GASTRIC HELICOBACTER INFECTIONS IN DOGS & CATS

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Presentation Aim

(1) To offer guidelines for therapy of gastric Helicobacter spp. infection in dogs and cats

Statement of the Problem

The cause of gastritis in dogs and cats is seldom determined; however, systemic disease, ulcerogenic drugs, and host immune responses to parasites, dietary antigens, and/or bacterial components may all cause mucosal inflammation. Helicobacter spp. infection has been associated with gastric disease in diverse species, including humans, ferrets, cheetahs, pigs, and laboratory animals. To date, numerous gastric Helicobacter spp. have been reported in populations of dogs and cats, including random-source animals, clinically healthy animals, laboratory beagles, and shelter dogs. While Helicobacter organisms are frequently demonstrated in gastric biopsy specimens obtained from sick client-owned dogs and cats, their role in gastritis as a potential pathogen has not been clearly established. Furthermore, the optimal therapy for resolution of clinical signs and eradication of gastric helicobacter infection remains poorly defined.

Diagnosis of Helicobacter Infection

Diagnostic tests include invasive tests (rapid urease test, histopathology, touch cytology, PCR, electron microscopy, FISH), which require an endoscopic/surgical biopsy, and noninvasive tests (urea breath and blood tests, serology). The relative merits of each are listed below:

- **Rapid Urease Test** is based on the production of urease by all gastric Helicobacter spp. Other urease-producing bacteria can give false positive results.
- **Histopathology** is based on the observation of gastric spirillar organisms (GSOs) in gastric biopsy tissue. Special stains, such as silver stains (Warthin-Starry) and Giemsa, will enhance visualization of organisms when colonization density is low. Note that multiple biopsies should be taken from different gastric regions since patchy colonization may be present in dogs and cats.
- **Touch cytology of endoscopic specimens** stained with Giemsa or Diff Quik™ has been shown to be a simple, reliable, and highly sensitive test for diagnosing infection with GSOs. Note that other histologic parameters (mucosal inflammation, lymphoid follicular hyperplasia) cannot be evaluated; and that the mere presence of gastric helicobacters does not equate to infection.
- **Bacterial culture** for GSOs is difficult due to their fastidious growth requirements.
- **PCR** of DNA extracted from biopsy specimens permits diagnosis and identification of gastric Helicobacter spp. Note that extremely low colonization densities may result in negative PCR results.
- **Electron microscopy** may identify organisms based on their spirillar morphology. Recent studies indicate that in vivo organisms may lose their characteristic morphology, and this diagnostic tool is not routinely accessible for clinicians in the field.
- **Fluorescence in situ hybridization (FISH)** utilizes molecular (DNA) probes specific to the 16S rRNA bacterial sequence of Helicobacter spp. organisms. These probes are applied directly to formalin-fixed biopsy specimens and permit detection of the spatial organization of bacteria within gastric tissues. An extremely sensitive and specific diagnostic tool restricted to specific GI laboratories.

The rapid urease test, histopathology, and touch cytology are highly accurate diagnostic tests for the diagnosis of naturally acquired Helicobacter infection in dogs and cats.

Treatment of Helicobacter Infection

A variety of protocols have been proposed, largely based on the human experience with peptic ulcers and H. pylori infection. The criteria for eradication used in Helicobacter-infected human patients are negative urease breath tests, negative gastric urease activity, or negative histopathology with Giemsa or silver stains such as Steiner or Warthin-Starry. The eradication of H. pylori in symptomatic humans has been associated with the attenuation of both symptoms and gastritis. Triple therapy using a proton-pump inhibitor with clarithromycin and amoxicillin or metronidazole given twice daily remains the recommended first choice treatment. Bismuth-containing quadruple therapy, if available, is also a first choice treatment option.
Well-defined guidelines for treating dogs and cats with gastric *Helicobacter* infection have not been formulated. The accumulated data to date would suggest that combination therapy with antimicrobials (e.g., amoxicillin, metronidazole) and acid secretory inhibitors (e.g., famotidine, omeprazole) may not eradicate *Helicobacter* spp. in all dogs and cats. For example, triple therapy with or without famotidine was equally effective in reducing clinical signs of gastritis in dogs 6 months post-treatment, but eradicated gastric bacteria in only 40% of the dogs. Similarly, Happonen et al. (1998) showed that triple therapy for 14 days eradicated gastric helicobacters in 7/9 dogs, but that gastric helicobacters recurred in 4/4 dogs within 3 years of eradication treatment. Whether antibiotic failure was attributable to reinfection or recrudescence in these earlier reports was unclear. In contrast to these other reports evaluating *Helicobacter* spp. status, a pilot study (Happonen et al. 2000) in dogs showed an 80% eradication rate out to 30 days following 1 week of triple therapy with omeprazole, metronidazole, and spiramycin. One recent study (Leib et al. 2007) indicated clearance of gastric helicobacters in dogs and cats out to 14 weeks post-triple therapy.

**Current Treatment Recommendations for Gastric Helicobacter Infection in Dogs and Cats**

1. Use triple therapy consisting of amoxicillin, metronidazole, and bismuth for 21 days.
2. The addition of an acid suppressor (e.g., famotidine = quadruple therapy) does not appear to be more effective than triple therapy.
3. Feed an elimination diet to reduce immunologically mediated gastritis.
4. Rebiopsy to confirm attenuation of gastritis and to confirm eradication, if possible. Note that clinical signs may not correlate with histologic severity of gastritis. Do not biopsy sooner than 4–6 weeks post-therapy since biopsy samples may provide a false positive infection status.

**References**


