

# Fatal Outcome after Star Fruit (*Averrhoa Carambola*) Ingestion in Patient with Chronic Renal Insufficiency

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## Abstract

Most of the patients with star fruit intoxication are uremic patient on dialysis and few of them are advanced renal failure patient not yet beginning dialysis. We reported a case of less advanced renal insufficiency (Cr: 2.3 mg/dL) who present vomiting, hiccup and lower limbs numbness after ingesting star fruit and rapid progressed to seizure six hours later. Status epilepticus was noted refractory to medical treatment. Continuous renal replacement therapy was performed on the fourth day but in vain. Patient expired on the fifth day due to status epilepticus and hypotension. (*Ann Disaster Med.* 2004;3:56-59)

**Key words:** Chronic Renal Insufficiency; Star Fruit; Intoxication

## Introduction

Star fruit (*Averrhoa Carambola*) is believed to have originated in Ceylon and the Moluccas, but it has been cultivated in south-east Asia and Malaysia for many centuries. It is rather popular in many countries either in the form of fresh fruit or juice. Some countries use it for medical purpose.<sup>1</sup> The toxicity of star fruit was published since 1980.<sup>2</sup> The symptoms of intoxication ranged from hiccup, vomiting to conscious disturbance, status epilepticus and death.<sup>3-5</sup> Most of the patients with star fruit intoxication were uremic patient on dialysis and few of them are advanced renal failure patient no yet beginning dialysis.

We reported a case of less advanced renal insufficiency (Cr: 2.3 mg/dL) who presented

vomiting, hiccup and lower limbs numbness after ingesting star fruit and rapid progressed to seizure six hours later. Status epilepticus was noted refractory to medical treatment. Continuous renal replacement therapy was performed on the fourth day but in vain. Patient expired on the fifth day due to status epilepticus and hypotension.

## Case Report

This patient was a 65-year-old female with diabetes mellitus, hypertension and chronic renal insufficiency. On the occasion, she consumed one fresh star fruit about 3 hours ago. Two hours after ingestion, she suddenly developed hiccup, black-out sensation, vomiting, watery diarrhea and numbness sensation over bilateral lower

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limbs and she was visited to our emergency department. On arrival, vital signs were blood pressure 215/98 mmHg, pulse rate 122/min, respiratory rate 20/min, body temperature 35.3°C. Physical examination revealed an alert woman with mild irritable condition and no obvious neurological disorder was noted. 5 mg of prochlorperazine was prescribed. Laboratory investigation showed blood urea nitrogen (BUN) 37 mg/dL, creatinine (Cr) 2.3 mg/dL, Na 140 meq/L, K 3.7 meq/L, glucose 393 mg/dL, AST 21 U/L, CRP 1.17 mg/dL, WBC 14,560/uL, Hgb 11.3 gm/dL, platelet 291,000 uL, PH 7.477, PCO<sub>2</sub> 28.2 mmHg, PaO<sub>2</sub> 108.9 mmHg, HCO<sub>3</sub><sup>-</sup> 21.0 mmol/L.

Symptoms were not improved after treatment. Furthermore, weakness over bilateral leg, inappropriate speech and agitation were develop about two hours later. Brain CT was performed and showed decreased attenuation area over right posterior cerebral artery (PCA) area without intracranial bleeding. Conscious disturbance with Glasgow Coma scale E4V2M5 was noted when performing brain CT. Neurological examination revealed isocoric pupil with appropriate light reflex, head and eyes deviated to left, positive Barbinski's sign over left side. Neither muscle power nor deep tendon reflex was changed. We had consult neurologist for further evaluation. Under the impression of seizure attack or extrapyramidal syndrome, phenytoin and akineton I.V. injection were suggested by neurologist. Midazolam was used due to persistent seizure activity and respiratory distress, endotracheal tube was inserted later. Lumbar puncture was also done and revealed normal pressure and normal data result. Brain CT was redone and showed neither intracranial hemorrhage nor other active

lesion. Then, she was admitted to intensive care unit (ICU) for further management.

Refractory clonic seizure which was poorly response to phenytoin and high dose midazolam was noted in the ICU. Thiopental was prescribed but only showed partial effect and it had side effect of dropping blood pressure. Dopamin was used for keeping hemodynamic status stable. Elevated blood sugar with high osmolarity (glucose 541 mg/dL, osmolarity 332 mosm/kg) was also noted and hydration with blood sugar control was performed. Blood sugar stabilized after treatment. Unfortunately, sudden onset of anuria and acute renal failure (Cr 4.2 mg/dL) was noted on the fourth day. Pulmonary edema was also noted. Continuous renal replacement therapy was performed. Following up brain CT was also done on the same day and showed severe brain edema in bilateral cerebral hemispheres with loss of gray and white matter interface at bilateral occipital-parietal regions. On the fifth day, patient was expired due to persistent seizure and hypotension without response to high dose inotropic agent.

