New treatments for manges in dogs?

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Canine demodicosis

- Most common = D. canis
- No difference in treatment recommendations for the three types of mite

Current approved drug in Canada:
- imidacloprid + moxidectin (Advantage Multi®)
  - "aid in treatment and control"
  - administer monthly for 4 applications
  - administer weekly if severe disease (European claim)
  - stop treatment after 1 month of negative scrapings
New treatments for demodicosis in dogs?

Isoxazolines:
- fluralaner (Bravecto®)
- afoxolaner (NexGard™)
- sarolaner (Simparica®)

fluralaner (Bravecto®)
- Two groups of 8 dogs with generalized demodicosis
  
**Group 1** – fluralaner (25 mg/kg) – once
**Group 2** – imidacloprid (10 mg/kg)/moxidectin (2.5 mg/kg) – 3 times at 28-day intervals

Reduction in mite numbers in scrapings compared to day 0:

<table>
<thead>
<tr>
<th></th>
<th>Day 28</th>
<th>Day 56</th>
<th>Day 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>fluralaner</td>
<td>99.8%</td>
<td>100%*</td>
<td>100%*</td>
</tr>
<tr>
<td>imidacloprid/moxidectin</td>
<td>98.0%</td>
<td>96.5%*</td>
<td>94.7%*</td>
</tr>
</tbody>
</table>

*+, same symbol = significantly different

At 12 weeks after initial treatment: equally effective impact on (↓) skin lesions and (↑) hair regrowth

(flouke et al 2015)

fluralaner (Bravecto®)
- On label in Argentina, Columbia, Mexico, New Zealand, Philippines, South Korea, Taiwan, Thailand and Vietnam - for treatment and control of dogs with demodicosis
- Most cases resolve after single treatment (label dosage)
  - If second treatment, give 3 months later

(N. Colapinto, Nov 14, 2017)
afoxolaner (NexGard™)

- Two groups of 8 dogs with generalized demodicosis

**Group 1** – afoxolaner (≥2.5 mg/kg) – days 0, 14, 28, 56
**Group 2** – imidacloprid (10 mg/kg)/moxidectin (2.5 mg/kg) – days 0, 14, 28, 56

Reduction in mite numbers in scrapings compared to day 0:

<table>
<thead>
<tr>
<th></th>
<th>Day 28</th>
<th>Day 56</th>
<th>Day 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>afoxolaner</td>
<td>99.2%*</td>
<td>99.9%*</td>
<td>100%*</td>
</tr>
<tr>
<td>imidacloroprid/moxidectin</td>
<td>89.8%*</td>
<td>85.2%*</td>
<td>86.6%*</td>
</tr>
</tbody>
</table>

*,+,# same symbol = significantly different

Days 28-84: significantly improved skin condition in group treated with afoxolaner (Beugnet et al 2016)

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afoxolaner (NexGard™)

- Not currently approved for treatment of demodicosis in dogs in any country

**Recommended (off label) treatment protocol:**

- Monthly treatment at 2.5-6.3 mg/kg (label dosage)
  - Majority of cases cleared within 2 months

(F. Rotondo, Nov 7, 2017)

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sarolaner (Simparica®)

- Two groups of 8 dogs with generalized demodicosis

**Group 1** – sarolaner (2 mg/kg) – days 0, 30, 60
**Group 2** – imidacloprid (10 mg/kg)/moxidectin (2.5 mg/kg) – weekly from day 0 to day 81

Reduction in mite numbers in scrapings compared to day 0:

<table>
<thead>
<tr>
<th></th>
<th>Day 14</th>
<th>Day 29</th>
<th>Day 74</th>
</tr>
</thead>
<tbody>
<tr>
<td>sarolaner</td>
<td>97.1%*</td>
<td>99.8%*</td>
<td>100%*</td>
</tr>
<tr>
<td>imidacloprid/moxidectin</td>
<td>84.4%*</td>
<td>95.6%*</td>
<td>100%*</td>
</tr>
</tbody>
</table>

*,+,# same symbol = significantly different

All dogs in both groups: marked clinical improvement (Six et al 2016)
sarolaner (Simparica®)
- On label in Australia and United Kingdom for treatment of dogs with demodicosis

**Recommended treatment protocol:**
- two treatments (2 mg/kg) one month apart

(M. Wamback, Nov 7, 2017)

sarcoptic mange

sarcoptic mange in dogs

Current approved drugs in Canada:
(a) imidacloprid + moxidectin (Advantage Multi®)
- administer monthly for 2 applications

(b) selamectin (Revolution®)
- for complete eradication 2 doses may be required
fluralaner (Bravecto®)

