

# Auto-brewery Syndrome

Nanthini D Kalaiarasan

## ABSTRACT

Auto-brewery syndrome is a rare medical condition where ethanol is produced by endogenous fermentation in the digestive tract.<sup>1</sup> In this rare medical condition, the intoxication of ethanol is produced by the yeast type *Saccharomyces cerevisiae*, which is known for its use in the production of bread and alcoholic beverages.<sup>2</sup> It occurs in patients with small bowel syndrome after surgical resection due to the fermentation of malabsorbed carbohydrates.<sup>3,4</sup>

**Keywords:** Brewery, Digestive system, Ethanol.

*Pondicherry Journal of Nursing* (2020): 10.5005/jp-journals-10084-12157

## DEFINITION

Auto-brewery syndrome is called gut fermentation syndrome and endogenous ethanol fermentation.<sup>4</sup> This is sometimes called "intoxication." This rare condition can make you intoxicated without alcohol. This is when your body converts sugars and carbs (carbohydrates) into alcohol. *Saccharomyces cerevisiae*, a type of yeast, has been identified as pathogenic to this condition. Recent research has shown that *Klebsiella pneumoniae* bacteria can dissolve carbohydrates in alcohol, which can accelerate nonalcoholic fatty liver diseases (Fig. 1).<sup>4</sup>

## SPREADING

Auto-brewery syndrome is a rare condition first reported by the medical community in the 1950s.<sup>4,5</sup> Since their initial discovery, researchers have identified auto-brewery syndrome in adults and children.<sup>5</sup> However, the authors of the 2019 case report at *BMJ Open Gastroenterology* believe that autoimmune syndrome may be the underlying medical condition.<sup>6</sup> Children with toddlers and small bowel syndrome are more likely to have auto-brewery syndrome. A medical case reports that a 3-year-old child with small bowel syndrome has "brewery syndrome" after drinking fruit juice, which is naturally high in carbohydrates.<sup>7,8</sup>

## INDICATION

- High intake of food items
  - Starchy foods
  - Carbohydrates

Department of Nursing, Kasturba Gandhi Nursing College, Puducherry, India

**Corresponding Author:** Nanthini D Kalaiarasan, Department of Nursing, Kasturba Gandhi Nursing College, Puducherry, India, Phone: +91 8056861301, e-mail: kalainanthu1311@gmail.com

**How to cite this article:** Kalaiarasan ND. Auto-brewery Syndrome. *Pon J Nurs* 2020;13(3):70–72.

**Source of support:** Nil

**Conflict of interest:** None

- Irritable bowel syndrome (IBS)
- Some types of yeast that cause auto-brewery syndrome: *Saccharomyces cerevisiae*, *Candida albicans*, *Candida cruci*, *Candida mabrata*  
Auto-brewery syndrome is likely to develop to maintain medical condition. In addition to:
  - Chron's disease,
  - Internal bacterial overgrowth,
  - Diabetes,
  - Obesity, and
  - A weak immune system
- More or prolonged antibiotic use alters the gut microbiome, resulting in increased fungal growth.
- Excessive intake of carbohydrates and processed foods can also cause gastrointestinal problems. Research shows that

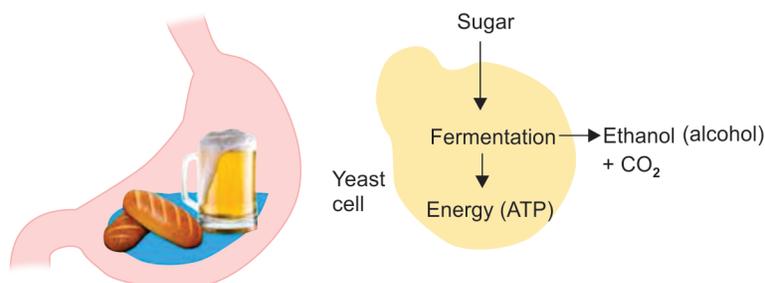


Fig. 1: Digestive tract

people with auto-brewery syndrome eat a “high-sugar, high-carbohydrate diet.”<sup>9</sup>

## CLINICAL FEATURES

- Early symptoms of auto-brewery syndrome include: brain fog, fatigue, dizziness, slurred speech, mood changes, forgetfulness, abdominal pain, dizziness, dry mouth, hangover, confusion, depression, anxiety, restlessness, memory and concentration problems, loss of coordination, and loss of concentration.<sup>10,11</sup>

## DIAGNOSIS

- Endoscopy is a nonsurgical procedure used to examine the digestive tract, collecting GI secretions for fungal examination. In the process, a light and camera are attached, allowing them to view images on the monitor.
- A stool test is performed to determine if yeast is high in your stomach.
- Glucose challenge test: If ethanol levels are elevated at any stage of the glucose challenge test, this may indicate the presence of the syndrome. When there is no auto-brewery syndrome, your blood alcohol level drops to zero. In the presence of auto-brewery disease, your blood alcohol level ranges from 1.0 to 7.0 mg per DL.<sup>12,13</sup>

## TREATMENT

- Reduce carbohydrates in your diet. A low-carbohydrate diet can help balance the fungus in your gut.
- Follow a strict diet: No carbohydrates

There are many different treatment options for auto-brewery syndrome, including:

- Changes in diet: This means avoiding carbohydrates and processed foods can help alleviate some of the symptoms of auto-brewery syndrome. Those who choose to limit their carbohydrate intake may try to eat a diet rich in protein, such as eggs, almonds, oats, cheese, Greek yogurt, milk, broccoli, lentils, pumpkin seeds, fish peanuts, and sprouts. Feel for longer. People with auto-brewery syndrome should avoid common carbohydrates and refined foods such as sugar,<sup>14</sup>
  - White bread,
  - White rice,
  - Flour,
  - Pasta, and
  - High-fructose corn juice sugars, including glucose, fructose, and dextrose.

