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Sevelamer Induced Colitis Causing Deep Cratered Ulcer in an End-Stage Renal Disease Patient

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Abstract Sevelamer is phosphate lowering oral agent used in chronic kidney disease (CKD) to decrease oral phosphate absorption. Sevelamer has been shown to cause crystalline induced colitis. This can manifest as abdominal pain or gastrointestinal bleeding. We present a case with chronic kidney disease and Moyamoya syndrome that presented with abdominal pain and anemia. Colonoscopy revealed a single circumferential cratered ulcer in the transverse colon. Pathology showed crystalline induced colitis. Sevelamer was discontinued and the patient`s symptoms improved.

Keywords: *Sevelamer, colitis, ulcer*

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1. Introduction

Sevelamer is a non-absorbable binder to phosphate in the gastrointestinal tract that functions by reducing oral phosphate absorption. Primarily, it has been used to reduce phosphate levels in patients with CKD to reduce hyperphosphatemia as this has been associated with endothelial damage, increased mortality, and vascular calcifications. [1,2] Sevelamer has been linked to benefits such as lowering low-density lipoprotein cholesterol and uric acid levels as well. It is a non-absorbable binder to phosphate in the gastrointestinal tract and can cause mucosal injury due to crystallization. Patients can present with abdominal pain, nausea, diarrhea and gastrointestinal bleeding. [3] Colitis and ulceration can be seen on imaging and endoscopy. They can even sometimes present with perforation due to deep cratered ulcers. Swanson et al. first described the crystallization-induced injury in 2013 where the pathology of the involved mucosa showed yellow-brown crystals with "fish scale" appearance. [4]

2. Case Report

We present a case of a 43-year-old woman with past medical history of hypertension, type 2 diabetes mellitus, cerebrovascular accident, epilepsy disorder, Moyamoya syndrome, and end-stage renal disease on hemodialysis. She also had history of vertical sleeve gastrectomy with gastro-colic fistula. Her medications included pantoprazole, levetiracetam, duloxetine, divalproex, atorvastatin, aspirin, erythropoietin and Sevelamer carbonate 800 mg three times daily. She presented with weakness, abdominal pain, and hematochezia. On physical exam, she had diffuse abdominal tenderness to palpation. The rest of the physical exam was unremarkable. Labs were significant for hemoglobin of 6.6 and hematocrit of 20 with a platelet count of 136. Blood urea nitrogen level was 27 mg/dL and creatinine level was 2.60 mg/dL. Stool studies were negative for Giardia lamblia, cryptosporidium, entamoeba histolytica, and clostridium difficile toxin gene. Computed Tomography (CT) of the abdomen-pelvis with contrast was initially unremarkable on admission.

Patient subsequently underwent an esophagogastroduodenoscopy (EGD) and a colonoscopy. EGD showed Los Angeles (LA) grade C esophagitis without active bleeding. Colonoscopy showed moderately congested mucosa in the ascending colon and a single cratered, semi- circumferential ulcer in the transverse colon. Pathology showed distorted colonic mucosa with ulcer and activity associated with crystallines consistent with Sevelamer-associated colitis. (Figure 1 & Figure 2) Cytomegalovirus stain was negative for viral inclusions. A repeat CT scan was done as the abdominal pain was worsening and it showed pan-colitis from ascending colon to sigmoid colon. (Figure 3) Sevelamer was discontinued and the abdominal pain and hematochezia progressively improved.

