Case: A 41 year-old man with no past medical history presented with new onset heartburn. An esophagogastroduodenoscopy showed normal findings. Biopsies of the duodenum, antrum, and esophagus were also normal. Samples of the gastric body revealed mild chronic inflammation around gastric pits, as illustrated in the images below.

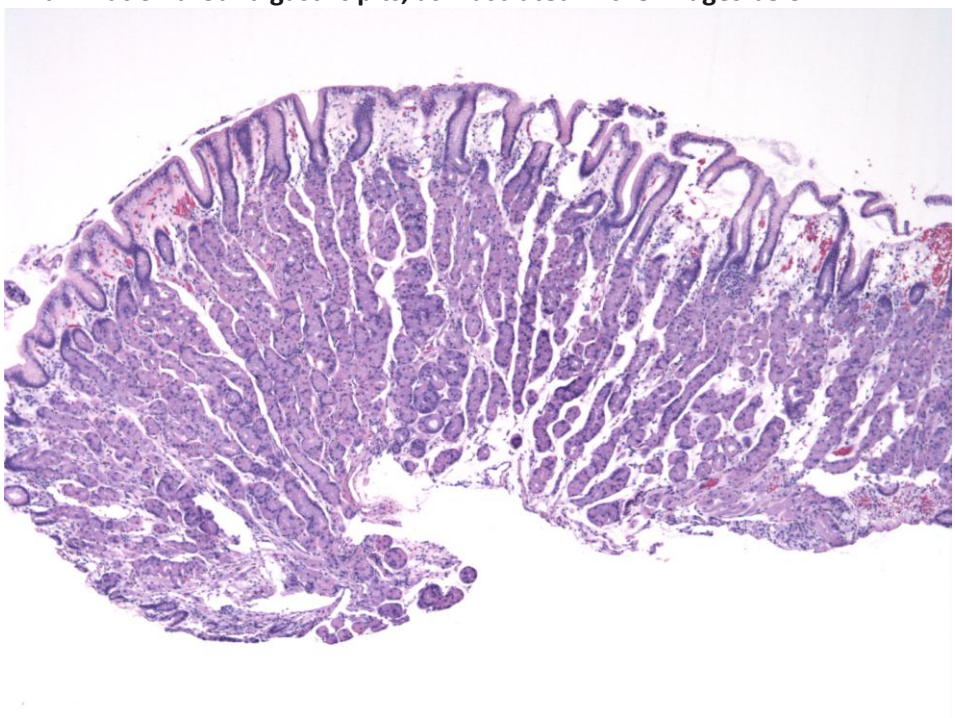

Figure 1. H&E, (40x)

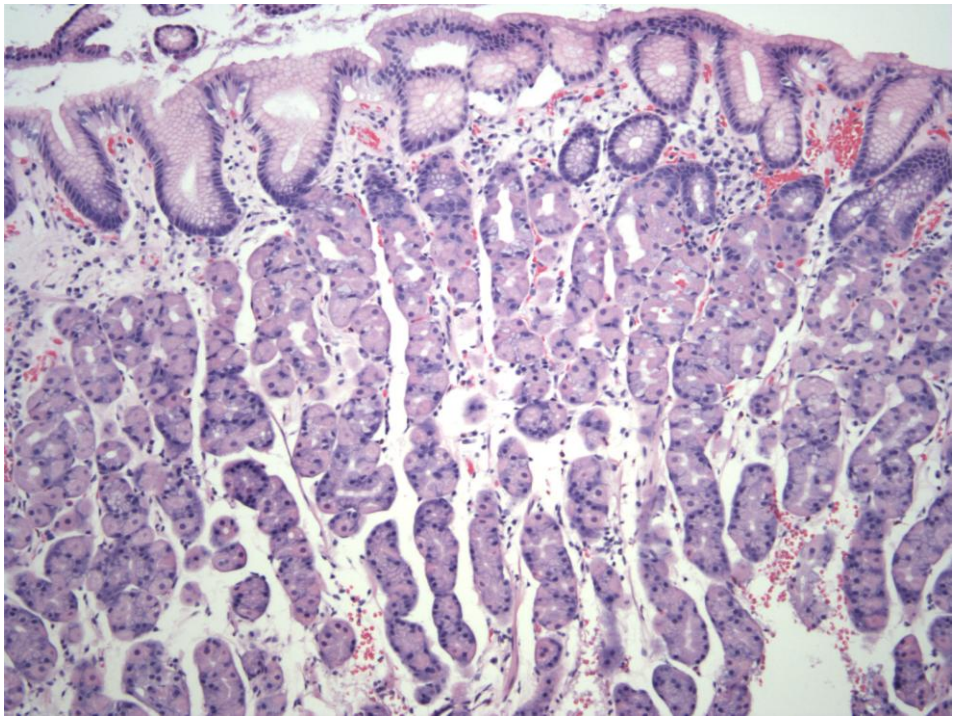

Figure 2. H&E, (100x)