- On label in New Zealand and South Korea - for treatment and control of dogs with sarcoptic mange
- Most cases resolve after single treatment (label dosage)
  - If second treatment, give 3 months later

(N. Colapinto, Nov 14, 2017)

afoxolaner (NexGard™)

- Two groups of 10 dogs with sarcoptic mange
  - **Group 1** – no treatment
  - **Group 2** – afoxolaner (≥2.5 mg/kg) – days 0, 28

Observations:
- Significantly lower mite counts in treated group on days 28 + 56 (no mites)
- Significantly better lesion resolution in treated group on day 56
  - No treated dog exhibited pruritus; 7/10 dogs in control group = pruritic
    (Beugnet et al 2016)
- Two treatments one month apart provide effective and safe treatment of sarcoptic mange in dogs
  (Hampel et al 2017 – poster)

sarolaner (Simparica®)

- 79 dogs with sarcoptic mange
  - **Group 1** – sarolaner (2 mg/kg) – days 0, 30
  - **Group 2** – imidacloprid (10 mg/kg) / moxidectin (2.5 mg/kg) – days 0, 30

Parasitological cure rate:

<table>
<thead>
<tr>
<th></th>
<th>Day 30</th>
<th>Day 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>sarolaner (n = 53)</td>
<td>88.7%</td>
<td>100%</td>
</tr>
<tr>
<td>imidacloprid/moxidectin (n = 26)</td>
<td>84.6%</td>
<td>96.0%</td>
</tr>
</tbody>
</table>

All dogs in both groups: marked clinical improvement
(Becskei et al 2016)
sarolaner (Simparica®)

- On label in the United Kingdom for treatment of dogs with *sarcoptic mange*

**Recommended treatment protocol:**

- Two treatments (2 mg/kg) one month apart

(M. Wamback, Nov 10, 2017)

dogs from northern communities?

Parasite #1?
Diphyllobothrium latum

**Distribution:**
- Alaska, Great Lakes region, northern Europe, Russia, parts of Asia and South America

**Hosts:**
- Adult parasite in small intestine of dogs, cats, people, foxes, mink and other fish-eating animals
  - Fish most commonly infected = perch, pike, walleye

**Clinical signs:**
- Infections in dogs and cats typically subclinical
  - Chains of segments commonly found in feces
D. latum - treatment

- Praziquantel dosage approved for Taenia spp. and Dipylidium caninum (5 mg/kg) often fails to eliminate D. latum infections in dogs/cats

Recommended treatment:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Species</th>
<th>Dosage</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>praziquantel</td>
<td>Dog</td>
<td>7.5 mg/kg*</td>
<td>PO</td>
</tr>
<tr>
<td>praziquantel</td>
<td>Cat</td>
<td>35 mg/kg**</td>
<td>PO</td>
</tr>
</tbody>
</table>

* Some authors recommend second treatment, 24 hours after the first
** Same dosage can be used in dogs

(Sakamoto 1977; Kirkpatrick et al 1987; Bowman 2014; Peregrine unpub)

Echinococcus in Ontario?

- Echinococcus granulosus = northern Ontario
- Echinococcus multilocularis = southern Ontario

Echinococcus
Echinococcus granulosus

www.cdc.gov/parasites/echinococcosis/biology.html
**Echinococcus granulosus**

in Ontario

- Adult tapeworm
- Hydatid cyst (liver, lungs)

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**Life cycle of Echinococcus multilocularis**

- Intermediate Host
- Small rodents
- Human infections

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**Human infections**

- Parasite typically develops in liver:
  - 44-year old woman, 10-month history of intermittent discomfort in upper right abdomen
  - Incubation period usually 5-15 years
Approximate distribution of *E. multilocularis* in central North America

Prevalence of *E. multilocularis* in coyotes and foxes (2015-2017)

- Overall, approximately 25% of wild canids (coyotes, foxes) in southern Ontario tested positive for *E. multilocularis*

Treatment of *E. granulosus* and *E. multilocularis* in the intestine of dogs

Label-approved treatment:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>praziquantel</td>
<td>5.0 mg/kg</td>
<td>PO</td>
</tr>
<tr>
<td></td>
<td>5.7 mg/kg</td>
<td>IM</td>
</tr>
</tbody>
</table>

Note: Not all products for dogs in Canada that contain praziquantel are approved for *Echinococcus* spp.
Dioctophyme renale

Screening for *D. renale* infections in dogs?

- Recognise that:
  - Parasites may be in pelvis of right kidney or free in abdomen
  - Prepatent period = 6 months to 2 years
- Urinalysis?
- Abdominal ultrasound?
Management of dogs infected with *D. renale*?

- Treatment?
- Surgery?
  - Nephrectomy?
  - Exploratory laparotomy?
- Do nothing?

Questions?