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C A S E R E P O R T

Persistent hiccup in a continuous ambulatory peritoneal dialysis patient following ingestion of star fruit

Kin-Yee LO, Gensy Mei-Wah TONG, Ping-Nam WONG, Siu-Ka MAK, Andrew Kui-Man WONG
Renal Unit, Department of Medicine, Kwong Wah Hospital, Hong Kong.

Abstract

Animal studies have suggested that ingestion of star fruit, which belongs to the Oxalidaceae family, may cause neurotoxicity. Outbreaks of intractable hiccups have been reported following ingestion of star fruit in patients on regular hemodialysis. Other complaints have included insomnia, agitation and mental confusion. We report a patient on continuous ambulatory peritoneal dialysis (CAPD) who presented with acute confusion and persistent hiccup following ingestion of star fruit. Symptoms resolved spontaneously. Other reported cases and management strategies are discussed.

Key words: Continuous ambulatory peritoneal dialysis (CAPD), Hiccup, Star fruit intoxication

中文摘要

楊桃屬於酢漿草科 (*Oxalidaceae*) 族。動物研究表明它可能有神經毒性。有報道顯示常規血液透析病人攝取楊桃後出現頑固的打嗝。其他症狀包括失眠、焦慮和精神恍惚。我們報告一個連續性家居腹膜透析 (CAPD) 病人食用楊桃後出現急性精神錯亂和持續的打嗝。她的症狀自發地消失。我們討論有關病例和治療方案。

CASE HISTORY

A 55-year-old lady on continuous ambulatory peritoneal dialysis (CAPD) presented with persistent hiccup. End-stage renal failure (ESRF) of unknown etiology had been diagnosed in 1995. Her CAPD regimen comprised 3 x 2 L exchanges/day. She became anuric 5 years following commencement of CAPD. Her body weight was 60 kg and height 160 cm. The total weekly Kt/V was 1.64 and nPCR was 1.56 g/kg/day when measured 2 months before presentation. She had remained stable for the last few years with the exception of poorly controlled hyperphosphatemia resulting in tertiary hyperparathyroidism, for which total parathyroidectomy was planned. Her regular medication comprised allopurinol, ferrous sulphate, folate, vitamin B complex, vitamin C, aluminium hydroxide and erythropoietin. No changes had been made to any of her medication prior to presentation.

She was admitted to the surgical unit with a 4-day history of persistent hiccup and a single episode of coffee ground

vomiting. Upper gastrointestinal endoscopy revealed gastritis for which oral cimetidine was prescribed. She was discharged home but readmitted to the renal unit on the same day because of persistent hiccup. The hiccup subsided shortly after admission without treatment. Physical examination revealed no focal neurological deficit, although she was noticed to be uncharacteristically talkative and hyperactive. She did not sleep at night and wandered around in the ward. This altered behavior resolved gradually over the next 2 days. Routine blood investigations revealed no significant deviation from her baseline: Na 140 mmol/L, K 3.8 mmol/L, Ca 2.29 mmol/L, urea 34.7 mmol/L, Cr 1118 μmol/L, pH 7.37, HCO₃ 20.1 mmol/L, WCC 13.8 x 10⁹ /L, Hb 7.3 g/dL, platelet 442 x 10⁹ /L. Electrocardiogram (ECG) showed sinus rhythm and chest X-ray was normal.

Since no obvious cause for the hiccups could be elicited, she was asked again if she had taken any drug, other than her usual medication, or if she had ingested any unusual food. She revealed that she had eaten a large

Correspondence: Dr. Kin-Yee LO, Renal Unit, Department of Medicine, Kwong Wah Hospital, 25 Waterloo Road, Kowloon, Hong Kong. Fax: (852) 2783 9902, E-mail: kinyeelo@hotmail.com

piece of star fruit 2 hours prior to the onset of symptoms because she was thirsty. She had rarely eaten star fruit since commencing CAPD. Her symptomatology was representative of reported cases of star fruit intoxication. The temporal sequence of events also suggested the existence of a causal relationship, although there were no laboratory findings to confirm such a diagnosis. As symptoms resolved completely in 2 days, no additional peritoneal dialysis or hemodialysis (HD) was prescribed.

