Acute Ischemic Colitis due to Oral Phenylephrine
Emran El-Alali, MD¹, and Tarik Alhmoud, MD, MS²

¹Department of Medicine, Anne Arundel Medical Center, Annapolis, MD
²Promedica Digestive Health Care (affiliated with ProMedica Toledo Hospital, Toledo, OH), Sylvania, OH

ABSTRACT
Oral phenylephrine is a commonly used over-the-counter nasal decongestant drug. It is usually taken for symptomatic relief (in combination drug products) for upper respiratory tract infections, allergic rhinitis, or sinusitis. Adverse cardiovascular effects of intravenous phenylephrine, including organ ischemia, are well known; however, oral phenylephrine is rarely associated with significant adverse effects. We describe the first case of acute ischemic colitis in a young patient due to over-the-counter oral phenylephrine, which was taken as a nasal decongestant. We reviewed the literature of colonic ischemia related to the use of systemic nasal decongestants phenylephrine and pseudoephedrine.

INTRODUCTION
Ischemic colitis (IC) is caused by sudden reduction in colonic perfusion leading to ischemic injury. IC is most commonly caused by nonocclusive colonic ischemia and less often due to acute arterial occlusion or mesenteric venous thrombosis.¹ The prevalence of acute intestinal vascular insufficiency, including IC, is 406 of 100,000.² Various medications can cause IC through vasoconstriction, hypotension, thrombogenic/procoagulant effect, or direct colonic toxicity.¹,³,⁴ Over-the-counter (OTC) systemic nasal decongestants include the alpha-adrenergic agonists pseudoephedrine and oral phenylephrine, which are used for symptomatic relief of nasal congestion in common cold, allergic rhinitis, and sinusitis. Alpha-adrenergic agonists work via arterial vasoconstriction, which can potentially lead to tissue ischemia of various organs. Pseudoephedrine is a more potent decongestant compared with phenylephrine and has been linked to IC in several case reports. Intravenous phenylephrine is used to treat shock and hypotension and is known to cause cardiovascular adverse effects and tissue ischemia. Such side effects are rare with oral phenylephrine.

CASE REPORT
A 34-year-old White man with no significant medical history presented to the emergency department with a 2-day history of lower abdominal pain. Pain was associated with watery diarrhea, which had progressed to hematochezia. The patient had no nausea, vomiting, fever, or chills. He was admitted to the hospital for further management.

The patient used multiple OTC DayQuil LiquiCaps (containing phenylephrine 10 mg per LiquiCaps) over 2 days before symptoms onset to relieve nasal congestion and cold symptoms. He did not use other OTC or prescription medications. The patient reported no family history of hypercoagulation disorders. He chews tobacco occasionally and does not drink alcohol or use illicit drugs.

Vital signs were normal. Body mass index was 43 kg/m². Heart rate and rhythm were normal and regular. Bowel sounds were normal. Abdomen was distended and showed left lower quadrant tenderness, no peritoneal signs, and no hepatosplenomegaly. White blood cell count was elevated (11.9 × 10⁹/L), and hemoglobin was normal (15.0 g/dL). Serum creatinine, electrolytes, and liver enzymes were normal. Enteric pathogen panel was negative. Urine drug screen was negative for illicit drugs. Abdominal and pelvic computed tomography showed mural thickening of the descending colon with infiltrative changes in the mesentery compatible with left-sided colitis.

During hospital stay, the patient was started on intravenous fluids and he maintained normal blood pressure, heart rate, and hemoglobin level. Gastroenterology consultation was requested, and colonoscopy demonstrated segmental moderate inflammation.
of the descending and sigmoid colon, characterized by mucosal congestion, erythema, erosions, friability, loss of vascularity, serpentine, and shallow ulcerations suggestive of IC vs, less likely, Crohn’s disease (Figure 1).

Histologic examination confirmed the diagnosis of IC. The patient was managed conservatively and was subsequently discharged from the hospital after resolution of symptoms. He was advised to avoid all phenylephrine-containing OTC products and to quit tobacco use. Outpatient mesenteric duplex study revealed no impairment to visceral circulation. He remained asymptomatic and was doing well after 2 months, during an outpatient office visit.

**DISCUSSION**

We report a case of IC in a young man after the use of oral phenylephrine that was taken as a decongestant for common cold.

### Table 1. Clinical characteristics of current case and previously reported case of ischemic colitis due to oral Phenylephrine

|                        | Current case       | Ward et al case⁵ |
|------------------------|--------------------|-------------------|
| Age, yr                | 34                 | 70                |
| Gender                 | Male               | Female            |
| Race                   | White              | African American  |
| Comorbidities          | Smokeless tobacco use, BMI 43 kg/m² | Hypertension, hyperlipidemia, and diverticulosis. Remote 5-pack-year smoking |
| Year of presentation   | 2019               | 2014              |
| Clinical presentation  | Lower abdominal pain (cramping) and hematochezia | Nausea, vomiting, lower abdominal pain (cramping), and hematochezia Elevated blood pressure LLQ tenderness |
|                        | Normal vital signs |                    |
|                        | LLQ tenderness     | LLQ tenderness    |
| OTC phenylephrine      | Phenylephrine HCl 5 mg, acetaminophen 325 mg, and dextromethorphan hydrobromide 10 mg | Phenylephrine bitartrate 7.8 mg, aspirin 325 mg, and chlorpheniramine maleate 2 mg |
| containing product     |                    |                   |
| Abnormal laboratory    | Leukocytosis (WBC 11.9 × 10⁹/L) | Leukocytosis (WBC 22.3 × 10⁹/L) |
| findings               |                    |                   |
| Affected colon         | Splenic flexure, sigmoid and descending colon | Splenic flexure, sigmoid and descending colon |
| Outcome                | Self-limited, no complications | Self-limited, no complications |

BMI, body mass index; LLQ, left lower quadrant; OTC, over-the-counter; WBC, white blood cell.

