A Possible Case of Granulomatous Gastritis Linked to Carbon Tetrachloride Exposure

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Introduction

Granulomatous gastritis (GG) is a rare clinical entity, and most cases described in the literature are associated with Crohn's disease, infections (tuberculosis), or underlying malignancy. Idiopathic GG is much less common, and the use of volatile solvents as an etiology has not been previously described.

Carbon tetrachloride belongs to the class of organic compounds known as halomethanes. Production of commercial quantities began in the 1900s, being widely used as a cleaning fluid. Most of these uses were discontinued in the mid-1960s due to increasing awareness of toxicity.

Inhalation of carbon tetrachloride appears to be the major route of exposure. Once absorbed it is widely found in fat but also in blood, muscle, liver, brain and other tissues and organ . The liver is the most prominent target of carbon tetrachloride in shorter- and longer-term oral studies of experimental animals, with one mechanism cited through granuloma formation

Case Description

A 67 year-old male underwent endoscopy for long-standing reflux symptoms and abdominal discomfort, not responsive to daily proton pump inhibitor (PPI) therapy. Index endoscopy revealed antral erythema and biopsies revealed florid non-caseating granulomatous gastritis.

Work-up for infectious etiologies, sarcoidosis, malignancy and Crohn's were all negative, including normal imaging, endoscopy, and histological stains.

Lab work	Hb 135 g/L, WBC 5.7 x 10^9/L, Plts 523 x 10^9/L, CRP 11 mg/L.
Stool studies	Stool culture, *C.difficile* antigen, and ova and parasite exam were negative.
Colonoscopy	Normal
CT Abdomen & Pelvis	Thickened folds are seen throughout the proximal to mid gastric body. No evidence of inflammation or malignancy

Investigations

B. GASTRIC ANTRUM, BIOPSIES:
-GASTRIC ANTRAL MUCOSA WITH NON-CASEATING GRANULOMATOUS GASTRITIS
-NEGATIVE FOR H. PYLORI TYPE ORGANISMS
-NEGATIVE FOR INTESTINAL METAPLASIA

C. GASTRIC BODY, BIOPSIES:
-GASTRIC BODY MUCOSA WITH NON-CASEATING GRANULOMATOUS GASTRITIS
-FOCALLY ENHANCED GASTRITIS
-NEGATIVE FOR H. PYLORI TYPE ORGANISMS
-NEGATIVE FOR INTESTINAL METAPLASIA

Figure 1. Mild antral erythema

Case Resolution

The patient was diagnosed with idiopathic granulomatous gastritis and initiated on high dose proton pump inhibitor therapy (PPI) twice daily.

Symptoms of abdominal pain and reflux gradually improved, achieving clinical remission. The patient remained asymptomatic from any other GI complaints.

Several repeat endoscopies revealed improved antral erythema but persistent granulomas on biopsies. The most recent gastroscopy performed in Spring 2022 revealed the absence of any granulomas in the gastric antrum or body, indicating histological remission.

Diagnosis

A. Duodenum, biopsies - Normal villous architecture with no significant increase in intraepithelial lymphocytes.
B. Gastric mucosal biopsies - Focal intestinal metaplasia in background of chronic inflammation, mild. No evidence of H. pylori like organisms, adenomatous change or malignancy.
C. Gastric mucosal biopsies - Chronic inflammation, mild. No evidence of H. pylori like organisms, intestinal metaplasia, adenomatous change or malignancy. No granulomata are seen.

Discussion

Granulomatous inflammation of the gastrointestinal tract is an uncommon entity. Our patient achieved clinical and histological remission through dose escalation to twice-daily PPI therapy.

One possible etiology identified was our patient's exposure to carbon tetrachloride, a solvent used in the past as a cleaning agent, during which time our patient had prolonged inhalation and dermal exposure.

Limited data suggest that dermal exposure of carbon tetrachloride can cause gastrointestinal symptoms such as nausea and vomiting, though the clear mechanism behind that is unclear. Perhaps the most well-known toxicity of carbon tetrachloride is hepatotoxicity, with one mechanism being the development of granulomas. Hepatic granuloma formation was observed in mice who were injected with either single or multiple injections of carbon tetrachloride .

Although a definitive causality cannot be proven, we propose a potential etiology behind our patient's diagnosis of idiopathic granulomatous gastritis.

References

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