Auto-brewery Syndrome in the Setting of Long-standing Crohn’s Disease: A Case Report and Review of the Literature

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Abstract

Clinical Background: A 71-year-old male with 50-year history of Crohn’s disease was evaluated for acute onset of dizziness and slurred speech. Blood ethanol levels were elevated despite abstinence from alcohol for over 30 years. CT enterography demonstrated massive dilation of the small bowel with anastomotic stricture.

Discussion: Auto-brewery syndrome may be considered in a patient with chronic obstruction or hypomotility presenting with elevated serum ethanol levels in the setting of high carbohydrate intake. Although treatment algorithms lack validation, judicious use of antibiotic therapy, carbohydrate control, and short courses of antifungal therapy have all been reported in the literature. Importantly, clinical consideration of ‘auto-brewery’ should be undertaken with substantial caution, given the lack of validated mechanisms linking endogenous ethanol production to peripheral blood ethanol.

1. Case Report

A 71-year-old man had a 50-year history of Crohn’s disease involving the small bowel. He had had a small bowel resection of unknown length in 1969. Thereafter, he was managed with intermittent courses of prednisone and 5-amino salicylic acid over the years. In 1987, he was diagnosed with cancer of the rectum, and underwent external beam radiation and resection of the tumour segment with a colorectal anastomosis. He did quite well until 2012 when he began to develop recurrent small bowel obstructions. He underwent a CT enterography which showed multiple small bowel strictures and active Crohn’s inflammation throughout the proximal small bowel. He was started on a course of prednisone, and then therapy with remicade was initiated, and he was referred to our centre.

In early 2013, he underwent an antegrade double balloon enterography where four distinct strictures with active inflammation were seen in the jejunum. These were dilated using an endoscopic balloon. The endoscopist did note intermittent dilation of the small bowel with feculent fluid. Small bowel bacterial overgrowth was suspected, and he was treated with a 4-week course of amoxicillin-clavulanate, 500/125 mg twice daily and metronidazole 500 mg thrice daily. This completely resolved his diarrhoea and bloating. He was instructed to then continue the antibiotics on an as-needed basis for recurrence of his symptoms.

In December 2013 and February 2014, he took repeated courses of amoxicillin-clavulanate and metronidazole, with improvement in his diarrhoea. However, he continued to have weight loss of over 4.5 kg. Hence, he began to increase his intake of sugar to gain weight. He switched from 6–8 diet colas a day to regular sugar-containing colas. He also began to eat a large amount of confectionery. In the middle of March 2014, he resumed his antibiotics due to recurrent diarrhoea. Three days later, he began to notice fogginess of thought and difficulty with walking. His wife noticed slurred speech, and he fell while showering. He was taken to the Emergency room (ER) where all routine blood tests were normal including complete blood count, electrolytes and ammonia. An MRI/MRA of the head was normal and he was then dismissed. The next day, he returned to the ER due to worsening symptoms and a blood ethanol level was found to be 234 mg/dl. He was admitted for acute alcohol intoxication and counselled about abstinence. The patient denied intake of any alcohol for over 30 years, and this history was corroborated by his wife. The next day, a repeat ethanol level was 170 mg/dl and, a few hours later, it was 125 mg/dl.
He was then dismissed from the hospital and he started a low carbohydrate diet. A week later, his ethanol level was undetectable.

One month later, a CT enterography showed improvement in overall inflammation but massive dilation of the small bowel to 10 cm in diameter and a stenosis at the anastomotic site with active and chronic inflammation secondary to Crohn’s disease [Figure 1]. The colon appeared normal. He underwent repeat enteroscopy with dilation of the long stricture. Fluid collected proximal to the stricture grew a large amount of Candida glabrata.

We hypothesised that the patient’s alcohol intoxication and elevated blood alcohol level were secondary to endogenous ethanol fermentation. The patient’s antibiotic regimen allowed increased growth of yeast in the proximal jejunum. Because the bowel was markedly dilated, it acted like a ‘vat’ and his increased sugar intake acted as the substrate for fermentation. Changing his diet to a low carbohydrate diet and avoiding antibiotics were sufficient to prevent a recurrence.

2. Discussion
We present a case of auto-brewery syndrome in the setting of Crohn’s disease with massive small bowel dilation. Ladkin and Davies reported the first case of endogenous alcohol production in 1948.1 A 5-year-old Ugandan boy presented to Mulago Hospital with gastric distension and decreased consciousness. He was found to have rupture of the posterior gastric wall with clearly alcoholic gastrointestinal contents despite no native medicine or beer intake for treatment of yaws. The boy died of his perforation and his microbiology cultures grew cocci and bacilli without any yeast seen.1 Kaji et al. described alcohol fermentation in young Japanese patients with yeast growth due to ingested carbohydrates.2 The group had previously linked endogenous alcohol fermentation to Candida and other yeast in inactive loops of bowel when excess carbohydrates are present.3

Similar instances of auto-brewery have been reported in children with short gut syndrome.4,5 Specifically, Dashan and Donovan describe a 13-year-old with short gut syndrome secondary to neonatal jejunal atresia, who was admitted for psychiatric evaluation after repeated bouts of auto-brewery.5 The patient’s physician father made an association between her alcohol levels via commercial breath analyser and the amount of carbohydrates in her meals. Endoscopic aspires grew abundant Candida and she was temporarily treated with antifungal therapy with complete symptom resolution.4 The validity of this report was strongly questioned by Logan and Jones, based on previous work in litigation of cases of driving under the influence of alcohol.6,7 They found effective clearance of endogenous ethanol [EE] by the portal venous system with little residual EE in peripheral blood. They concluded there is a lack of clinical or forensic evidence between EE production and the driving under the influence defence. Endogenous alcohol production has also been purported to be a mediator of hepatic disease following jejuno-ileal bypass surgery for medically complicated obesity. Mezey et al. documented low concentrations of serum ethanol production in one-third of patients after bypass surgery.8 Despite histological similarities between patients with hepatic disease after jejuno-ileal bypass and patients with alcoholic hepatitis or cirrhosis, Mezey et al. concluded that ethanol production was unlikely to be a key mediator of post-bypass hepatic disease, for the above-mentioned reasons.8

We report a case of auto-brewery syndrome in the setting of chronic Crohn’s disease and long-standing obstruction. Although rare, auto-brewery may be considered in a patient with chronic obstruction or hypomotility presenting with elevated serum ethanol levels in the setting of high carbohydrate intake. Treatment algorithms lack validation, but judicious use of antibiotic therapy, carbohydrate control, and short courses of antifungal therapy have all been reported in the literature. Importantly, clinical consideration of ‘auto-brewery’ should be undertaken with substantial caution given the lack of validated mechanisms linking endogenous ethanol production to peripheral blood ethanol.6,7 Moreover, significant medicolegal issues are present in consideration of auto-brewery, due to the potential for inappropriate use in legal defence strategy.6,7 These uncertainties highlight the need for future study and validation of the mechanisms leading to the development of auto-brewery syndrome.

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Conflict of Interest
None declared.

Author Contributions
All authors contributed equally to study design, implantation, and manuscript preparation with editing.

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Figure 1. Coronal image from a CT enterography demonstrates massive dilation of the small bowel to ten centimeters with a stricture at a prior small bowel anastomosis.