## DRUG

Antifungal medications for the treatment of auto-brewery syndrome are:

- Fluconazole (Diflucan),
- Itraconazole (Sporanox),
  - Nystatin (mycostatin), and
  - Echinocandins such as Caspofungin (Cancidas)

## MANAGEMENT

- Treat any underlying medical conditions
- Weight loss if needed
- Limit or avoid sugary foods and beverages
- Choosing complex carbohydrates over simple carbohydrates
- Exercises include running, stationary cycling, jogging, and swimming, which are excellent options for burning calories.

## CONCLUSION

Auto-brewery syndrome is a condition that occurs when the intestinal yeast produces large amounts of ethanol, which is similar to anesthetic properties.<sup>15,16</sup> People with auto-brewery syndrome report abnormally high blood alcohol levels even when they do not drink alcohol. It is diagnosed by multiple investigations, including endoscopy and stool testing, and corrected through antifungal medications and dietary management.<sup>17</sup>

## REFERENCES

1. Hafez EM, Hamad MA, Fouad M, Abdel-Lateff A. Auto-brewery syndrome: Ethanol pseudo-toxicity in diabetic and hepatic patients. *Hum Exp Toxicol* 2017;36(5):445–450. DOI: 10.1177/0960327116661400.
2. Welch BT, Coelho Prabhu N, Walkoff L, Trenkner SW. Auto-brewery syndrome in the setting of long-standing Crohn's disease: a case report and review of the literature. *J Crohns Colitis* 2016;10(12):1448–1450. DOI: 10.1093/ecco-jcc/jjw098.
3. Cordell BJ, Kanodia A, Miller GK. Case-control research study of auto-brewery syndrome. *Glob Adv Health Med* 2019;8:2164956119837566. DOI: 10.1177/2164956119837566.
4. Malik F, Wickremesinghe P, Saverimuttu J. Case report and literature review of auto-brewery syndrome: probably an underdiagnosed medical condition. *BMJ Open Gastroenterol* 2019;6(1):e000325. DOI: 10.1136/bmjgast-2019-000325.
5. Spinucci G, Guidetti M, Lanzoni E, Pironi L. Endogenous ethanol production in a patient with chronic intestinal pseudo-obstruction and small intestinal bacterial overgrowth. *Eur J Gastroenterol Hepatol* 2006;18(7):799–802. DOI: 10.1097/01.meg.0000223906.55245.61.
6. Green AD, Antonson DL, Simonsen KA. Twelve-year-old female with short bowel syndrome presents with dizziness and confusion. *Pediatr Infect Dis J* 2012;31(4):425. DOI: 10.1097/INF.0b013e318241590f.
7. Jansson-Nettelblatt E, Meurling S, Petrini B, Sjölin J. Endogenous ethanol fermentation in a child with short bowel syndrome. *Acta Paediatr* 2006;95(4):502–504. DOI: 10.1080/08035250500501625.
8. Dahshan A, Donovan K. Auto-brewery syndrome in a child with short gut syndrome: case report and review of the literature. *J Pediatr Gastroenterol Nutr* 2001;33(2):214–215. DOI: 10.1097/00005176-200108000-00024.
9. Simic M, Ajdukovic N, Veselinovic I, Mitrovic M, Djurendic-Brenesel M. Endogenous ethanol production in patients with diabetes mellitus as a medicolegal problem. *Forensic Sci Int* 2012;216(1-3):97–100. DOI: 10.1016/j.forsciint.2011.09.003.
10. Bivin WS, Heinen BN. Production of ethanol from infant food formulas by common yeasts. *J Appl Bacteriol* 1985;58(4):355–357. DOI: 10.1111/j.1365-2672.1985.tb01473.x.
11. Aragonès G, González-García S, Aguilar C, Richart C, Auguet T. Gut microbiota-derived mediators as potential markers in nonalcoholic fatty liver disease. *Biomed Res Int* 2019;2019:8507583. DOI: 10.1155/2019/8507583.
12. Nair S, Cope K, Risby TH, Diehl AM, Terence RH. Obesity and female gender increase breath ethanol concentration: potential implications for the pathogenesis of nonalcoholic steatohepatitis. *Am J Gastroenterol* 2001;96(4):1200–1204. DOI: 10.1111/j.1572-0241.2001.03702.x.

13. Baker SS, Baker RD, Liu W, Nowak NJ, Zhu L. Role of alcohol metabolism in non-alcoholic steatohepatitis. *PLoS ONE* 2010;5(3):e9570. DOI: 10.1371/journal.pone.0009570.
14. Zhu L, Baker RD, Zhu R, Baker SS. Gut microbiota produce alcohol and contribute to NAFLD. *Gut* 2016;65(7):1232. DOI: 10.1136/gutjnl-2016-311571.
15. Izumi T, Battaglia T, Ruiz V, Perez Perez GI. Gut microbiome and antibiotics. *Arch Med Res* 2017;48(8):727–734. DOI: 10.1016/j.arcmed.2017.11.004.
16. Maier L, Pruteanu M, Kuhn M, Zeller G, Telzerow A, Anderson EE, et al. Extensive impact of non-antibiotic drugs on human gut bacteria. *Nature* 2018;555(7698):623–628. DOI: 10.1038/nature25979.
17. Ushida Y, Talalay P. Sulforaphane accelerates acetaldehyde metabolism by inducing aldehyde dehydrogenases: relevance to ethanol intolerance. *Alcohol Alcohol* 2013;48(5):526–534. DOI: 10.1093/alcalc/agt063.