

## Case Report

# Hydrogen Peroxide Colitis: The Accidental Enema

Ramin Karimi, MD,<sup>1</sup> Ashish Sharma, MD,<sup>1</sup> Kevin Tran, MD,<sup>1</sup>  
Sebastian Montgomery, MD<sup>1</sup>

Author affiliations are listed at the end of this article.

### Abstract

#### Description

Chemical colitis is defined as inflammation of the large intestine or colon as a result of exposure from a harsh chemical through an enema or other procedure. In this case, the chemical is hydrogen peroxide, which is commonly used as an antiseptic for minor abrasions. Hydrogen peroxide enemas were once popular for difficult to treat constipation. However, resultant colitis and proctitis limited its use. When administered rectally in a high enough concentration, intense abdominal pain and transient bloody diarrhea can occur, with the majority of affected patients making a full recovery with supportive management. Here we discuss a case of an accidental low concentration hydrogen peroxide enema in an otherwise healthy young adult that emphasized the dangers of hydrogen peroxide damage to mucosal membranes.

Correspondence to:  
Sebastian Montgomery, MD  
Coliseum Medical Center  
Mercer University School of  
Medicine  
380 Hospital Dr., Suite 430  
Macon, GA 31217  
([Sebastian.Hyman@hcahealthcare.com](mailto:Sebastian.Hyman@hcahealthcare.com))

#### Keywords

hydrogen peroxide/adverse effects; enema; enema/adverse effects; colitis/chemically induced; colitis, ulcerative; chemical colitis; rectal administration; female; adult

## Introduction

Hydrogen peroxide is a clear, colorless and odorless liquid. It is typically used as a household disinfectant in 3% solutions and as a household antiseptic for small or superficial injuries. Hydrogen peroxide was historically used as a component of the “bubble gum” enema—an enema that combines small amounts of hydrogen peroxide, sodium phosphate and docusate sodium. However, its use diminished after multiple cases of severe colitis and proctitis were linked directly to rectal hydrogen peroxide administration.<sup>1</sup> We conducted a PubMed search with hydrogen peroxide and mucosal injury, limiting it to English language articles. No publication year limit was imposed. Multiple case reports were noted with the majority focusing on accidental oral administration by children. One report was noted within the past year with a vaginal hydrogen peroxide douche used as an enema.<sup>2</sup> All case reports of chemical colitis showed exposure to more concentrated solutions than those of our patient. Our case may highlight the danger hydrogen peroxide can pose on mucosal membranes even in very

dilute preparations. Patients exposed to rectal hydrogen peroxide are often treated conservatively and make a complete recovery with no long term consequences.<sup>3</sup>

## Case Presentation

We report the case of a 33-year-old African American female with a past medical history of sickle cell traits and beta-thalassemia minor presenting with intense abdominal and rectal pain as well as small volume bloody mucoid diarrhea. The patient suffers from chronic constipation as the result of oral iron therapy, which she successfully manages at home with weekly bottled water enemas. While attempting her weekly enema, she mistakenly used a diluted hydrogen peroxide solution that a visiting family member had used for teeth whitening. This solution contained approximately 5mL of 35% hydrogen peroxide in a 100mL of bottled water, giving the final solution an estimated hydrogen peroxide concentration of 1.75%. Immediately following the administration of the enema, she noted the sensation that something was wrong and evacuated her bowels. Diffuse abdominal

and rectal pain described as intense cramping immediately followed the evacuation of the bowels. This pain waxed and waned over several hours.

Additionally, there were 6 to 8 small volume bloody mucoid diarrheal episodes that coincided with increased abdominal pain and non-bloody, non-bilious emesis. When the pain did not cease after 3 hours, she requested EMS transportation to our emergency department. The initial abdominal exam showed a diffusely tender abdomen with guarding but no rebound. Pain improved with IV pain management, and a repeat exam showed minimal diffuse tenderness without guarding or mass. Bowel sounds were hyperactive in the lower quadrants bilaterally, and diarrhea was small volume with scant mucus and no obvious blood. We did not conduct a rectal exam due to concern about worsening the already damaged mucosal membranes, patient refusal and gastroenterologist consultant advice. CT abdomen and pelvis showed inflammatory findings consistent with colitis and proctitis with an incidental finding of fatty liver.

