Sevelamer crystal–associated peritonitis in a patient on continuous ambulatory peritoneal dialysis: a case report

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Case report

A 60-year-old Chinese lady was admitted in August 2019 with fever, abdominal pain, and turbid peritoneal dialysate effluent. She had a history of end-stage renal disease due to immunoglobulin A nephropathy and had been on continuous ambulatory peritoneal dialysis for 3 years. Her usual medication included aspirin, calcitriol, cetirizine, ferrous sulphate, metoprolol, mirtazapine, pantoprazole, pregabalin, and sevelamer carbonate (1600 mg three times a day). Peritoneal dialysate fluid grew *Escherichia coli*, and intra-peritoneal gentamicin and ceftazidime were started. Her peritoneal dialysis catheter was removed 1 week later due to refractory peritonitis, but her abdominal pain persisted with development of paralytic ileus. A contrast computed tomography scan of abdomen performed 2 days following catheter removal revealed gross pneumoperitoneum and mural thickening over the small bowel. Laparotomy was performed and a proximal descending colonic ulcer with 2-mm perforation was identified. The patient underwent a left hemicolectomy but later succumbed in the intensive care unit due to hospital-acquired pneumonia.

An analysis of the colonic specimen demonstrated full thickness necrosis of the colonic wall with associated acute suppurative inflammation and peripheral ulceration. Incidentally there were abundant polygonal, non-refractile crystals with a brown, fish-scale configuration in the necrotic debris (Fig 1). The crystals appeared violet on periodic acid–Schiff stain staining. On haematoxylin and eosin staining, they had a two-toned colour imparted by pink linear accentuations (Fig 2).

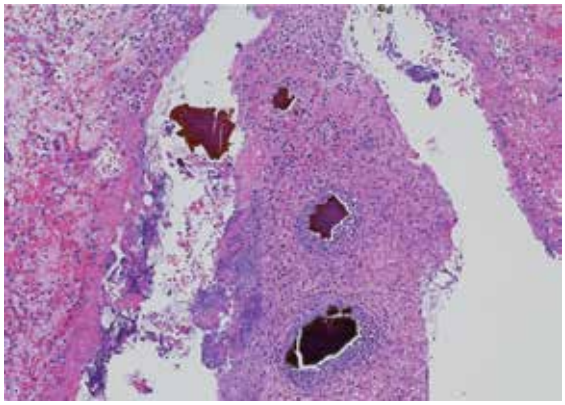

FIG 1. Incidental finding of polygonal crystals in resected colon specimen (haematoxylin and eosin staining, ×100)

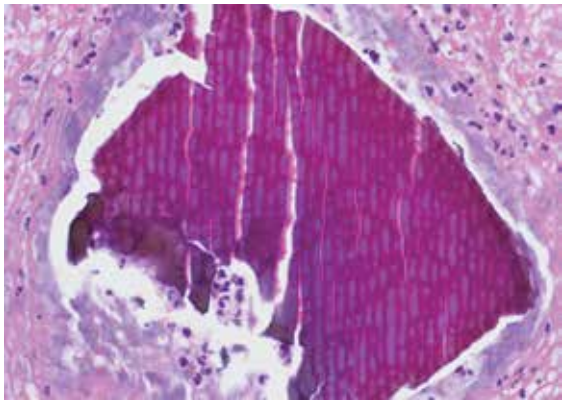

FIG 2. The crystals had a broad, curved, irregularly shaped 'fish scale' configuration, with two-toned colour and pink linear accentuations (haematoxylin and eosin staining, ×600)

Discussion

Sevelamer is a calcium-free anion-exchange resin prescribed as a phosphate binder in patients with chronic kidney disease. It is composed of a non-absorbable hydrogel with ammonia on a carbon backbone. Stomach acid releases sevelamer polymer that binds phosphate in the intestine and forms a crystalline aggregate.[1] Initially approved by the United States Food and Drug Administration in October 1998 as sevelamer hydrochloride, sevelamer has been largely replaced since 2007

by sevelamer carbonate.[1] Sevelamer is commonly associated with gastrointestinal (GI) tract side-effects such as dyspepsia, abdominal pain, flatulence, and constipation.[2] Sevelamer crystals (SCs) are non-polarised, have a broad curved and irregularly spaced fish-scale pattern, appear violet on periodic acid–Schiff staining, and have a two-tone yellowish/brownish colour on haematoxylin and eosin staining.[1] About 19 cases of sevelamer-associated GI ulcers have been reported in the literature.[3] The lesion can be found in all segments of the GI tract although the colon is the most common site. Sevelamer crystals are usually found inside the GI tract mucosa.[2] Endoscopic findings include erosions and ulcerations, pseudo-inflammatory polyps and bezoar. Although a dose-dependent association had been reported, a recent review could not confirm the association.[2] In one case report, a colonic mucosal ulcer developed while taking sevelamer carbonate 800 mg three times a day (duration not known).[4] In another case report, a recto-sigmoid ulcer developed after taking sevelamer carbonate 1600 mg three times a day for 2 months.[5] Diabetic patients appeared to be more prone to SC-associated GI lesions.[2] They developed SC-associated GI lesions with a smaller dose compared with non-diabetics. Most reported cases required discontinuation of sevelamer,[3,6,7] although improvement in clinical condition and cessation of rectal bleeding following dose reduction were reported in one case.[2]

In our patient, there were two possible explanations for her clinical course. She may have developed severe continuous ambulatory peritoneal dialysis peritonitis as a primary disease with secondary paralytic ileus, predisposing to SC deposition in the GI tract mucosa. Alternatively, she may have sustained GI tract injury by SC leading to colonic perforation and secondary peritonitis.

To the best of our knowledge, SC has not been previously reported to present with continuous ambulatory peritoneal dialysis peritonitis. The treating physician must be vigilant for potential complications of sevelamer prescribed in patients on peritoneal dialysis, especially when they have paralytic ileus.

Author contributions

Concept or design: YH Wong, SSH Wong.
Acquisition of data: YH Wong, SM Li.
Analysis or interpretation of data: YH Wong, SM Li.
Drafting of the manuscript: YH Wong, SM Li.
Critical revision of the manuscript for important intellectual content: All authors.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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Ethics approval

The patient was treated in accordance with the Declaration of Helsinki. The patient's next-of-kin has granted permission for submission and publication of this case report.

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