CASE REPORT

STAR FRUIT (AVERRHOA CARAMBOLA) INTOXICATION: AN IMPORTANT CAUSE OF CONSCIOUSNESS DISTURBANCE IN PATIENTS WITH RENAL FAILURE

Chin-Tung Chang, M.D., Yung-Chang Chen, M.D., Ji-Tseng Fang, M.D.,* and Chiu-Ching Huang, M.D.

Division of Critical Care Nephrology, Section of Nephrology, Department of Medicine, Chang Gung Memorial Hospital, Taoyuan, Taiwan

ABSTRACT

Star fruit intoxication is a rare cause of consciousness disturbance in patients with renal failure. Most cases in the literature are uremic patients on maintenance dialysis. We present a patient with chronic renal failure, who was not on dialysis program yet, suffered from star fruit intoxication with presentation of consciousness disturbance and successfully managed by a session of hemodialysis.

Key Words: Star fruit (Averrhoa carambola); Consciousness disturbance; Chronic renal failure

INTRODUCTION

A large variety of disorders, including uremic encephalopathy, dysequilibrium syndrome, dialysis dementia, hypertensive encephalopathy, infection,

*Corresponding author. Division of Critical Care Nephrology, Section of Nephrology, Chang Gung Memorial Hospital, 5 Fu-Shin Street, Kweishan, Taoyuan, Taiwan. Fax: 886-3-3282173; E-mail: fangjits@ms4.hinet.net

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drug, hypoglycemia, electrolytes imbalance, hypoxia and cerebral vascular
diseases can induce consciousness disturbance in patients with chronic renal
failure. Star fruit intoxication is also a cause of consciousness disturbance in
patients with chronic renal failure although rare. From a literature review
using the Medline and Science Citation Index, only one case with advanced
chronic renal failure not yet on dialysis that suffered from star fruit intoxica-
tion manifested by consciousness disturbance had been reported.[1–4]

We report a patient with chronic renal failure not yet on dialysis who
suffered from star fruit intoxication with presentation of consciousness dis-
turbance and successfully managed by one session of hemodialysis.

CASE REPORT

A 64-year-old male diabetic patient with chronic renal failure, hyperten-
sion and gout was admitted via the emergency room with a chief complaint of
severe low back pain radiating to both legs. On admission, blood pressure
was 150/80 mmHg, pulse 76/min, and respiratory rate 18/min and body
temperature 37°C. Physical examination revealed an alert man with positive,
bilateral straight leg raising test. Laboratory studies disclosed blood urea
nitrogen (BUN) 32 mg/dL, creatinine (Cr) 4.3 mg/dL, sodium (Na)
141.4 mmol/L, potassium (K) 5.39 mmol/L and glucose 106 mg/dL. MRI
study of lumbosacral spine showed multiple spinal stenosis due to interver-
tebral disc protrusion. Therefore, he received regular physical therapy for
spinal stenosis and oral medications for glycemic and blood pressure control.
Low back pain improved and patient was quite well after above treatment.

One week after admission, he developed hiccup, nausea and vomiting,
followed by consciousness disturbance and agitation. Blood pressure was
130/80 mmHg and body temperature 37.3°C when consciousness disturbance
occurred. Laboratory studies showed BUN 31 mg/dL, Cr 4.4 mg/dL, Na
141 mmol/L, K 3.89 mmol/L, calcium 7.9 mg/dL, ammonia 14 umol/L glucose
219 mg/dL, magnesium 2.0 mg/dL, WBC 6800/mm³, hemoglobin 10.4 g/
dl, pH 7.464, PaCO₂ 30.8 mmHg, PaO₂ 144 mmHg, HCO₃⁻ 22.3 mmol/L, corti-
sol 19.11 ug/dL (normal 5–25), Free T₄ 1.2 ng/dL (normal 0.76–1.79)
and TSH 0.89 uIU/mL (normal 0.35–5.0). Brain CT did not reveal any
specific abnormality.

