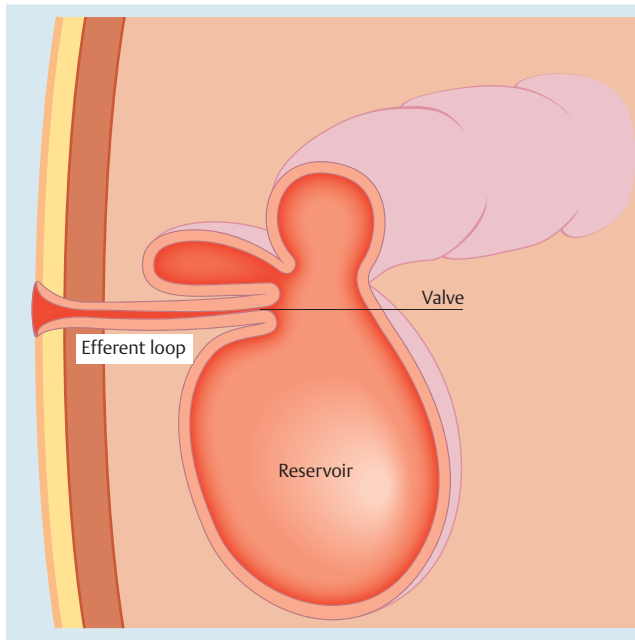


## Enteroliths in a Kock continent ileostomy: case report and review of the literature



**Fig. 1** Schematic representation of a Kock continent ileostomy.

The Kock continent ileostomy (KCI) was designed by Nik Kock, who used an intussuscepted ileostomy loop to create a nipple valve (► **Fig. 1**) that would not leak and would allow ileal effluent to be evacuated with a catheter [1]. Enterolith formation is a rarely reported long-term complication of KCI that can lead to disabling symptoms mandating treatment [2–4].

We report the case of a 65-year-old woman who underwent total proctocolectomy and subsequent construction of a KCI when she was 31 years of age. The proce-

dures were done to treat ulcerative proctocolitis complicated by colon cancer. She had a well-functioning KCI that she had catheterized daily for 34 years before she presented with intermittent abdominal pain and occasional bleeding from the stoma, and she reported having difficulty catheterizing her ileostomy.

Computed tomography and ileoscopy demonstrated three oval enteroliths in the pouch and a lipoma in the efferent loop of the KCI (► **Fig. 2**). The patient's symptoms decreased after resection of the lipoma with a snare cautery. However,

similar symptoms recurred 2 years later. A second ileoscopy showed a narrowed efferent loop that was dilated by insertion of the colonoscope, with successful relief of her symptoms. Chemical analysis of one of the retrieved enteroliths revealed calcium oxalate crystals. Five cases have previously been noted in the literature (► **Table 1**).

The alkaline milieu of succus entericus in the ileum may induce the precipitation of a calcium oxalate concretion; in contrast, the acidic milieu found more proximally in the intestine enhances the solubility of calcium. The gradual precipitation of unconjugated bile salts, calcium oxalate, and calcium carbonate crystals around a nidus composed of fecal material or undigested fiber can lead to the formation of calcium oxalate calculi over time [5].

Endoscopy\_UCTN\_Code\_CCL\_1AD\_2AJ

**Competing interests:** None

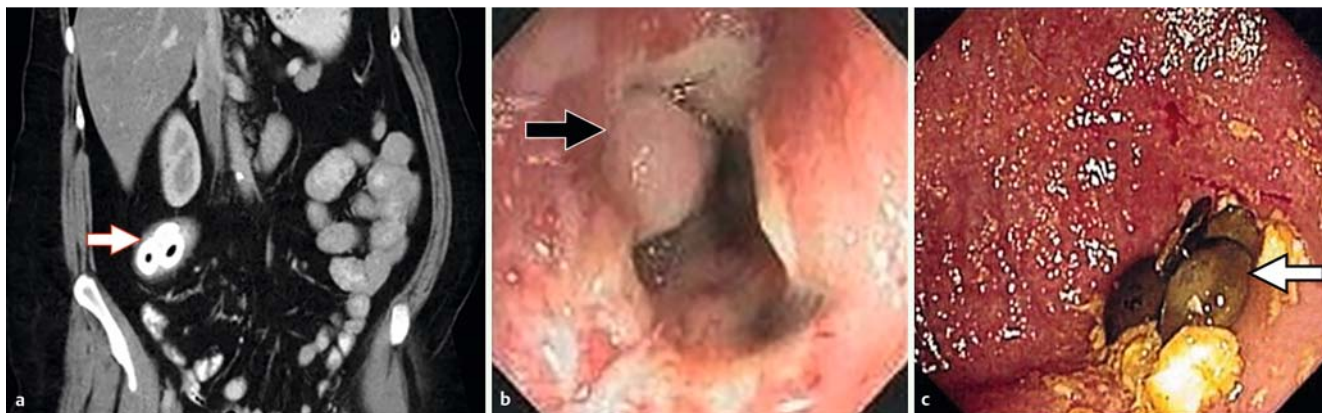
**Hadi Moattar<sup>1</sup>, Jakob Begun<sup>1,2</sup>, Timothy Florin<sup>1,2</sup>**

