIOLOGY**

##### **Dogs**

- *Demodex canis*—a mite; part of the normal fauna of the skin; typically present in small numbers; resides in the hair follicles and sebaceous glands of the skin
- Pathology develops when numbers exceed that tolerated by the immune system.
- The initial proliferation of mites may be the result of a genetic or immunologic disorder.

#### **Cats**

- Poorly understood disorder
- Mites have been identified on the skin and within the otic canal.
- Two species: *D. cati* and an un-named species

#### **SYSTEMS AFFECTED**

Skin/Exocrine—dead and degenerate *D. canis* mites may be found in noncutaneous sites (e.g., lymph node, intestinal wall, spleen, liver, kidney, urinary bladder, lung, thyroid gland, blood, urine, and feces) and are considered to represent drainage to these areas by blood and/or lymph.

#### **GENETICS**

The initial proliferation of mites may be the result of a genetic disorder.

#### **INCIDENCE/PREVALENCE**

- Dogs—common
- Cats—rare

#### **GEOGRAPHIC DISTRIBUTION**

None

#### **SIGNALMENT**

##### **Species**

Dogs and rarely cats

##### **Breed Predispositions**

Potential increased incidence in Siamese and Burmese cat breeds

##### **Mean Age and Range**

- Localized—usually in young dogs; median age 3–6 months
- Generalized—both young and old animals

##### **Predominant Sex**

None

#### **SIGNS**

##### **Dogs**

Localized

- Lesions—usually mild; consist of erythema and a light scale
- Patches—several may be noted; most common site is the face, especially around the perioral and periocular areas; may also be seen on the trunk and legs

Generalized

- Can be widespread from the onset, with multiple poorly circumscribed patches of erythema, alopecia, and scale
- As hair follicles become distended with large numbers of mites, secondary bacterial infections are common, often with resultant rupturing of the follicle (furunculosis).
- With progression, the skin can become severely inflamed, exudative, and granulomatous.

### **Cats**

- Often characterized by partial to complete multifocal alopecia of the eyelids, periocular region, head, and neck
- Lesions—variably pruritic with erythema, scale, and crust; those caused by the unnamed species are often quite pruritic.
- Ceruminous otitis externa has been reported.

### **CAUSES**

- *Demodex canis*
- *Demodex cati*

### **RISK FACTORS**

#### **Dogs**

- Exact immunopathologic mechanism unknown
- Studies indicate that dogs with generalized demodicosis have a subnormal percentage of IL-2 receptors on their lymphocytes and subnormal IL-2 production.
- Genetic factors, immunosuppression and/or metabolic diseases may predispose animal

#### **Cats**

- Often associated with metabolic diseases (e.g., FIV, systemic lupus erythematosus, diabetes mellitus)
- Unnamed species—short and blunted; rarely a marker for metabolic disease; individual reports indicate that it may be transferable from cat to cat within the same household.



## **Diagnosis**

### **DIFFERENTIAL DIAGNOSIS**

#### **Dogs**

- Bacterial folliculitis/furunculosis
- Dermatophytosis
- Contact dermatitis
- Pemphigus complex
- Dermatomyositis
- Systemic lupus erythematosus

#### **Cats**

- Allergic dermatitis
- Scabies

### **CBC/BIOCHEMISTRY/URINALYSIS**

- Nondiagnostic for *Demodex* sp.
- May be useful for identifying underlying metabolic diseases in cats

### **OTHER LABORATORY TESTS**

FeLV and FIV serology—identify underlying metabolic diseases in cats

### **IMAGING**

N/A

### **DIAGNOSTIC PROCEDURES**

- Skin scrapings—diagnostic for finding large numbers of mites in the majority of cases
- Cutaneous biopsy—may be needed when lesions are chronic, granulomatous, and fibrotic (especially on the paw)

#### **PATHOLOGIC FINDINGS**

N/A



### **Treatment**

#### **APPROPRIATE HEALTH CARE**

- Outpatient
- Localized—conservative; most cases (90%) resolve spontaneously with no treatment.
- Evaluate the general health status of dogs with either the localized or the generalized form.

#### **NURSING CARE**

N/A

#### **ACTIVITY**

N/A

#### **DIET**

N/A

#### **CLIENT EDUCATION**

- Localized—most cases resolve spontaneously
- Generalized (adult dog)—frequent management problem; expense and frustration with the chronicity of the problem are issues; many cases are medically controlled, not cured.