Fever up to 38.5°C developed few hours later and he was treated as
septic encephalopathy with parenteral antibiotics (Ampicillin sodium and
Sulbactam Sodium). Septic work up including CSF analysis, Indian Ink,
gram stain and acid fast stain of CSF, urine analysis, chest X-ray, abdominal
sonogram and cardiac echography did not disclose any possible
infectious focus. Bacterial culture of blood and CSF did not grow any micro-
organism. Four days later, persistent fever and consciousness disturbance
was still noted. Further studies including repeated CSF analysis and
brain MRI were performed, but no specific abnormality was found. Electroencephalography revealed diffuse cortical dysfunction. According to the suggestion of infection man, parenteral acyclovir was added for possible viral encephalopathy, however fever did not subside and consciousness disturbance still existed.

Eight days after his consciousness disturbance, a Nephrologist was consulted due to deterioration of renal function. BUN raised from 32 to 76 mg/dL and Cr raised from 4.3 to 6.2 mg/dL. His family offered valid information to the Nephrologist that the patient had ingested two star fruits one day before occurrence of consciousness disturbance. Under the suspicion of star fruit intoxication, we arranged a 2-h session of hemodialysis. Consciousness improved progressively after dialysis treatment. Two days after dialysis, he did not have any mental confusion and fever subsided subsequently.

**DISCUSSION**

Because of the reduced ability to excrete toxic substance, patients with chronic renal failure are vulnerable to various drugs and toxin. Star fruit is a fruit originating from Southeast Asia and acclimatized to many other tropical countries. It belongs to Oxalidaceae family, species *Averrhoa carambola*.

Neurotoxic activity of star fruit was first described by Muir and Lam\(^1\) in 1980, the authors showed that the fruit extracts in a dose exceeding 8 g/Kg induced convulsions in mice when injected into the peritoneal cavity. Martin et al.\(^2\) described an outbreak of intractable hiccups in patients with regular hemodialysis program after ingestion of star fruit, but they did not mention any sign of neurological involvement.

Neto et al.\(^3\) described six uremic patients on maintenance dialysis had a variety of manifestations that ranged from hiccups, nausea, insomnia, agitation, asthenia through mental confusion. All these manifestations subsided after one session of hemodialysis. They concluded that star fruit contained an unknown neurotoxin that could be removed by hemodialysis. They also conducted a preliminary toxicological investigation of the effect of star fruit on a normal rat. An extract of star fruit injected into the peritoneal cavity and cerebral ventricles provoked tonic-clonic type convulsions.

Chang et al.\(^4\) reported the largest group of star fruit intoxication. There are twenty patients in their report including fifteen uremic patients on maintenance dialysis, four uremic patients treated with continuous ambulatory peritoneal dialysis and one patient with advanced chronic renal failure (Cr 6.4 mg/dL) who had not undergone dialysis. According to this report, both fresh star fruit and fruit juice can induce intoxication. Presenting symptoms were predominantly neuromuscular that are similar to those described by Neto et al.\(^3\) Eight patients including the patient with advanced renal failure died despite of hemodialysis intervention. In this report, the presence
of altered consciousness most clearly differentiated patients who died and those who survived. They concluded that star fruit intoxication in patients with renal failure may have a high resultant mortality even when supportive care and dialysis were promptly administered.

Several lessons should be learned from our patient. Firstly, on the basis of the patient’s presenting course, we suggest that star fruit intoxication should be suspected in patients with renal failure who did not undergo dialysis if various neurological manifestations including hiccups, vomit and consciousness disturbance occurred and there was not any definite cause of these manifestations. Secondly, star fruit intoxication could occur in patients without advanced chronic renal failure. Thirdly, star fruit intoxication should be considered in patients having rapid deterioration of renal function without other etiology of acute renal failure after ingestion of star fruit. Finally, hemodialysis should be performed as soon as possible if star fruit intoxication related consciousness disturbance is highly suspected, even renal failure was not very severe.

In conclusion, we described a diabetic patient with chronic renal failure who suffered from star fruit intoxication and successfully managed by one session of hemodialysis. Star fruit intoxication should be considered when patients with chronic renal failure presented with consciousness disturbance, other unexplained neurological symptoms, or unexplained rapid deterioration of renal function. Hemodialysis should be initiated as soon as possible in addition to other supportive care.

REFERENCES