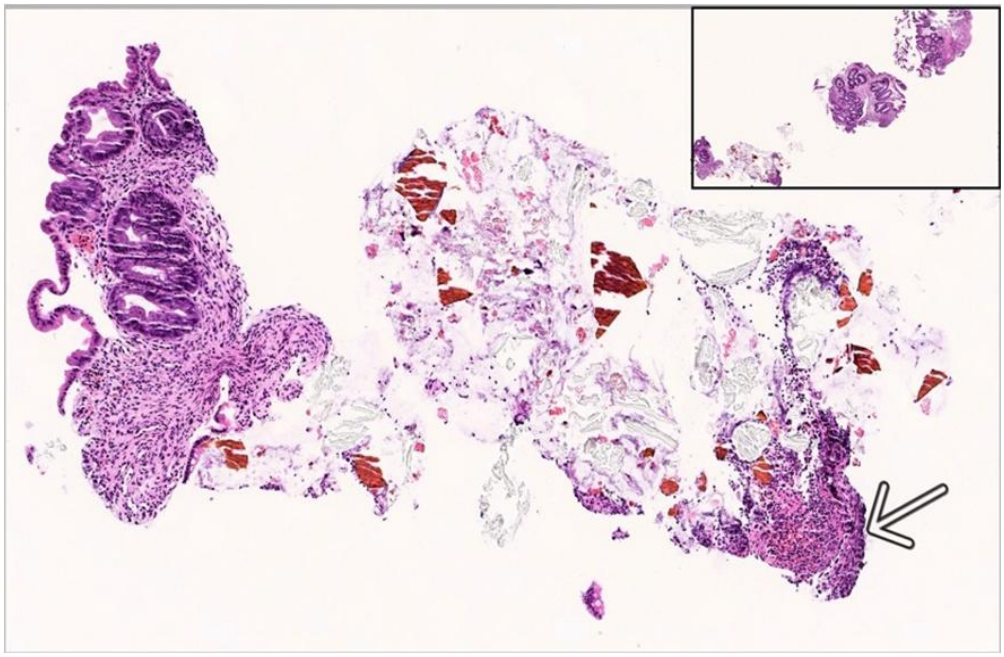

Figure 1. Hematoxylin & eosin staining section showing distorted colonic mucosa with ulceration (arrow) and activity associated with crystals (5x magnification)

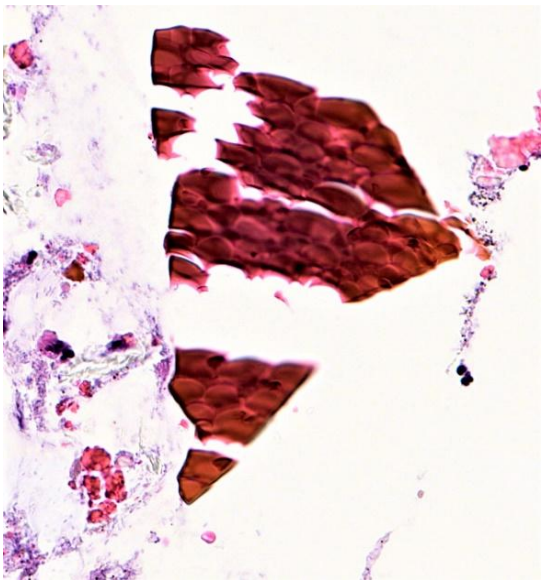

Figure 2. Higher magnification showing yellow crystals with fish scale appearance consistent with Sevelamer crystals (20x magnification)

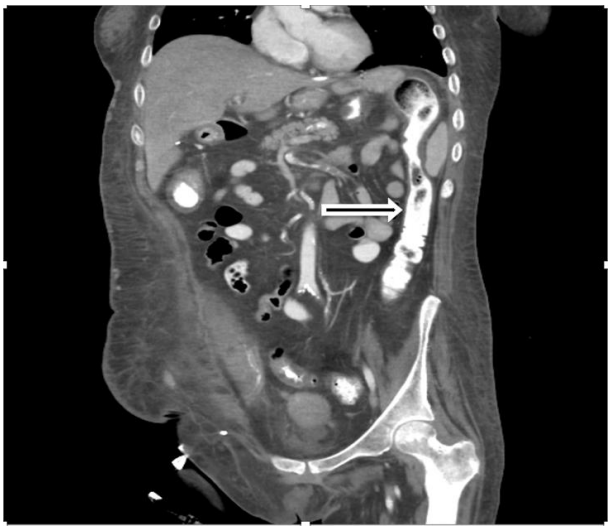

Figure 3. Computer Tomography Scan of the abdomen and pelvis with contrast demonstrating showed pan-colitis from ascending colon to sigmoid colon. This was most marked in the hepatic flexure, distal transvers colon, splenic flexure, and sigmoid colon (arrow pointing)

3. Discussion

Sevelamer is a phosphate binder frequently used in patients with CKD which can cause mucosal injury in the mucosa of the GI tract. It exerts its effect by first being protonated in the stomach to ammonia, which releases a polymer that binds phosphate. This produces phosphate crystalline concretions that are released in the feces but can stay in the GI tract. [5] Ingestion has been associated with various complications including but not limited to mild symptoms nausea, abdominal pain, and diarrhea. However, rarely it can cause intestinal bleeding, ischemic colitis, colonic perforation, and colitis presenting as a pseudotumor. [6,7]