#### **SURGICAL CONSIDERATIONS**

N/A



### **Medications**

#### **DRUGS OF CHOICE**

##### ***Amitraz (Mitaban; Taktic-EC)***

- A formamidine, which inhibits monoamine oxidase and prostaglandin synthesis; an  $\alpha_2$ -adrenergic agonist
- Use weekly (the label reads every other week) at 1/2 vial (5 mL)/gal water until resolution of clinical signs and no mites are found on skin scrapings; do not rinse off; let air-dry.
- Treat for one month following negative skin scrape
- Apply a benzoyl peroxide shampoo before application of the dip as a bactericidal therapy and to increase exposure of the mites to the miticide through follicular flushing activity.
- The efficacy is proportional to the frequency of administration and the concentration of the dip.
- May be mixed with mineral oil (3 mL amitraz to 30 mL mineral oil) for application to focal areas, such as pododemodosis
- Success with the 9% amitraz collar has not been established, although there are positive anecdotal reports.

- Between 11% and 30% of cases will not be cured; may need to try an alternative therapy or control with maintenance dips every 2–8 weeks.

#### ***Ivermectin (Ivomec; Eqvalan Liquid)***

- A macrocyclic lactone with GABA agonist activity.
- Daily oral administration of 0.3–0.6 mg/kg very effective, even when amitraz fails
- Treat for 60 days beyond negative skin scrapings (average 3–8 months).

#### ***Milbemycin (Interceptor)***

- A macrocyclic lactone with GABA agonist activity
- Dosage of 1 mg/kg PO q24h cures 50% of cases; 2 mg/kg PO q24h cures 85% of cases.
- Treat for 60 days beyond multiple negative skin scrapings.

#### ***Cats***

- Exact protocols are not defined.
- Topical lime-sulfur dips or amitraz solutions applied weekly for 4 treatments often lead to good resolution of clinical signs.

#### **CONTRAINDICATIONS**

Ivermectin—contraindicated in collies, Shetland sheepdogs, old English sheepdogs, other herding breeds, and crosses with these breeds; sensitive breeds appear to tolerate the acaricidal dosages of milbemycin (see above).

#### **PRECAUTIONS**

##### ***Amitraz***

- Most common side effects—somnolence, lethargy, depression, anorexia seen in 30% of patients for 12–36 hr after treatment
- Other side effects—vomiting, diarrhea, pruritus, polyuria, mydriasis, bradycardia, hypoventilation, hypotension, hypothermia, ataxia, ileus, bloat, hyperglycemia, convulsions, death
- The incidence and severity of side effects do not appear to be proportional to the dose or frequency of use.
- Humans can develop dermatitis, headaches, and respiratory difficulty after exposure.
- Yohimbine at 0.11 mg/kg IV is an antidote.

##### ***Ivermectin and Milbemycin***

Signs of toxicity—salivation, vomiting, mydriasis, confusion, ataxia, hypersensitivity to sound, weakness, recumbency, coma, and death

#### **POSSIBLE INTERACTIONS**

- Amitraz—may interact with heterocyclic antidepressants, xylazine, benzodiazepines, and macrocyclic lactones
- Ivermectin and milbemycin—cause elevated levels of monoamine neurotransmitter metabolites, which could result in adverse drug interactions with amitraz and benzodiazepines

#### **ALTERNATIVE DRUGS**

None



#### **Follow-Up**

#### **PATIENT MONITORING**

Multiple skin scrapings and evidence of clinical resolution are used to monitor progress.

#### **PREVENTION/AVOIDANCE**

Avoid breeding animals with generalized form

#### **POSSIBLE COMPLICATIONS**

Secondary bacterial infections

#### **EXPECTED COURSE AND PROGNOSIS**

- Prognosis (dogs)—depends heavily on genetic, immunologic, and underlying diseases
- Localized—most cases (90%) resolve spontaneously with no treatment; < 10% progress to the generalized form
- Adult-onset (dogs)—often severe and refractory to treatment



### **Miscellaneous**

#### **ASSOCIATED CONDITIONS**

Adult-onset—sudden occurrence is often associated with internal disease, malignant neoplasia, and/or immunosuppressive disease; approximately 25% of cases are idiopathic over a follow-up period of 1–2 years.

#### **AGE-RELATED FACTORS**

Young dogs are often predisposed.

#### **ZOONOTIC POTENTIAL**

None

#### **PREGNANCY**

Do not breed animals with the generalized form.

#### **SYNONYMS**

Mange

#### **ABBREVIATIONS**

- FeLV = feline leukemia virus
- FIV = feline immunodeficiency virus
- GABA =  $\gamma$ -aminobutyric acid
- IL = interleukin



### **IMAGES**





