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

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 procedure was done to treat ulcerative pancolitis 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].

Competing interests: None

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

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


**Bibliography**

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