Microscopic Findings: Jejunal mucosal nodules corresponded to discrete polyps of proliferative mucosa heavily infected with coccidia (Fig. 1). In proliferative regions, the cytoplasm of most epithelial cells in both the crypts and villi was expanded by one or multiple coccidial forms, including macrogametocytes, microgametocytes, schizonts, developing oocysts, and undifferentiated gamonts, the latter of which were particularly numerous in the base of crypts (Fig. 2-4). The lamina propria in both proliferative and adjacent regions was expanded by moderate numbers of lymphocytes and plasma cells with fewer eosinophils and histiocytes. Mucosal polyps were associated luminal hemorrhage.

In addition, this animal had severe anemia, which resulted in centrilobular and paracentral necrosis of the liver (hypereosinophilic hepatocytes with loss of nuclei and maintenance of architecture; images not shown).

Morphologic Diagnosis: Jejunum: severe, chronic, multifocal, proliferative, lymphoplasmacytic enteritis with luminal hemorrhage and myriad intralesional coccidian parasites.

Cause: *Eimeria* spp. (among differentials are *E. arloingi* and *E. ninakohlyakimovae*).

Main Clinical Pathology Finding: Anemia (packed cell volume [PCV] 8%) and hypoproteinemia (total protein 3.6 g/dl).

Typical Gross Findings: Mucosal edema, congestion, and numerous white to yellow, variably raised, pinpoint to approximately 1 cm in diameter, mucosal nodules in the small or large intestines.
**Figure 1** - Regions of mucosal proliferation at low magnification.

**Figure 2** - Regions containing micro and macrogamonts at intermediate magnification.
Discussion: Coccidia are protozoa, members of the Apicomplexa protistan phylum, named for their typical “apical complex” of organelles that polarize towards one end of the organism, which all follow a similar life cycle. Coccidia in domestic animals are generally host specific with numerous, but differing, species affecting cattle, small ruminants, horses, pigs, dogs and cats. In sheep and goats, the highest prevalence and excretion occur in young animals of less than 4-6 months and, in some cases, as early as 2-4 or 4-8 weeks via fecal-oral transmission. Clinical signs may include green or yellow watery diarrhea with occasional blood or mucous, ill-thrift, and weight loss with signs typically representing small intestinal pathology. Grossly, affected intestine may be edematous, congested, and with chronicity develop numerous white to yellow, variably raised, pinpoint to approximately 1 cm in diameter, mucosal nodules in the small or large intestines. Typical histologic lesions include hyperplastic intestinal epithelium containing developmental stages of coccidia, with severe cases also resulting in a proliferative enteritis with
nodule formation. This case fits with a severe, chronic case of coccidiosis based on the severe parasite load, in addition to the mucosal nodule formation. While luminal hemorrhage is occasionally present, the degree of anemia seen in this goat kid is not frequently reported in coccidiosis cases. The severity of the anemia likely accounted for the centrilobular hepatocellular necrosis, induced by severe hypoxia.

References:

*The Diagnostic Exercises are an initiative of the Latin Comparative Pathology Group (LCPG), the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website (http://www.cldavis.org/diagnostic_exercises.html).

Associate Editor for this Diagnostic Exercise: Patricia Pesavento
Editor-in-chief: Vinicius Carreira