**Figure 1.** Endoscopy showing edema, erythema, friability, loss of vascularity, erosions, and ulcerations in the sigmoid colon (A and B) and descending colon (C).
IC was likely induced by the vasoconstrictive effect of the alpha-adrenergic receptor agonist phenylephrine, probably aggravated by coexisting smokeless tobacco use. Although the patient had obesity (body mass index of 43 kg/m²), he had no hypertension, heart disease, diabetes, or previous thromboembolic events, and his drug screen was negative for illicit drugs that are associated with IC (cocaïne or amphetamines). A mesenteric duplex showed no vascular occlusions or impairment to visceral circulation. The episode resolved after discontinuing the offending drug.

We performed a literature search on PubMed and Google Scholar databases for IC related to oral phenylephrine use. Only 1 case report linking acute IC to oral phenylephrine use was found.5 Table 1 shows the characteristics of our patient compared with the previously reported case by Ward et al (similar word count).

Pseudoephedrine—in contrast to phenylephrine—was reported to cause IC in 11 case reports.6–13 Pseudoephedrine is a more potent decongestant compared with oral phenylephrine, largely because of its higher systemic bioavailability.14 Pseudoephedrine was more widely used before restrictions were placed on its sale to limit its illicit conversion to methamphetamines.15 As a result, phenylephrine has largely replaced pseudoephedrine in many OTC cold and allergy medicines.

We conclude that our patient is the first reported case of acute IC due to oral phenylephrine use in a young person. The occurrence of IC with the less potent systemic decongestant phenylephrine in a patient with limited risk factors, and the fact that henyphrine became the more prevalent decongestant, suggests the call for extra caution with OTC decongestants use. Onset of abdominal pain and diarrhea should alert individuals to promptly discontinue the drug and seek medical attention. Finally, a detailed medication history including the use of OTC products is crucial and can significantly contribute to the patient’s management.

DISCLOSURES

Author contributions: E. El-Alali and T. Alhmoud wrote the manuscript and reviewed the literature. E. El-Alali is the article guarantor.

Financial disclosure: None to report.

Informed consent was obtained for this case report.

Received March 27, 2020; Accepted July 10, 2020

REFERENCES

1. Brandt LJ, Feuerstadt P, Longstreh G, Boley SI; American College of Gastroenterology. ACG clinical guideline: Epidemiology, risk factors, patterns of presentation, diagnosis, and management of colon ischemia (CI). Am J Gastroenterol. 2015;110(1):18–45.
2. ElKafrawy AA, Chauhan M, Elkaryoni A, et al. National trends, outcomes and predictors of mortality in patients with ischemic colitis and acute mesenteric venous thrombosis. A Nationwide Inpatient Sample Study from 2002 to 2014. Gastroenterology. (Suppl) 2019;156(6):S-1067 (Abstract).
3. Hais DI, Koziuch P, Brandt LJ. Pharmacologically mediated colon ischemia. Am J Gastroenterol. 2007;102(8):1765–80.
4. Tapia C, Schneider T, Manz M. From hyperkalemia to ischemic colitis: A resins way. Clin Gastroenterol Hepatol. 2009;7(8):e46–7.
5. Ward PW, Shaneyfelt TM, Roan RM. Acute ischaemic colitis associated with oral phenylephrine decongestant use. BMJ Case Rep. 2014:201302518.
6. Schneider RP. Ischemic colitis caused by decongestant? J Clin Gastroenterol. 1995;21(4):335–6.
7. Dowd J, Bailey D, Moussa K, Nair S, Doyle R, Culpepper-Morgan JA. Ischemic colitis associated with pseudoephedrine: Four cases. Am J Gastroenterol. 1999;94(9):2430–4.
8. Lichtenstein GR, Yee NS. Ischemic colitis associated with decongestant use. Ann Intern Med. 2000;132(8):682.
9. Klestov A, Kubler P, Meule J. Recurrent ischaemic colitis associated with pseudoephedrine use. Intern Med J. 2001;31(3):195–6.
10. Traino AA, Buckley NA, Bassett ML. Probable ischemic colitis caused by pseudoephedrine with tramadol as a possible contributing factor. Ann Pharmacother. 2004;38(12):2068–70.
11. Sherid M, Samo S, Husein H, Sulaiman S, Vainder JA. Pseudoephedrine-induced ischemic colitis: Case report and literature review. J Dig Dis. 2014;15(5):276–80.
12. Ambesh P, Siddiqui S, Obiagwu C, et al. Pseudoephedrine associated ischemic colitis. Am J Ther. 2018;25(5):e604–6.
13. Aziz M, Pervez A, Fatima R, Bansal A. Pseudoephedrine induced ischemic colitis: A case report and review of literature. Case Rep Gastrointest Med. 2018;2018:8761314.
14. Horak F, Zieglmayer P, Ziegelmayer R, et al. A placebo-controlled study of the nasal decongestant effect of phenylephrine and pseudoephedrine in the Vienna Challenge Chamber. Ann Allergy Asthma Immunol. 2009;102(2):116–20.
15. Eccles R. Substitution of phenylephrine for pseudoephedrine as a nasal decongestant. An illigal way to control methamphetamine abuse. Br J Clin Pharmacol. 2007;63(1):10–4.

Copyright: © 2020 The Author(s). Published by Wolters Kluwer Health, Inc. on behalf of The American College of Gastroenterology. This is an open access article distributed under the Creative Commons Attribution License 4.0 (CCBY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.