<sup>1</sup> Department of Gastroenterology, Mater Adult Hospital, South Brisbane, Australia

<sup>2</sup> Mater Research, University of Queensland, Translational Research Institute, Woolloongabba, Australia

### References

- 1 Kock NG. Intra-abdominal "reservoir" in patients with permanent ileostomy. Preliminary observations on a procedure resulting in fecal "continence" in five ileostomy patients. *Arch Surg* 1969; 99: 223–231
- 2 Baig MK, Valerian B, Hakim L et al. Holmium: yttrium aluminium garnet laser lithotripsy for symptomatic Kock pouch calculi. *Surg Innov* 2006; 13: 193–197



**Fig. 2** a Abdominal computed tomographic scan demonstrating enteroliths in the Kock continent ileostomy (KCI) (arrow). b Polypoid lesion in the efferent loop of the KCI (arrow). c Darkly pigmented enteroliths in the KCI (arrow).

**Table 1** Reported cases of enterolith associated with Kock continent ileostomy (KCI).

Patient gender and age, y	Time with KCI, y	Presenting symptoms	Diagnostic modalities	Number of stones, n	Composition of stones	Treatment and outcome	Source
Female, 48	23	Abdominal pain, frequent need for pouch catheterization	Abdominal X-ray, ileoscopy	3	Calcium oxalate, 95 % Calcium phosphate, 5 %	Symptomatic relief after endoscopic stone extraction following holmium-yttrium-aluminum garnet laser lithotripsy	Baig et al. [2]
Female, 39	9	Increased pouch output, abdominal cramps, weight loss	Abdominal X-ray, barium study, ileoscopy	15	Calcium hydroxyapatite	Symptom resolution after surgical exploration and stone removal	Fox et al. [3]
Female, 53	20	Abdominal pain, blood in pouch contents	Abdominal X-ray, ileoscopy	30	Cholesterol, 50 % Other unidentified lipid, 50 %	Endoscopic extraction of enteroliths with basket, outcome not specified	Geller et al. [4]
Male, 52	15	Abdominal pain, blood in pouch contents	Ileoscopy	12	Not specified	Patient declined further intervention	Geller et al. [4]
Female, 55	13	Abdominal pain, peristomal itching and erythema	Ileoscopy	8	Not specified	Unsuccessful endoscopic extraction with snare and lithotripsy basket, patient declined further intervention	Geller et al. [4]
Female, 65	34	Abdominal pain, difficulty catheterizing pouch, bleeding from stoma	Abdominal computed tomography, ileoscopy	4	Calcium oxalate, 90 % Calcium phosphate, 10 %	Symptomatic improvement after efferent loop stricture relieved with resection of a lipoma and dilation	Current case

- 3 Fox ER, Chung T, Laufer I. Enteroliths in a continent ileostomy. *AJR Am J Roentgenol* 1988; 150: 105–106
- 4 Geller A, Clain JE, Lewis BS et al. Enteroliths in a Kock continent ileostomy: endoscopic diagnosis and management. *Gastrointest Endosc* 1998; 48: 306–308
- 5 Paige ML, Ghahremani GG, Brosnan JJ. Laminated radiopaque enteroliths: diagnostic clues to intestinal pathology. *Am J Gastroenterol* 1987; 82: 432–437

#### Bibliography

**DOI** <http://dx.doi.org/10.1055/s-0034-1391302>  
*Endoscopy* 2015; 47: E200–E201  
 © Georg Thieme Verlag KG  
 Stuttgart · New York  
 ISSN 0013-726X

#### Corresponding author

**Hadi Moattar, MD**  
 Department of Gastroenterology  
 Mater Adult Hospital  
 Raymoond Terrace South Brisbane  
 Brisbane, Queensland 4101  
 Australia  
 Fax: +617 3163 8548  
[hadi.moattar@mater.org.au](mailto:hadi.moattar@mater.org.au)