Anti-Parasitic Therapy for Canine Demodicosis

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The parasite problem

- Ecto- and endo- parasites are an important part of veterinary clinical medicine.
- Identification of ectoparasitic infections continues to be a significant portion of daily practice in veterinary dermatology.
- Most domestic animals are predisposed to development of ectoparasitic infections:
  - Sarcoptiform mites
  - Demodex mites
  - Psoroptiform mites
  - Many others
Canine demodicosis

Demodex canis

Demodex injai

Demodex cornei
Canine demodicosis

• One of the most common dermatologic diseases in dogs

• Prevalence in
  – North America: 0.38%-0.58%
  – Mexico: 23%
  – Korea: 5%
  – India: 3%
Treatment of demodicosis

• Only one FDA-approved treatment
  – Amitraz
    • Monoamine oxidase inhibitor (MAOI)
    • Alpha-2 adrenergic properties
    • Inhibits prostaglandin synthesis
    • Leads to over-excitation \(\rightarrow\) paralysis \(\rightarrow\) death in insects
    • Available only as a topical treatment
    • High risk for adverse effects: sedation, bradycardia, vomiting, ataxia, vomiting, diarrhea, hyperglycemia
Treatment of demodicosis

- Macrocyclic lactones
  - Ivermectin
    - Most common off-label treatment for many years
    - Daily oral therapy required for ~3-9 months
  - Others:
    - Milbemycin (oral)
    - Moxidectin (oral and topical)
    - Doramectin (injectable)
Macrocyclic lactones

• Toxicity can occur
• Easy to overdose
• ABCB1- Δ1 (formerly MDR1) mutation
  – Encodes for P-glycoprotein transmembrane protein pump
  – Mutation common in herding breed dogs and their crosses
• Signs of toxicity: mydriasis, ataxia, sedation, stupor, coma, hypersalivation, vomiting, diarrhea, blindness, tremors, seizures, respiratory depression
Newest treatment options

• Newest class of parasiticide discovered in early 2000s
  – Isoxazolines
  – GABA receptor antagonists
  – Bind to chloride channels in nerves and muscles → blocks transmission of neuronal signals → paralysis → death of insects
  – Considered very safe with minimal side effects
    • Vomiting immediately after administration is most common
Isoxazolines

- Licensed in the USA as flea and tick preventatives for dogs and some for cats
  - afoxolaner
    - Monthly oral tablet (dogs only)
  - fluralaner
    - Every 3 month oral tablet (dogs only)
    - Every 3 month topical applicator (cats, soon to be available for dogs)
  - sarolaner
    - Monthly oral tablet (dogs only)
Efficacy of oral afoxolane for the treatment of canine generalized demodicosis

Frédéric Beugnet¹,*; Lénaïg Halos¹; Diane Larsen¹; and Christa de Vos²

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² Clinvet International (Pty) Ltd, PO Box 11186, 9321 Universitas, South Africa

Efficacy of orally administered fluralaner (Bravecto™) or topically applied imidacloprid/moxidectin (Advocate®) against generalized demodicosis in dogs

Josephus J Fourie¹,*; Julian E Liebenberg¹; Ivan G Horak²; Janina Taenzler³; Anja R Heckerth³ and Regis Frénais⁴

Efficacy of sarolane, a novel oral isoxazoline, against two common mite infestations: Demodex spp. and Otodectes cynotis

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An aside: feline demodicosis

Demodex gatoi

Demodex cati
Fluralaner shown to be effective for *D. cati*
Anecdotally effective for *D. gatoi*
All isoxazolines effective against Otodectes
Fluralaner also shown to be effective against Psoroptes mites in rabbits and Lynxacarus mites in cats
Normal demodex populations

Afoxolaner and fluralaner treatment do not impact on cutaneous Demodex populations of healthy dogs

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• 20 healthy dogs with no history of skin disease
  – 10 each received afoxolaner or fluralaner
• RT-PCR performed for demodex DNA from hair plucks at d0, d30, d90
• D0 - 5/20 positive; D30 – 3/18 positive; D90 – 6/20 positive
• Treatment with isoxazolines does not impact normal demodex populations
Demodicosis is a common disease in canine patients – severe infections secondary to bacterial skin infections can occur.

Until recently, treatment involved daily administration of oral ivermectin – this required months of treatment and significant risk for side effects.

Treatment of demodicosis (and other parasitic infestations) has been revolutionized by the discovery of the isoxazoline parasiticides.

- Decrease in frequency of administration of medications and quicker resolution of disease have improved both patient and owner quality of life.
References