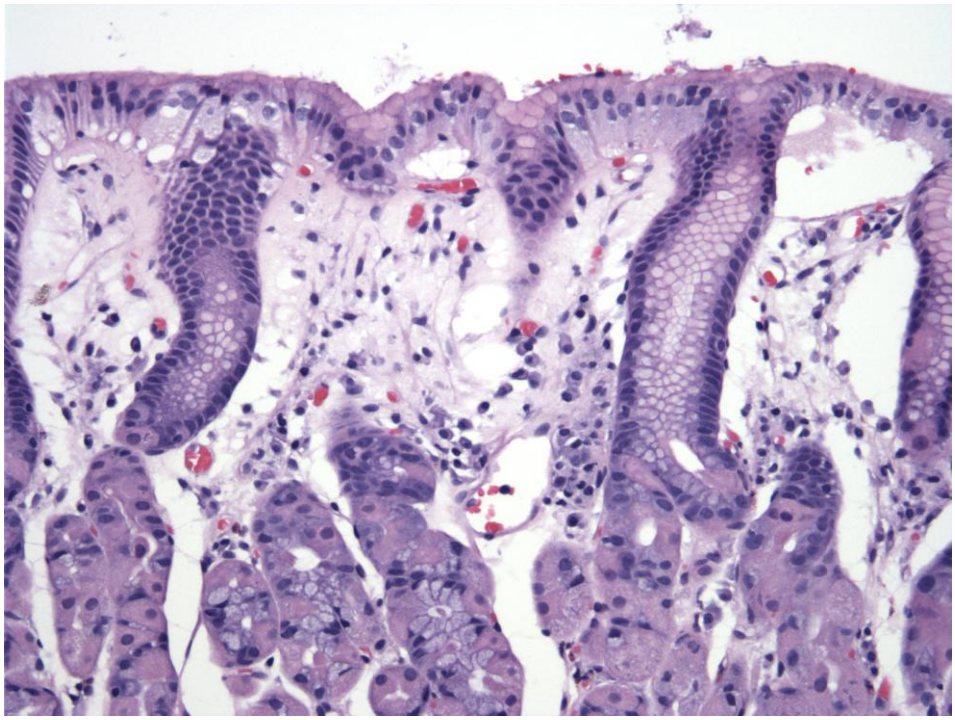

Figure 3. H&E, (200x)