DISCUSSION

Hiccup is a common, usually benign and transient phenomenon. It can be predictably elicited by over-indulgence of food and alcohol. It arises due to involuntary, intermittent spasmodic contraction of the diaphragm and inspiratory intercostal muscles that results in a sudden inspiration and ends with an abrupt closure of the glottis. It often occurs with a frequency of 4 to 60 hiccups per minute (1), and serves no known physio-logical function.

It may be a programmed isometric exercise of the inspiratory muscle that aids survival during the perinatal period when the respiratory tract needs to mature rapidly. There are numerous causes of hiccup including: 1. pathology of the central nervous system, 2. irritation of the vagus nerve, 3. phrenic nerve and diaphragm, 4. toxic-metabolic causes, 5. postoperative problems, 6. drugs, and 7. psychogenic problems. Hiccup is considered to be intractable if it lasts for more than 2 months (2).

Star fruit belongs to the *Oxalidaceae* family, species *Averrhoa carambola*, and is a fruit widely found in Asia. Animal studies have suggested that its ingestion may be associated with neurotoxicity. Injection of star fruit extract into the mouse peritoneum has been reported to provoke convulsion (3).

Outbreaks of intractable hiccups have previously been reported in patients on regular HD who ate star fruit (4). The same problem was not seen in staff who ate the same fruit. Another study reported six patients on dialysis who were apparently intoxicated following ingestion of star fruit (5). Symptoms ranged from insomnia and hiccups, to agitation and mental confusion. HD aided resolution of symptoms although one patient died despite dialysis and active resuscitation.

The largest series from Taiwan reported the development of clinical symptoms in 20 patients on dialysis after eating star fruit or drinking star fruit juice. Four of them were

on CAPD and 15 on HD. The onset of symptoms varied from 2.5 to 14 hours after ingestion and included: sudden onset limb numbness (75%), muscle weakness (35%), intractable hiccups (60%), and varying degrees of disturbed consciousness (50%) and seizure. Computer tomography of the brain and lumbar puncture in those with impaired consciousness were unremarkable. Mild leukocytosis was observed in four patients. Serum potassium and calcium levels were within normal limits in most patients although four were hyperkalemic (range 5.4 to 7.1 mmol/L). Treatment was tailored to the severity of presenting symptoms. HD was performed in addition to the patients' regular dialysis sessions. Eight patients died, including one who had not commenced CAPD. Eight of the 10 patients with impaired consciousness died whereas all patients without altered consciousness survived. All deaths occurred within 5 days of symptom occurrence despite additional HD and intensive medical care (6).

In patients with compromised renal function, metabolites of ingested food and drugs that are renally excreted may accumulate. Thus substances ingested by healthy persons and generally considered "safe" may be harmful for uremic patients. Star fruit is the only foodstuff suspected of causing neurotoxicity in renal failure patients.

These case series provide strong evidence for such a toxic effect with associated high mortality in patients with ESRF. The exact toxin has not been identified. The varied toxicity may be due to biological factors: individual metabolism and excretion of the toxin, patient's age and the toxin content in the different star fruit subspecies. Star fruit appears to contain a powerful neurotoxin that can accumulate in this group of susceptible patients and may cause irreversible neurological damage (5). Star fruit intoxication must be considered in uremic patients who present with altered consciousness or unexplained neurological symptoms.

REFERENCES

1. Fishman MB. Overview of hiccups. UpToDate 2000;8.
2. Kahrilas PJ, Shi G. Why do we hiccup? Gut 1997;41:712-713.
3. Muir CK, Lam CK. Depression action of *Averrhoa carambola*. Med J Malaysia 1980;3:279-280.
4. Martin LC, Caramori JST, Barreti P, Soares VA. Intractable hiccups induced by carambola ingestion in patients with end stage renal failure. J Bras Nefrol 1993;15:92-94.
5. Neto MM, Robl F, Netto JC. Intoxication by star fruit in six dialysis patients? Nephrol Dial Transplant 1998;13:570-572.
6. Chang JM, Hwang SJ, Kuo HT. Fatal outcome after ingestion of star fruit in uremic patients. Am J Kidney Dis 2000;35:189-193.