

More Than Just A Gastroenteritis - Bottle gourd (Lagenaria Siceraria) Toxicity Diagnosed in the Emergency Department

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Case report

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Abstract

Background

Bottle gourd (*Lagenaria siceraria*) is sometimes used in complementary medicine practice for the treatment of chronic ailments. It belongs to the Cucurbitaceae family. However, there have been reports of toxicity due to consumption of bottle gourd juice leading to severe abdominal upset and upper gastrointestinal bleeding. As emergency physicians we need to be aware of such complementary medicine induced haemorrhagic gastroenteritis as possible etiology of gastrointestinal haemorrhage.

Case presentation

We present a case of a 41-year-old gentleman who presented to the emergency department (ED) with multiple episodes of vomiting, hematemesis and diarrhoea after consuming bottle gourd juice. The patient was resuscitated and stabilized with fluids, proton pump inhibitors and antiemetics. He was subsequently admitted to General Medicine ward for further management. He continued to receive symptomatic treatment in the ward and underwent esophagogastroduodenoscopy (OGD) during his hospitalization stay. His symptoms improved and he was discharged stable five days later.

Conclusion

Early recognition of this rare presentation of bottle gourd toxicity is important in our local context especially where traditional medicine is widely prevalent nowadays. Treatment is supportive. Public awareness of dangerous effects from the consumption of bitter bottle gourd juice and complementary medicine without proper consultation with practitioner plays a crucial role to prevent further cases. Physicians need to advise patients on the use of traditional medicine and their potential side effects.

Background

Bottle gourd (*Lagenaria siceraria*) is sometimes used in complementary medicine practice for the treatment of chronic ailments. It belongs to the Cucurbitaceae family. However, there have been reports of toxicity due to consumption of bottle gourd juice leading to severe abdominal upset and upper gastrointestinal bleeding. As emergency physicians we need to be aware of such complementary medicine induced haemorrhagic gastroenteritis as possible etiology of gastrointestinal haemorrhage.

Case Presentation

A 41-year-old gentleman presented to our ED with vomiting, hematemesis, diarrhoea and abdominal pain. He has a past history of diabetes mellitus on diet control and hyperlipidaemia on fenofibrate. He had been consuming 1 glass (50mls) per day of bottle gourd juice, for the past 1 month. It was recommended to him by an Indian traditional medicine practitioner as complementary treatment for his hyperlipidaemia. He was not on any other medications that could have contributed to gastric irritation or bleeding. He

procures his gourds from the market and uses a juicer to prepare the juice, usually within 3 days of procurement. He usually consumes the juice immediately after preparation.

He was asymptomatic until the day of presentation, he consumed his daily glass of bottle gourd juice but noted that the juice tasted unusually bitter. 1 hour later, he developed profuse vomiting totalling 16 episodes, associated with 9 episodes of non-bloody diarrhoea. The last two episodes of vomiting were associated with a moderate amount of fresh red blood (approximately 100mls each). He was hypotensive en route to the hospital but was fluid responsive.

On examination, the patient was conscious, but was tachycardiac with heart rate of 123 beats per minute, blood pressure of 150/103 mmHg, respiratory rate of 22 breaths per minute with oxygen saturation of 98% on room air. His oral mucosa was dry. There was tenderness elicited over upper abdominal area with voluntary guarding. Per rectal examination reviewed brown stool.

Computed tomography of abdomen and pelvis was normal. A provisional diagnosis of acute gastroenteritis was made and a possibility of gastrointestinal (GI) bleed was also considered. A nasogastric tube was inserted and GI aspirate was minimal blood stained fluid. He was treated with supportive care which included intravenous fluids, proton pump inhibitors, analgesia and antiemetics. His tachycardia improved and blood pressure maintained stable after he was adequately hydrated with 500mls of intravenous crystalloids. He was also given 1 pint of packed cell transfusion in ED in view of the amount of hematemesis. Surgical review opined that there was no acute surgical intervention required at that point of time, and the patient was admitted to General Medicine ward for further observation.

During his hospitalization stay, he had only 1 further episode of hematemesis on day 1 of stay (100mls). There were no further episodes of vomiting thereafter and his stools became formed after day 2 of admission. He continued to receive symptomatic treatment and underwent esophagogastroduodenoscopy (OGD) on day 3 of admission, which revealed pangastritis and duodenitis. He was discharged stable on day 5.