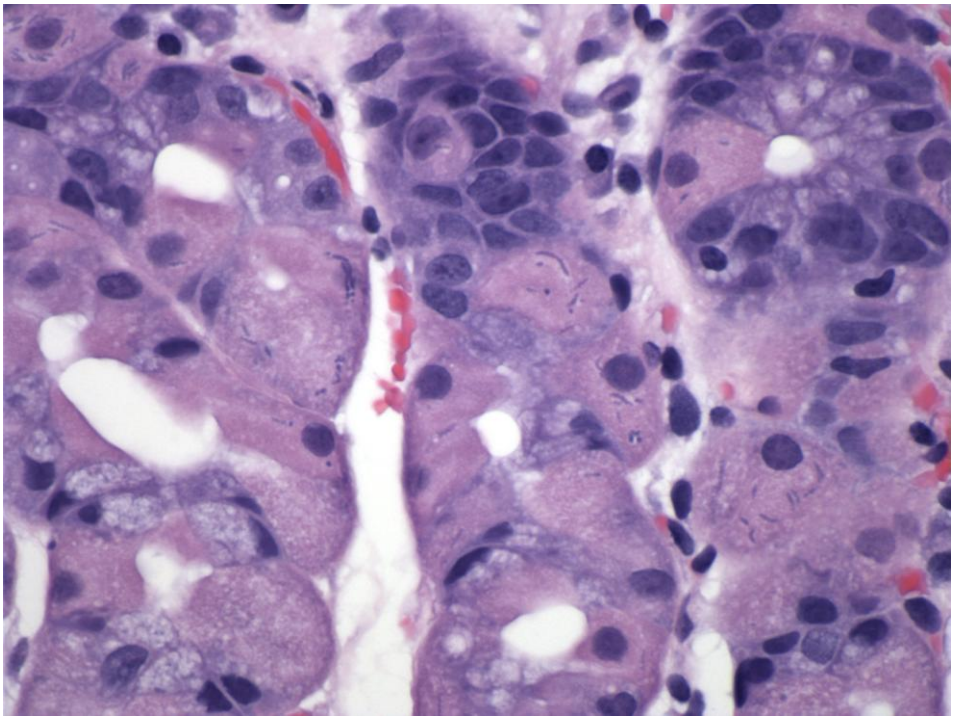

Figure 4. H&E, (600x)

The next appropriate step would be:

A. Sign out descriptively without evidence of H. pylori
B. Sign out as chronic inactive gastritis and obtain H. Pylori immunohistochemical stain
C. Order immunohistochemical stains for gastrin and chromogranin, as well as H. Pylori

An immunostain for H. pylori was obtained. Images are depicted below.

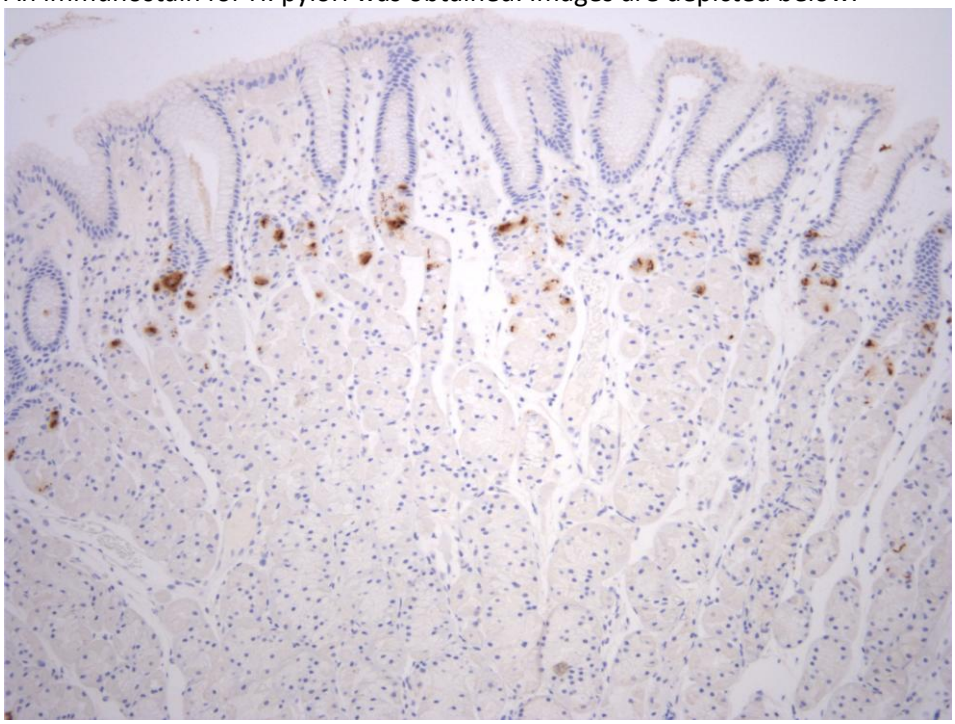

Figure 5. H. Pylori, immunohistochemical stain (100x)

