CASE 3

Luís, Pedro; Ferreira, Cristina
Pathology Department, Hospital de Santa Maria, CHLN-EPE; Lisbon, Portugal

Case History:

A 75 year-old female presented with abdominal pain and hematochezia. She underwent a colonoscopy that revealed multiple mucosal ulcerations suggestive of ischemic colitis. Colonic biopsies were performed. No other information was available at the time of the histological diagnosis. After the diagnostic report we received the clinical information that two days before the colonoscopy she presented at emergency room with a urinary tract infection and worsening of the chronic renal insufficiency that she had for 7 years. Because the patient had potassium levels of 6,2mEq/L she was treated with Sodium Sulfonated Polystyrene (Kayexalate), a cation-exchange resin. At the second day of treatment she started with bloody diarrhea. C. difficile toxin and Cytomegalovirus serology were negative.

Pathological Findings:

The colonic biopsy revealed acute inflammation with crypt abscesses, mucosal ulceration and granulation tissue; no microorganisms were identified. Some polygonal structures were recognized in the lamina propria and lumen; they were lightly basophilic on hematoxylin and eosin stain, red on PAS, refractile but not polarizable, and displayed a mosaic pattern that resembles fish scales.

Diagnosis:

Acute colitis with ulceration related with kayexalate administration.

Follow-up:

Upon retrieval of the therapeutics, the patient improved her condition and there were no further complications.

Discussion:

Sodium polystyrene sulfonate (SPS or Kayexalate) is a cation-exchange resin that is usually administered with sorbitol, an osmotic laxative, to treat hyperkalemia. It has been implicated in damage of gastrointestinal tract (GI), causing bleeding symptoms, ulcers, ischemic lesions and necrosis, that can be transmural with subsequently perforation. Although different parts of GI tract can be involved the majority of the reports refer to colon involvement. The intestinal injuries are more frequently reported in postoperative, dialysis and transplants patients but it can be found in any patient and with just a single intake. A previous report refers the occurrence of intestinal necrosis in patients with no critical illnesses at admission; two of them died due to intestinal complications; the overall mortality in this series was 36%.

In a review of our experience, over the last four years 7 cases were diagnosed in our institution, five in colonic biopsy and two in resection specimens. All patients but two had chronic renal disease; in only one case there was information about previous renal impairment at the time of the diagnosis, the data only being present in the clinical processes. Three patients had a fatal outcome due to colonic perforation.

SPS (Kayexalate) can be used orally or rectally. When orally administered, sodium ions in SPS permutes with hydrogen ions in the acidic milieu of the stomach; in bowel the hydrogen ions are exchanged for potassium ions, thus facilitating the excretion of K^+ in the stool and lowering the serum potassium concentration; the cathartic effect of hypertonic sorbitol produces an osmotic diarrhea, avoiding the formation of concretions of crystalline resin with subsequent severe constipation, bezoars or intestinal obstruction, a complication initially related with the administration of SPS as a suspension in water. It has been postulated that sorbitol is the responsible for GI injury, probably by the induction of hypovolemia, hyperreninemia, elevation of prostaglandin levels and localized colonic mesenteric vasospasm (fig 1). However, a recent report refers the possibility that SPS itself may be toxic.

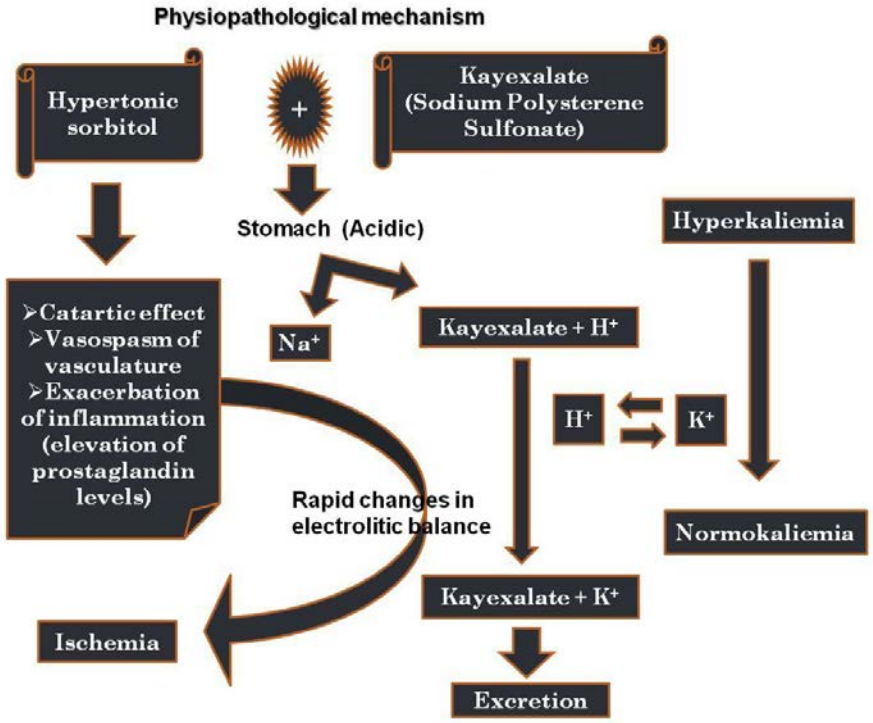

Fig 1.

