The evidence surrounding the role of parasites in intestinal disease

Nicola Kerbyson BVMS Cert AVP (EM) MRCVS
School of Veterinary Medicine
College of Medical, Veterinary and Life Sciences
University of Glasgow
n.kerbyson.1@research.gla.ac.uk

The threat of parasitic disease

- Exposure to complex mixture of parasites
- Heavy burdens common
- Anthelmintic resistance is an increasing concern

Parasites which cause intestinal disease: A review of the evidence and recent developments

Overview

- Strongylus vulgaris
- Parascaris equorum
- Anoplocephala perfoliata
- Cyathostomiasis

Infection due to S. vulgaris

- Thrombi detectable in cranial mesenteric artery 21 days after experimental infection
- L4 larvae migrate to the root of the cranial mesenteric artery


Photographs courtesy of D.Knottenbelt
### Strongylus vulgaris

**Overview**

- The re-emerging parasite!
- **1960s/70s/80s** - Very important parasite, clinical cases common, prevalence 80-100%
- The primary target of all parasite control programs

### Strongylus vulgaris: The current situation

- **1990s/2000s:**
  - Reduction in prevalence
  - Cyathostomins became the primary focus of parasite control
  - Anthelmintic resistance to cyathostomins emerged in the 00s
  - Reduction in anthelmintic use and targeted treatments

- **Sardinia 2011:**
  - 100% of 46 horses had gross pathological lesions attributable to *S. vulgaris*
  - Larvae found in 39% cranial mesenteric arteries
  - Larval culture detection rate: 41%

- **Denmark 2012:**
  - 692 horses
  - Overall prevalence of 12%
  - Farm prevalence:
    - Selective anthelmintic use: 83%
    - No selective anthelmintic use: 39%

### Strongylus vulgaris: The current conundrum

- Are modern anthelmintic control programmes the reason why *S. vulgaris* is re-emerging?
- What should be our focus now?
Parascaris equorum

- Normally young horses
- Prevalence 31-61% (Austin et al. 1990; Lind and Christensson 2009)
- 2 disease `syndromes`
  - Acute due to intestinal obstruction
  - Chronic- lethargy, anorexia, poor weight gain


Overview | S. vulgaris | P. equorum | A. perfoliata | Cyathostomiasis

Parascaris equorum

- Increased risk of acute small intestinal obstruction following anthelmintic administration
- 72% had anthelmintic in preceding 24hrs (Cribb et al. 2006)
- Most likely due to mass of dying worms
- Anthelmintic associated reduction in intestinal motility has been postulated


Overview | S. vulgaris | P. equorum | A. perfoliata | Cyathostomiasis

Treatment of ascarid impaction

- Enterotomy/resection and anastomosis
- Milking impaction into caecum
- Horses undergoing enterotomy appear to have lower long term survival (60% vs 27%)


Overview | S. vulgaris | P. equorum | A. perfoliata | Cyathostomiasis

Prevention

Anthelmintic efficacy to P. equorum expressed as a % egg reduction in a faecal egg count reduction test

<table>
<thead>
<tr>
<th>Ref</th>
<th>FBZ</th>
<th>PYR</th>
<th>IVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geurden et al 2013</td>
<td>100%</td>
<td>100%</td>
<td>48.8%</td>
</tr>
<tr>
<td>Laugier et al 2012</td>
<td>Not tested</td>
<td>Not tested</td>
<td>40-69%</td>
</tr>
<tr>
<td>Lyons et al 2008</td>
<td>84%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Management

- Increase interval of worming to > 8 weeks
- Preserve benzimidazoles for clinical cases
- Delay first treatment of foals to 60-70 days


Tapeworms and colic

- Ileal obstruction

- Ileal impaction

- Ileal rupture

- Caecocaecal intussusception
A. perfoliata - Diagnosis

- Faecal flotation: Good sensitivity only if tapeworm burden is high
- ELISA: Potential for false positive due to persistence of high antibody titres
- For both diagnostic techniques there is conflicting evidence between the infection intensity and incidence of colic - may reflect sensitivity of tests rather than true reflection of relationship.

Cyathostomiasis

- Mortality rate of up to 50% in clinical cases of larval cyathostomiasis
- Marked inflammatory reaction during mucosal penetration and reemergence

Current diagnosis:
- Baermann technique
- Larval culture

The problem with diagnosis:
- Disease caused by larval stage
- Diagnosis currently limited to patent infection - after the damage has been done
- Pre-patent period prolonged
- Pre-patent diagnostic tests would be of immense benefit to equine health.
Cyathostomiasis

- PCR ELISA (Hodgkinson et al 2003)
- Reverse line blot assay (Cwiklinski 2012)

Both require an egg shedding adult worm........

Cyathostomin diagnosis: The future

- A cyathostome specific antigen has been identified (McWilliam et al 2010)
- It has been evaluated in an indirect ELISA
- More work needs to be done to make the ELISA quantitative

Acknowledgements

- Professor Derek Knottenbelt
- Freedom Health
- SIVE