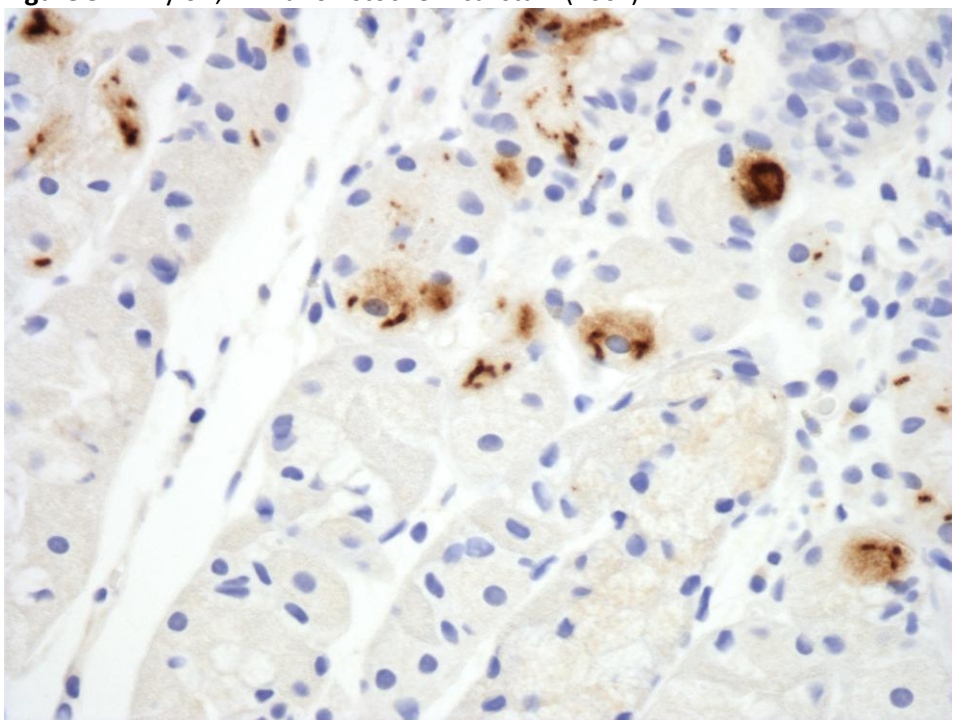

Figure 6. H. Pylori, immunohistochemical stain (400x)

What is your diagnosis?

A. Helicobacter-associated chronic gastritis
B. Autoimmune gastritis
C. Normal

SCROLL DOWN FOR ANSWERS AND DISCUSSION...

Answer and discussion:

A. Helicobacter-associated chronic gastritis (*Helicobacter heilmannii*-like organisms)

Helicobacter pylori is an important cause of chronic gastritis, and plays a role in the pathogenesis of peptic ulcer disease, gastric lymphoma, and gastric carcinoma. Characteristic features include a superficial plasma cell-rich infiltrate punctuated by neutrophilic infiltration of gastric pits. Organisms are usually identified in luminal mucin or at the surface of foveolar epithelium, although occasional intracellular forms may be seen in some cases. Data from numerous studies show that organisms are always associated with some degree of chronic inflammation in the lamina propria, but are not detected in uninflamed mucosa. Thus, "up front" ancillary stains are not necessary for *H. pylori* detection, whereas chronic inflammation in the gastric mucosa should prompt use of immunohistochemical stains in the event that *H. pylori organisms* are not detected [1].

Helicobacter heilmanni-like organisms comprise a distinct group of spiral shaped bacteria that can cause chronic gastritis, although the inflammatory infiltrate is typically mild and neutrophilic activity is infrequent. *Helicobacter heilmanni*-like organisms are longer than *H. pylori* and contain multiple flagella at each end [2,3]. They are usually found in proximity to foveolar epithelium, similar to *H. pylori*. However, the former occasionally reside in parietal cell canaliculi and parietal cells [3,4]. In these cases, *H. heilmanni*-like organisms are variably present attached to foveolar cells and mucosal inflammation may be inconspicuous. The organisms show cross-reactivity with polyclonal anti-*H. pylori* antibodies [5].

Chronic inflammation in the lamina propria may reflect *H. pylori* infection, even when organisms are not detected in H&E stained sections and, thus, this finding is generally considered an indication for obtaining ancillary stains for *H. pylori*. Autoimmune gastritis shows mixed inflammation centered on oxyntic glands, even in the absence of glandular atrophy and or intestinal metaplasia. Although chromogranin and gastrin stains can help distinguish atrophic oxyntic mucosa from antral mucosa, they have no role in biopsy samples that show normal oxyntic glands.

1. Batts, K., et. al., *Appropriate use of special stains for identifying Helicobacter pylori: Recommendations from the Rodger C. Haggitt Gastrointestinal Pathology Society.* Am J Surg Pathol, 2013. **37**(11), e12-22.
2. Mario B., et. al., *Helicobacter heilmannii sensu lato: An overview of the infection in humans*. World J Gastroenterol, 2014. **20**(47), 17779–17787.
3. Kobayashi M. et al., *Helicobacter heilmannii-like organism in parietal cells: A diagnostic pitfall*. Pathology International, 2016. **66**, 120-122.
4. Joo, M. et. al., *Helicobacter heilmannii-associated Gastritis: Clinicopathologic Findings and Comparison with Helicobacter pylori-associated Gastritis*. J Korean Med Sci, 2007. **22**, 63-69.
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