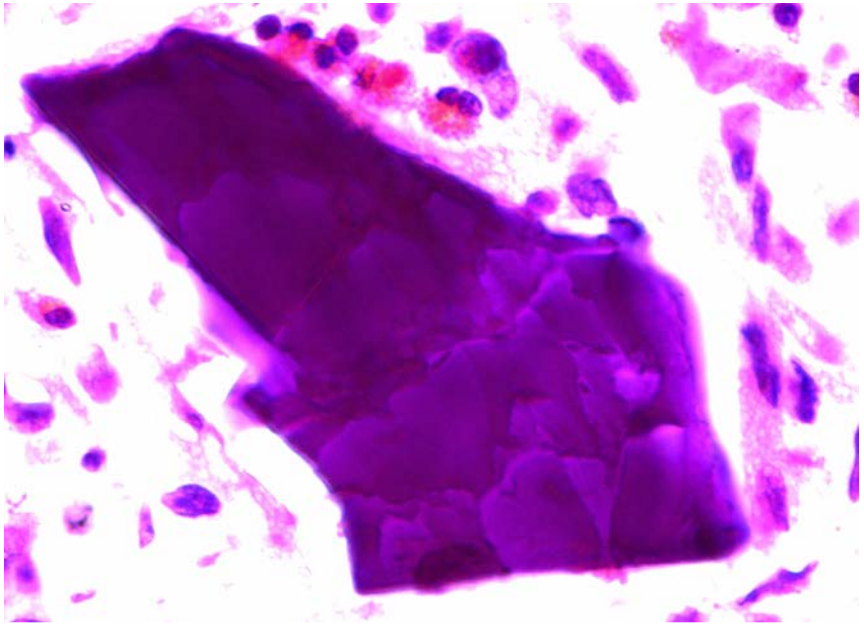

Fig 2. H.E. 1000x

The diagnosis is based on the recognition of the presence of the typical kayexalate crystals, within inflammatory exudates or in lamina propria; they are an important diagnostic clue that should raise the suspicion for previous kayexalate administration. The crystals of SPS are slightly basophilic on H&E stain, red on Periodic acid-Schiff stain and have a mosaic pattern similar with a fish scale (fig 2). They can be easily missed or mistaken as debris, so awareness of this entity is mandatory, as it is important to recognize them to achieve a correct diagnosis.

This case emphasizes the importance to recognize this rare clinical condition given the significant morbidity and mortality associated.

References:

Lillemoe KD, Romolo JL, Hamilton SR, Pennington LR, Burdick JF, Williams, Intestinal necrosis due to sodium polystyrene (Kayexalate) in sorbitol enemas: clinical and experimental support for the hypothesis, GM.Surgery. 1987 Mar; 101(3):267-72.

Gardiner GW. Kayexalate (sodium polystyrene sulphonate) in sorbitol associated with intestinal necrosis in uremic patients, Can J Gastroenterol. 1997 Oct; 11(7):573-7.

Rashid A., Hamilton S., Necrosis of the Gastrointestinal Tract in Uremic Patients as a Result of Sodium Polystyrene Sulfonate (Kayexalate) in Sorbitol: An underrecognized Condition, Am J Surg Pathol; 1997;21(1):60-69

Abraham SC, Bhagavan BS, Lee LA, Rashid A, Wu TT, Upper gastrointestinal tract injury in patients receiving kayexalate (sodium polystyrene sulfonate) in sorbitol: clinical, endoscopic, and histopathologic findings, Am J Surg Pathol. 2001 May; 25(5):637-44.

Montgomery E., Biopsy Interpretation of the Gastrointestinal Tract Mucosa; Philadelphia; Lippincott Williams & Wilkins; 2006:11-13

McGowan C.E., Saha S., Chu G., et al, Intestinal Necrosis due to Sodium Polysterene Sulfonate (Kayexalate) in Sorbitol, Southern Medical Journal; 2009;102(5):493-97

Harel Z, Harel S, Shah PS, Wald R, Perl J, Bell CM, Gastrointestinal adverse events with sodium polystyrene sulfonate (Kayexalate) use: a systematic review, Am J Med. 2013 Mar; 126(3):264.e9-24. Epub 2013 Jan 12.