For several days, additional, though less frequent, mucoid and scanty bloody diarrhea were noted with increased bloating and flatulence. With the advice of gastroenterology, conservative treatment was initiated with light intravenous fluids, low-dose oral steroids and electrolyte management. No direct visualization of the colon membranes was complete. The external rectum did not show notable changes, though the exam was limited at patient request. The patient recovered fully, was discharged on hospital day 3 and subsequently lost to follow-up.

## Discussion

Hydrogen peroxide rapidly converts to oxygen and water when exposed to the enzymatic catalyst catalase.<sup>4</sup> Catalase is released from tissues when damaged, leading to the classical appearance of white foam when cleaning small skin abrasions. In hydrogen peroxide's most common medical use as a topical antiseptic, the hydrogen peroxide destroys bacterial cell walls through oxidation. Oral or rectal administration leads to mucosal membrane contact resulting in caustic or oxidative injury. Common risks of

mucosal caustic injury from hydrogen peroxide include a direct cytotoxic effect through lipid peroxidation, ulceration through caustic or oxidative injury and perforation through direct mucosal damage or expansion due to oxygen release. An additional risk for cerebral infarctions can occur as the result of a large volume oxygen gas embolization.<sup>5,6</sup>

Due to the commonality of this clear, odorless solution, incidences of accidental poisonings are frequent, particularly in children, who tend to ingest hydrogen peroxide orally. In a study of more than 95,000 toxic exposures reported to poison control in 3 years, 0.34% were due to hydrogen peroxide exposure with over 85% through ingestion.<sup>5</sup> Poison control centers typically identify concentrations as low as 3% relatively harmless when ingested with foaming at the mouth and snow-white mucous membranes being the primary signs.<sup>7</sup> These injuries commonly require minimal intervention, which focuses on supportive care, guardian education, reassurance and outpatient follow-up. These findings differ from our patient's experience where a preparation containing no more than 1.75% hydrogen peroxide caused significant distress and symptoms requiring short-term hospitalization for supportive care, electrolyte replacement and pain management.

New or resurging trends in the naturopathic and alternative medicine communities, often spread via the internet, have led to hydrogen peroxide use in teeth whitening, mouth wash, skin cleansers and even enemas. The increased demand has led to concentrations up to 35% commonly available online and in natural health food stores. This food grade hydrogen peroxide has been subject to an increased variety of unsubstantiated claims, such as its use as a naturopathic cancer remedy. These concentrated solutions carry more potential for harm when in contact with mucosal membranes due to their greater oxidative capacity. Hydrogen peroxide has also been used for wound irrigation and the sterilization of medical instruments. In the sterilization of endoscopic equipment, concentrations up to 7.5%, or 1% when mixed with peracetic acid are commonly used.<sup>8</sup> As a result of this use, it was observed that a small amount would come into contact with the mucosal membranes, resulting in a white mucoid path with frothing around the point of

contact. This transient phenomenon became known as the snow-white sign and was seen as self-resolving and of limited risk.<sup>9</sup> Hydrogen peroxide effectiveness at eliminating biofilms is one of the features that has led to continued use in endoscopic equipment cleaning regardless of this risk.<sup>10</sup> A now-defunct use of hydrogen peroxide is in a “bubble gum” enema, which contained diluted hydrogen peroxide, sodium phosphate and docusate sodium. However, after reports of life-threatening colitis, bloody diarrheal episodes and emesis, this type of enema fell out of favor, regardless of its supposed success in managing difficult to treat constipation.<sup>11</sup> Patients subjected to this enema commonly showed colitis on imaging and transient mucosal membrane inflammation on biopsy.