Discussion And Conclusion

Bottle gourd (*Lagenaria siceraria*) is believed to have many health benefits and with the increased practice of traditional medicine, it is used as alternate therapies to treat ailments [1]. However, a handful of reports have been published regarding toxicity due to consumption of this juice [2][3]. We report a case of bottle gourd juice toxicity diagnosed in the Emergency Department, review the literature in general, discuss the mechanism of toxicity and other substances that may present similarly. To the best of our knowledge, this is the first locally reported case of bottle gourd toxicity arising in our population.

Bottle gourd is also known as bottle gourd, white-flowered gourd, long melon, birdhouse gourd, is a member of *Cucurbitaceae* family. It is cultivated throughout the tropical and subtropical regions of the world. Consumption of bottle gourd juice is thought to work as a health tonic and part of traditional

healthy living practices in controlling diabetes mellitus, hypertension, cardiovascular diseases, liver diseases and weight loss. It is believed to have cardioprotective, diuretic and nutritive properties [1][4]. The ethanolic extract also showed to have antihepatotoxic and antihyperlipidemic activities in rats [5]. People usually prepare the juice by blending bottle gourd pieces in a blender. Black pepper, salt, mint leaves or lemon can be added to enhance the taste. It should be served fresh and not to be stored by refrigerating it [6].

However, toxic level of Cucurbitacin can accumulate in bottle gourd or when it is inappropriate processed. Consumption of such juice can result in serious toxic reactions which may potentially be fatal [2][3]. Cucurbitacin is a tetracyclic triterpenoid which has been shown to have cytotoxic effects in animals and humans. It has anti-tumorigenic and cytotoxic effect by inducing apoptosis and cell cycle arrest. It was also found to be associated with persistent hypotension, pleural effusion and ascites in mice due to increased capillary permeability, and is lethal in small doses in mice and rabbits. In vitro studies suggested that Cucurbitacin inhibits binding of cortisol to glucocorticoid receptors in a dose-dependent manner, this mechanism may potentiate other causes of hypotension in bottle gourd toxicity such as fluid and blood loss. [7].

Members of the *Cucurbitaceae* family (cucumber, zucchini, eggplant, squash, pumpkin and bitter melon) have been cultivated for food. Occasionally poisoning can occur due to toxic constituents accumulating in cultivated ones, or when wild species are mistaken for cultivated ones. Plants tend to accumulate this toxin with maturation and hence over-ripened ones produce more Cucurbitacin. Compared with other plants in the family, bottle gourd has higher content of Cucurbitacin and when it is grown under environmental stress such as extreme temperature and poor soil quality, they produce elevated level of Cucurbitacin [8][9].

The extreme bitterness of Cucurbitacin should hinder humans from being exposed to substantial quantities of the compounds. Nevertheless, there have been a few reports of toxicity due to consumption of bitter bottle gourd juice leading to severe gastrointestinal complications. Most patients present with abdominal pain, vomiting, diarrhoea, upper gastrointestinal bleeding and hypotension within 30 minutes to one hour after ingesting bitter bottle gourd juice and the symptoms may last up to 2 to 7 days [2][3]. In recent years, researchers in India reported a few cases of patients experienced severe haematemesis and hypotension requiring inotropic support from this toxicity [2][3][10][11]. There were also lethal cases reported due to consumption of the juice [12][13].

There is no well described antidote for this toxicity and management is mainly supportive such as replacement of fluid deficits, correction of electrolyte abnormalities, symptomatic treatment of vomiting, control of upper gastrointestinal bleeding, management of shock and blood transfusions if necessary [3].

