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World Journal of Clinical Cases (*World J Clin Cases*, *WJCC*, online ISSN 2307-8960, DOI: 10.12998) is a peer-reviewed open access academic journal that aims to guide clinical practice and improve diagnostic and therapeutic skills of clinicians.

The primary task of *WJCC* is to rapidly publish high-quality Autobiography, Case Report, Clinical Case Conference (Clinicopathological Conference), Clinical Management, Diagnostic Advances, Editorial, Field of Vision, Frontier, Medical Ethics, Original Articles, Clinical Practice, Meta-Analysis, Minireviews, Review, Therapeutics Advances, and Topic Highlight, in the fields of allergy, anesthesiology, cardiac medicine, clinical genetics, clinical neurology, critical care, dentistry, dermatology, emergency medicine, endocrinology, family medicine, gastroenterology and hepatology, geriatrics and gerontology, hematology, immunology, infectious diseases, internal medicine, obstetrics and gynecology, oncology, ophthalmology, orthopedics, otolaryngology, pathology, pediatrics, peripheral vascular disease, psychiatry, radiology, rehabilitation, respiratory medicine, rheumatology, surgery, toxicology, transplantation, and urology and nephrology.

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Hydrogen peroxide ingestion with injury to upper gastrointestinal tract

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Abstract

Hydrogen peroxide is a common over-the-counter solution that has developed a growing body of literature regarding toxic ingestion. Intentional ingestion of high concentration hydrogen peroxide for health purposes has gained popularity in certain patient populations; purported benefits are due to the increased oxygen released into the blood stream. We present for evaluation one such case with associated imaging that presented to our urban medical center. A brief review of the literature was also performed noting current recommendations regarding both outcomes and indications for endoscopy as well as hyperbaric oxygen therapy following ingestion of hydrogen peroxide. Our patient was a 51-year-old white female who presented with foamy hematemesis after ingesting 10 drops of 35% hydrogen peroxide as part of a home remedy to cleanse her colon and improve blood oxygenation. In addition to hematemesis, she also reported diffuse abdominal pain with sore throat and hoarse voice. Her imaging demonstrated portal venous gas and gastric edema. She was admitted for hyperbaric oxygen therapy and underwent upper endoscopy demonstrating diffuse esophagitis and gastritis with white exudate and multiple petechiae. She was later discharged home in stable condition and was lost to follow-up.

Key words: Hydrogen peroxide; Caustic injury; Hyperbaric oxygen therapy; Ingestion of hydrogen peroxide; Arterial gas emboli

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Core tip: In patients presenting with unresolving epigastric and hematemesis following ingestion of hydrogen peroxide, evaluation with endoscopy is indicated. Computed tomography and/or magnetic resonance imaging are also indicated to evaluate for formation of arterial gas emboli. Therapy is primarily supportive, ± hyperbaric oxygen therapy depending on presence of neurological symptoms, presence of gas emboli, and

availability of resources.

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INTRODUCTION

Hydrogen peroxide is a common over-the-counter solution that has developed a growing body of literature regarding toxic ingestion^[1-5]. The main mechanisms for toxicity include direct lipid peroxidation, oxygen gas production, and corrosive injury^[1]. Reported toxicities and fatalities tend to involve higher concentrations (> 35%) and pediatric patients^[1].

Intentional ingestion of high concentration hydrogen peroxide for health purposes has gained popularity in certain patient populations; purported benefits are due to the increased oxygen released into the blood stream. We present for evaluation one such case with associated imaging.

CASE REPORT

A 51-year-old white female presented to our urban medical center with foamy hematemesis after ingesting 10 drops of 35% hydrogen peroxide as part of a home remedy to cleanse her colon and improve blood oxygenation. In addition to hematemesis, she also reported diffuse abdominal pain with sore throat and hoarse voice.

At the time of presentation, vitals were normal and stable. Her initial abdominal exam was benign and she was neurologically intact. Labs were within normal limits save for a leukocytosis of 12.6 thousand/mm³. CT imaging obtained at admission demonstrated portal venous gas, gastric pneumatosis, and gastric edema (Figure 1). She was given a proton-pump inhibitor and admitted for hyperbaric oxygen therapy (HBT) to be followed by upper endoscopy evaluation.

Esophagogastroduodenoscopy performed the following morning revealed a small hiatal hernia, diffuse esophagitis and gastritis with white exudate and multiple petechiae, and two areas of duodenitis (Figures 2 and 3). Gastric biopsies later demonstrated only active, chronic gastritis with marked congestion and extravasated blood. Following her endoscopy and hyperbaric oxygen therapy, patient tolerated a liquid diet and was deemed stable for discharge home later that day. Patient was lost to follow-up.