## Conclusion

Hydrogen peroxide’s various household and medical uses, as well as its inherent risks, seem to be commonly misunderstood, particularly in the alternative medicine communities. New or resurging trends spread in online communities can lead to unexpected uses, including toxic ingestions. Its commonality around the house and odorless appearance make it a common accidental poison in both children and adults, as in our patient’s case. Hydrogen peroxide is an agent to be aware of in both accidental and intentional use but typically responds well to supportive management. Physicians should understand the life-threatening complications, including cerebral infarction and bowel perforation, and more public education of the risks of ingestion is needed.

## Declarations

Ethics approval and consent to participate:  
Written informed consent was obtained from the patient.

Consent for publication:  
Written informed consent was obtained from the patient.

Availability of data and material:  
N/A (retrospective chart review)

Authors’ contributions:  
RK, KT and SM saw the patient. RK drafted the manuscript, and all authors contributed substantially to its revision. SM takes responsibility for the paper as a whole.

## Conflicts of Interest

The authors declare they have no conflicts of interest.

The authors are employees of Coliseum Medical Center, a hospital affiliated with the journal’s publisher.

This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

## Author Affiliations

1. Coliseum Medical Center, Macon, GA

## References

1. Kibria R, Ali SA, Barde CJ. Gone but not forgotten. “Bubble gum enema” containing hydrogen peroxide and causing life-threatening colitis. *Gastrointest Endosc.* 2010;72(3):619-621. <https://doi.org/10.1016/j.gie.2010.02.031>
2. Baiomi A, Patel H, Abbas H, Vootla V, Makker J. Chemical colitis caused by hydrogen peroxide vaginal douche: A case report. *World J Gastrointest Endosc.* 2019;11(9):486-490. <https://doi.org/10.4253/wjge.v11.i9.486>
3. Pawar D, Calara A, Jacob R, Beck N, Peiris AN. Hydrogen Peroxide Induced Colitis: A Case Report and Literature Review. *Case Rep Gastrointest Med.* 2017;2017:6432063. <https://doi.org/10.1155/2017/6432063>
4. Alfonso-Prieto M, Biarnés X, Vidossich P, Rovira C. The molecular mechanism of the catalase reaction. *J Am Chem Soc.* 2009;131(33):11751-11761. <https://doi.org/10.1021/ja9018572>
5. Pritchett S, Green D, Rossos P. Accidental ingestion of 35% hydrogen peroxide. *Can J Gastroenterol.* 2007;21(10):665-667. <https://doi.org/10.1155/2007/423217>
6. Watt BE, Proudfoot AT, Vale JA. Hydrogen peroxide poisoning. *Toxicol Rev.* 2004;23(1):51-57. <https://doi.org/10.2165/00139709-200423010-00006>
7. Soloway RA. Hydrogen Peroxide how to prevent and treat unintentional poisonings. Poison.org. <https://www.poison.org/articles/2012-jun/hydrogen-peroxide>. Accessed January 13, 2020.
8. Rutala WA, Weber DJ. Disinfection of endoscopes: review of new chemical sterilants used for high-level disinfection. *Infect Control Hosp Epidemiol.* 1999;20(1):69-76. <https://doi.org/10.1086/501544>

9. Bilotta JJ, Waye JD. Hydrogen peroxide enteritis: the “snow white” sign. *Gastrointest Endosc*. 1989;35(5):428-430. [https://doi.org/10.1016/S0016-5107\(89\)72849-2](https://doi.org/10.1016/S0016-5107(89)72849-2)
10. Lineback CB, Nkemngong CA, Wu ST, Li X, Teska PJ, Oliver HF. Hydrogen peroxide and sodium hypochlorite disinfectants are more effective against *Staphylococcus aureus* and *Pseudomonas aeruginosa* biofilms than quaternary ammonium compounds. *Antimicrob Resist Infect Control*. 2018;7:154. Published 2018 Dec 17. <https://doi.org/10.1186/s13756-018-0447-5>
11. Desai Y, Orledge J. Chemical colitis from a hydrogen peroxide enema. *J Miss State Med Assoc*. 2010;51(11):314-316.