## Discussion

The toxicity of star fruit was first published in 1980 by Muir and Lam.<sup>2</sup> They showed that the fruit extracts in doses exceeding 8g/kg provoked convulsions in mice when injected into the peritoneal cavity.

The first toxic effect to people was first described in 1993. Martin et al. described an outbreak of intractable hiccups in eight patients with regular hemodialysis program after ingestion of star fruit, and all recovered after hemodialysis.<sup>3</sup> But they did not mention other neurological involvement.

The hiccups occurring in patients on di-

alysis after ingestion of star fruit had been seen as a curiosity and not as a threat until 1998. Neto et al. described six uremic patients on maintenance dialysis had a variety of manifestation that ranged from hiccups, nausea, insomnia, agitation, asthenia through mental confusion.<sup>4</sup> One patient died of seizure and hypotension. The other five people recovered after one session of hemodialysis. They also extracted star fruit juice and injected into the peritoneal cavity and cerebral ventricles. Tonic-clonic type convulsions could be induced with the injection. They concluded that star fruit contained an unknown neurotoxin that could be removed by hemodialysis.

In the year of 2000, Chang et al. reported twenty patients of star fruit intoxication.<sup>5</sup> Among the twenty patients, nineteen patients were uremic patient under hemodialysis or peritoneal dialysis and one patient had advanced chronic renal failure (Cr 6.4 mg/dL) without dialysis. The symptoms were similar to those described by Neto et al.<sup>4</sup> Brain CT was performed in patients with altered consciousness, but no significant abnormality was noted. Eight patients including the patient with advanced renal failure died despite of hemodialysis intervention. They found the presence of altered consciousness most clearly differentiate patients who died and those who survived. They also concluded star fruit ingestion by patients with renal failure will cause high mortality even after dialysis.

Neto et al. reported the largest group of star fruit intoxication in 2003.<sup>1</sup> There were 32 uremic patients in their study. Among them, twenty-eight patients were under dialysis process and other four patients were not yet undergoing dialysis. Seven patients died in the study. They found there were poor association

between the amount ingested and the severity of symptoms. The onset of symptoms ranged from 30 minutes to six hours. They classified the neurotoxic effects of star fruit into three levels: (1) mild intoxication: hiccup, vomiting and insomnia; (2) moderate intoxication: psychomotor agitation, numbness and paresthesia of the limbs, and mild mental confusion; and (3) severe intoxication: moderate to severe mental confusion progressing to coma, seizures progressing to status epilepticus, and haemodynamic instability progressing to hypotension and shock. The severe symptoms may mimic either strokes, brain stem strokes, or may even resemble 'metabolic' or uremic disturbances. They noted certain cases of mild intoxication progress to severe symptoms if not properly treated, and the velocity of progression is extremely variable, depending on the characteristics of each patient. Some patient died rapidly and any patient with suspected star fruit intoxication should not be discharged and should be observed very closely. They also noted mild symptoms such as hiccups may persist for several days and rebound effect occurred in most of the patients. They concluded that patients presenting with severe intoxication who are not treated, that are treated by peritoneal methods, or by late hemodialysis, will die with most of them in status epilepticus.

Several lessons should be learned from our patient. First, most study revealed uremic or advanced renal failure patients are at high risk of star fruit intoxication. In our patient, the creatinine level was 2.3 mg/dL when admission and star fruit intoxication was not impressed at first. We must focused on the decline of renal function and suspect patients have star fruit intoxication by their history and symptoms even they only have mild renal insufficiency. Second,

the mild symptoms of hiccup, vomiting could not be treated by conventional medication like prochlorperamide. Third, the symptoms of star fruit intoxication will progress rapidly if not treated properly. In our case, the patient suffered from hiccup and vomiting then progressed to conscious disturbance and seizure only in five hours. Close observation of these patients was needed. Fourth, hemodialysis will be less helpful after status epilepticus occurred. Our case started continuous renal replacement therapy on the fourth day after ingestion, but seizure and hypotension were not improved and patient died on the next day. Early hemodialysis is indicated in star fruit intoxication. However, we noted a report of a case with conscious disturbance after ingesting star fruit and hemodialysis was performed on the eighth day.<sup>6</sup> The patient recovered two days later without any mental confusion. The response to hemodialysis may be individualized.

In conclusion, we described a diabetic patient with chronic renal insufficiency and had symptoms of vomiting, hiccup and numbness over bilateral foot 2 hours after ingesting star fruit. Status epilepticus occurred 6 hours later and patient died of seizure and hypotension on the fifth day even starting continuous renal replacement therapy on the fourth day. Star fruit intoxication must be considered if patient have likely symptoms even their renal insufficiency was not advanced. Supportive treatment was not useful in these patients and early hemodialysis was indicated. Late hemodialysis will be less helpful in these patients.

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