Although gastrointestinal bleeding after consumption of plant material can arise if there is severe vomiting leading to Mallory-Weiss tear, but consumptions of certain plant species are often reported to lead to gastrointestinal bleeding due to inherent toxicity. Other than plants with high concentration of cucurbitacin from the *Cucurbitaceae* family, consumption of plants with toxalbumin such as *Abrus*

precatorius, *Ricinus communis* can also lead to gastrointestinal bleed. Some members of the *Fabaceae* family like *Phaseolus* genus and *Wisteria sinesis* also contain toxic lectins that can lead to gastrointestinal bleeding when consumed [14]. Plants with anthraquinone can also lead to severe diarrhoea with bleeding [14]. Members of *Thuja*, *Psoralea*, *Daphne* and *Phytolacca* genera have also been reported to cause gastrointestinal bleeding [14]. In general, there is no antidote for these poisoning and the management for gastrointestinal bleeding is supportive, in the case of toxalbumin, multi-organ failure and cardiovascular collapse should be anticipated [15].

In conclusion, early recognition of this rare presentation of bottle gourd toxicity is important in our local context especially where traditional medicine is widely prevalent nowadays. Treatment is supportive. Public awareness of dangerous effects from the consumption of bitter bottle gourd juice and complementary medicine without proper consultation with practitioner plays a crucial role to prevent further cases. Physicians need to advise patients on the use of traditional medicine and their potential side effects.

Abbreviations

M.Med

Master of Medicine in Emergency Medicine

FAMS

Fellows of the Academy of Medicine, Singapore

ED

Emergency Department

OGD

esophagogastroduodenoscopy

GI

gastrointestinal

Declarations

Ethics approval and consent to participate: No ethics approval was obtained. This case report was designed to contribute generalisable knowledge. No intervention was involved. Verbal consent was obtained from the patient and documented in hospital record system.

Consent for publication: Not applicable.

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References

1. Parle Milind, Kaur Satbir. Is Bottle Gourd A Natural Guard? International Research Journal of Pharmacy 2(6):13–17
2. Khalid Ismail Khatib, Kapil Sharad Borawake. Bottle Gourd (*Lagenaria Siceraria*) Toxicity: A “Bitter” Diagnostic Dilemma. Journal of Clinical and Diagnostic Research. 2014 Dec; 8(12): MD05–MD07.
3. Ankur Verma, Sanjay Jaiswal. Bottle gourd (*Lagenaria siceraria*) juice poisoning. World Journal of Emergency Medicine. 2015; 6(4): 308–309.
4. Kaushik, Vidhu Aeri, and Showkat R. Mir. Cucurbitacins – An insight into medicinal leads from nature. Pharmacognosy Review. 2015 Jan-Jun; 9(17): 12–18.
5. Ghule BV, Ghanti MH, Saoji AN, Yeole PG. Antihyperlipidemic effects of metabolite extract from *Lagenaria siceraria* stand. Fruit in hyperlipidemic rats. J Ethnopharmacology. 2009;124:333–337.
6. The Ayurveda Experience. May 16, 2018. <https://theayurvedaexperience.com/blogs/tae/bottle-gourd-benefits-lauki-calabash-juice-recipes>
7. Jorn Gry, Inge Soborg and Hans Christer Andersson. Cucurbitacins in Plant Food 2006.
8. Dolan LC, Matulka RA, Burdock GA. Naturally Occurring Food Toxins. Toxins 2010 Sep;2(9):2289–2332.
9. J A Hey. Cucurbitacins in bitter zucchini. Crop and food research report No.598. April 2002.
10. A Sharma, JP Sharma, R Jindal, RM Kaushik. Bottle gourd poisoning. JK Sci. 2006;8:120–21.
11. R Puri, R Sud, A Khaliq, M Kumar, S Jain. Gastrointestinal toxicity due to bitter bottle gourd (*Lagenaria siceraria*) - a report of fifteen cases. Indian J Gastroenterol. 2011;30:233–36.
12. Indian Council of Medical Research Task Force. Assessment of effects on health due to consumption of bitter bottle gourd (*Lagenaria siceraria*) juice. Indian J Med Res. 2012;135:49–55.
13. Umesh Isalkar. Pune woman dies after drinking bottle gourd juice. The Times of India. Retrieved 7 July 2018.
14. Dietrich Frohne. Poisonous Plants: A Handbook for Pharmacists, Doctors, Toxicologists, Biologists and Veterinarians, Second Edition. Manson Pub Lt. 2005. ISBN-10: 1874545944
15. Kent Olson. Poisoning & Drug Overdose. McGraw-Hill Medical. 2006. ISBN-10: 0071443339