DISCUSSION

Mortality associated with hydrogen peroxide ingestion

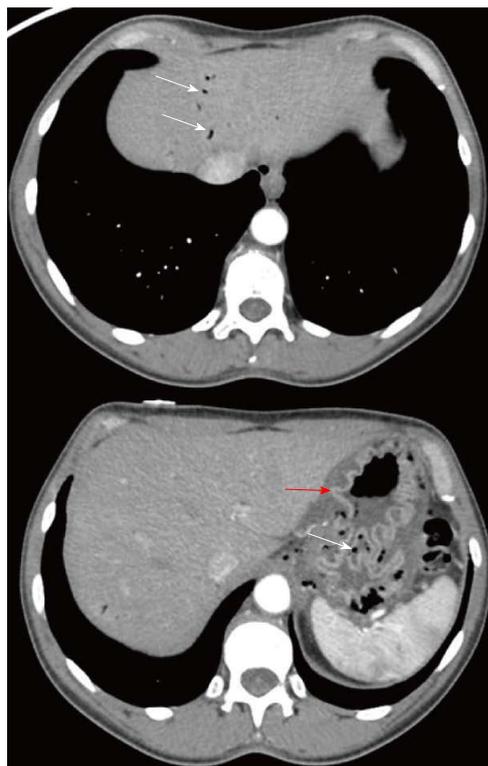


Figure 1 Computed tomography abdomen demonstrating portal venous gas as well as gastric pneumatosis and edema (portal venous gas and gastric pneumatosis noted with white arrows, gastric edema noted with red arrow).

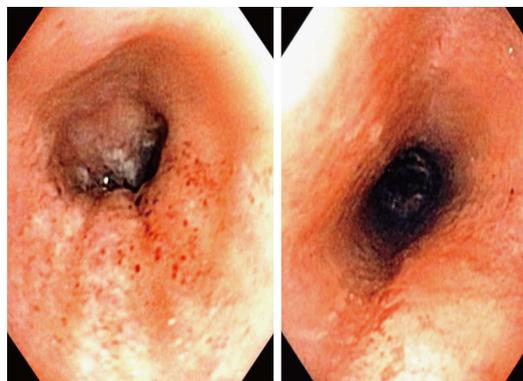


Figure 2 Esophagogastroduodenoscopy demonstrating esophagitis with multiple petechiae and white exudate.

usually involves the formation of arterial gas emboli (AGE) and the development of cerebral embolism^[1-3]. Perforation may occur, but is not as commonly described as AGE. The most common injury noted on upper endoscopy following ingestion is a Grade I caustic mucosal injury which tends to resolve spontaneously without further sequelae^[6]. The "snow-white" sign may be visualized, an area of mucosa that has a blanched appearance secondary to blood being driven away by rapid oxygen production; this is demonstrated on our endoscopic image (Figure 2 left panel)^[1].

Management of hydrogen peroxide ingestion consists



Figure 3 Esophagogastroduodenoscopy demonstrating diffuse gastritis (Left) and areas of duodenitis (Right).

mainly of supportive care and endoscopic evaluation if hematemesis or unresolving epigastric pain develops, typically in association with concentrated doses^[1]. CT/MRI imaging is indicated to evaluate for formation of AGE, especially with the development of neurological symptoms. HBT has been shown to be helpful in such cases and is generally associated with complete resolution of symptoms; delayed therapy may contribute to mortality^[2-4].

While neurological symptoms are definitive indications for HBT, its role in the presence of portal venous gas is still being evaluated^[2,3]. Several centers with ready access to HBT have suggested that the mere presence of portal venous gas indicates need for HBT. While it would seem a prudent measure to prevent further progression of gas emboli, a case report does exist of conservatively managed portal venous gas without HBT and without subsequent negative sequelae^[7].

COMMENTS

Case characteristics

The patient presented with epigastric pain, foamy hematemesis, sore throat, and hoarseness.

Clinical diagnosis

Physical exam demonstrated a benign abdomen and no neurological deficits.

Differential diagnosis

Presentation concerning for perforation of gastrointestinal tract with possible arterial gas emboli, evaluated by computed tomography and esophagogastroduodenoscopy (EGD).

Laboratory diagnosis

Electrolytes and complete blood count obtained demonstrating only leukocytosis of 12.6 thousand/mm³.

Imaging diagnosis

Computed tomography abdomen demonstrated portal venous gas, gastric pneumatosis, and gastric edema.

Pathological diagnosis

Gastric biopsy demonstrated active, chronic gastritis with marked congestion and extravasated blood.

Treatment

Patient was kept NPO; treated with IV fluids, a proton-pump inhibitor, and hyperbaric oxygen therapy; and evaluated by EGD.

Related reports

EGD demonstrated a small hiatal hernia, diffuse esophagitis and gastritis with white exudate and multiple petechiae, and two areas of duodenitis.

Experiences and lessons

Hydrogen peroxide ingestion generally requires conservative management and may benefit from hyperbaric oxygen therapy.

Peer-review

The authors demonstrated a case of 51-year-old white female presented to our urban medical center with foamy hematemesis after ingesting 10 drops of 35% hydrogen peroxide. The present study was well investigated and will give us an important information in the field of clinical gastroenterology.

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