Pathology of the crystal induced colitis can demonstrate broad, curved, irregularly space “fish scales” with violet staining on periodic acid-Schiff (PAS)-Alcian stain and a rusty brown color on hematoxylin and eosin staining. [4] Both formulations of Sevelamer (hydrochloride and carbonate) in both chewable and powdered form have been found to cause colitis in any segment of the GI tract. [5] To cause significant colitis, it is thought that in addition to having direct toxic effects on gastrointestinal mucosa, sevelamer crystals can embed themselves in mucosa resulting in a foreign body reaction. This can cause formation of pseudo-inflammatory polyps or ulcerations as seen on colonoscopy. In a few cases, massive accumulation of sevelamer crystals have also lead to formation of a fecalith and eventually fecal impaction. [8]

Our patient was on Sevelamer 800 mg three times daily and presented with abdominal pain and acute anemia.

Colonoscopy revealed a cratered ulcer in the transverse colon with confirmed histopathology of the lesion demonstrating crystal-induced colitis. Previous case reports have demonstrated that patients with history of diabetes, CKD, and major abdominal surgery such as in our patient are thought to be at increased risk for developing crystal induced colitis. Slow gastric emptying in these patients can potentially lead to larger quantities of Sevelamer crystal accumulation. [9] Treatment of the colitis is generally removal of the offending agent. It may be necessary to wait for pathology results prior to discharge in a hospitalized patient with this suspected diagnosis to prevent progression of colitis. Our patient had improvement in symptoms following cessation of Sevelamer therapy.

Further studies are needed to establish a correlation between dosage of Sevelamer and severity of colitis as no such correlation exists in literature. The medication should be used with caution in patients with slow gut transit and multiple abdominal surgeries to prevent crystal induced colitis. Alternative anion-exchange resins such as lanthanum carbonate have been used with good effect in patients with sevelamer induced colitis to treat hyperphosphatemia. [10] Sevelamer induced colitis can be a diagnostic challenge presenting as the underlying cause of iron therapy resistant anemia even in the absence of overt GI bleeding in a patient with CKD. Early removal of the offending agent provides a reasonable chance of recovery.

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Abbreviations

Gastrointestinal (GI)
CKD (Chronic Kidney Disease)
EGD (Esophagogastroduodenoscopy)

References

[1] Floege J. Phosphate binders in chronic kidney disease: a systematic review of recent data. *Journal of nephrology*. 2016; 29(3): 329-340.

[2] Abbasian N, Burton JO, Herbert KE, et al. Hyperphosphatemia, phosphoprotein phosphatases, and microparticle release in vascular endothelial cells. *Journal of the american society of nephrology*. 2015; 26(9): 2152-2162.

[3] Cozzolino M, Rizzo MA, Gallieni M, et al. Sevelamer for hyperphosphataemia in kidney failure: Controversy and perspective. *Therapeutic advances in chronic disease*. 2012; 3(2): 59-68.

[4] Swanson BJ, Limketkai BN, Liu TC, et al. Sevelamer crystals in the gastrointestinal tract (GIT): A new entity associated with mucosal injury. *American journal of surgical pathology*. 2013; 37(11): 1686-1693.

[5] Yuste C, Mérida E, Hernandez E, et al. Gastrointestinal complications induced by sevelamer crystals. *Clinical kidney journal*. 2017; 10(4): 539-544.

[6] Okwara C, Choi C, Park JY. Sevelamer-Induced Colitis Presenting as a Pseudotumor. *YJCGH*. 2015; 13: A39-A40.

[7] Hung OY, Maithel SK, Willingham FF, Farris AB, Kauh JS. Hypergastrinemia, type 1 gastric carcinoid tumors: Diagnosis and management. *J Clin Oncol*. 2011; 29(25): e713-e715.

[8] Madan P, Bhayana S, Chandra P, et al. Lower gastrointestinal bleeding: Association with Sevelamer use. *World journal of gastroenterology*.2008; 14(16): 2615-2616.

[9] Lai T, Frugoli A, Barrows B, et al. Sevelamer Carbonate Crystal-Induced Colitis. *Case reports in gastrointestinal medicine*. 2020; 2020: 1-4.

[10] Uy PP, Vinsard DG, Hafeez S. Sevelamer-Associated Rectosigmoid Ulcers in an End-Stage Renal Disease Patient. *ACG case reports journal*. 2018; 5(11): e831-3.