ISSN 2220-3141 (online)

World Journal of

Critical Care Medicine

World J Crit Care Med 2022 September 9; 11(5): 311-341

Published by Baishideng Publishing Group Inc

World Journal of Critical Care Medicine

Contents

Quarterly Volume 11 Number 5 September 9, 2022

World Journal of Critical Care Medicine

Quarterly Volume 11 Number 5 September 9, 2022

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ABOUT COVER

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AIMS AND SCOPE

The primary aim of the *World Journal of Critical Care Medicine* (*WJCCM*, *World J Crit Care Med*) is to provide scholars and readers from various fields of critical care medicine with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJCCM mainly publishes articles reporting research results and findings obtained in the field of critical care medicine and covering a wide range of topics including acute kidney failure, acute respiratory distress syndrome and mechanical ventilation, application of bronchofiberscopy in critically ill patients, cardiopulmonary cerebral resuscitation, coagulant dysfunction, continuous renal replacement therapy, fluid resuscitation and tissue perfusion, hemodynamic monitoring and circulatory support, ICU management and treatment control, sedation and analgesia, severe infection, *etc*.

INDEXING/ABSTRACTING

The *WJCCM* is now abstracted and indexed in PubMed, PubMed Central, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database.

RESPONSIBLE EDITORS FOR THIS ISSUE

NAME OF JOURNAL
World Journal of Critical Care Medicine

ISSN
ISSN 2220-3141 (online)

LAUNCH DATE
February 4, 2012

FREQUENCY
Quarterly

EDITORS-IN-CHIEF
Hua-Dong Wang

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/2220-3141/editorialboard.htm

PUBLICATION DATE
September 9, 2022

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World Journal of Critical Care Medicine

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World J Crit Care Med 2022 September 9; 11(5): 330-334

DOI: 10.5492/wjccm.v11.i5.330

ISSN 2220-3141 (online)

CASE REPORT

Acute kidney injury associated with consumption of starfruit juice: A case report

Thajudeen Mohammed Zuhary, R Ponampalam

Specialty type: Toxicology

Provenance and peer review: Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): 0
Grade C (Good): C, C
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Chen BH, Taiwan; Tu GW, China

Received: January 6, 2022
Peer-review started: January 6, 2022
First decision: March 24, 2022
Revised: May 6, 2022
Accepted: July 18, 2022
Article in press: July 18, 2022
Published online: September 9, 2022

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Abstract

BACKGROUND

This study aims to highlight the potential serious complications of acute kidney injury (AKI) resulting from the consumption of excessive amounts of starfruit, a common traditional remedy.

CASE SUMMARY

A 78-year-old male with a past medical history of hypertension, diabetes mellitus and hyperlipidemia without prior nephropathy presented to the emergency department (ED) with hiccups, nausea, vomiting and generalized weakness. In the preceding 1 wk, he had consumed 3 bottles of concentrated juice self-prepared from 1 kg of small sour starfruits. His serum creatinine was noted to be 1101 μmol/L from baseline normal prior to his ED visit. He was diagnosed with AKI secondary to excessive starfruit consumption.

CONCLUSION

Consumption of starfruit can cause acute renal failure, with a good outcome when promptly identified and treated.

Key Words: Acute kidney injury; Acute renal failure; Starfruit; Hemodialysis; Case report

Core Tip: Physicians should have a high index of suspicion on possible interactions and toxicities that may occur with the use of traditional medications in combination with prescription drugs in susceptible patients. This report highlights the toxicity of starfruit when consumed as a traditional remedy for diabetes mellitus resulting in acute kidney injury.

Citation: Zuhary TM, Ponampalam R. Acute kidney injury associated with consumption of starfruit juice: A case report. *World J Crit Care Med* 2022; 11(5): 330-334
URL: https://www.wjgnet.com/2220-3141/full/v11/i5/330.htm
DOI: https://dx.doi.org/10.5492/wjccm.v11.i5.330

INTRODUCTION

The starfruit (Averrhoa carambola) is a popular fruit in tropical countries due to its nutritional and medicinal benefits[1], and is used to treat various ailments such as diabetes mellitus, rheumatism, and cough. The starfruit is used as a traditional remedy in Asian countries such as Malaysia and Indonesia to treat diabetes mellitus due to its hypoglycemic properties[2]. Despite its frequent consumption, many people are unaware of the dangers of overindulging in starfruit. When consumed in large quantities, the fruit contains high levels of oxalic acid, which can be nephrotoxic. Starfruit-induced neurotoxicity and nephrotoxicity, which manifests as acute kidney injury (AKI) in individuals with underlying renal dysfunction, is well documented[3,4]. AKI in individuals with normal renal function is rare. We present a case report of AKI following the consumption of starfruit.

CASE PRESENTATION

Chief complaints

A 78-year-old male presented to the emergency department (ED) with hiccups, nausea, vomiting and generalized weakness.

History of present illness

In the preceding week, he had consumed 3 bottles of concentrated juice which were self-prepared from 1 kg of starfruits. Following ingestion of the third bottle of the fruit juice, he developed bouts of severe nausea and vomiting without abdominal pain or diarrhea.

History of past illness

He had a past medical history of hypertension, diabetes mellitus and hyperlipidemia.

Personal and family history

No significant family history.

Physical examination

On arrival at the ED, his vital signs were stable (temperature was 36.8°C, pulse rate 60 bpm, respiratory rate 18 breaths/min, and blood pressure 161/78 mmHg) and there was no pitting edema. Examinations of his cardiovascular, respiratory, abdominal and neurological systems were normal.

Laboratory examinations

Laboratory examination results are shown in Figure 1 and Table 1.

Imaging examinations

No imaging was undertaken.

MULTIDISCIPLINARY EXPERT CONSULTATION

The patient was initially seen in the ED and admitted under renal medicine for specialized care.

FINAL DIAGNOSIS

Acute kidney injury.

TREATMENT

The patient was treated with 4 sessions of hemodialysis and supportive care such as intravenous fluid. After each session

Table 1 Trend in patient's blood investigations

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 7	Day 13	Day 17	Day 24	Day 60	Day 135
Renal function											
Serum creatinine (μmol/L)	1101		680	659	495	340	328	208	177	127	99
Serum urea (mmol/L)	38.1		23.1	27.1	22.0	14.5	25.2	17.4	10.6	12.4	6.2
Electrolytes											
Sodium (mmol/L)	134		142	146	147	137	135	136	138	140	144
Potassium (mmol/L)	4.4		3.5	3.5	3.1	4.0	4.3	4.0	4.1	3.8	3.9
Chloride (mmol/L)	101		105	102	100	98	101	102	105	108	110
Bicarbonate (mmol/L)	15.9		22.8	26.8	31.1	24.6	28.3	23.7	24.6	23.5	24.9
Magnesium (mmol/L)	0.91										
Liver function											
Total protein (g/L)	60										76
Serum albumin (g/L)	32										41
Total bilirubin (mmol/L)	07										09
Alkaline phosphatase (U/L)	58										65
Alkaline transaminase (U/L)	57										17
Routine tests											
White blood cells (× 10^9/L)	9.33					10.25					9.89
Neutrophil (%)	78.8					74.6					74.1
Lymphocytes (%)	11.1					11.6					15.9
Hemoglobin (g/dL)	12.3					13.8					14.1
Platelet count (× 10^9/L)	208					307					281
Coagulation											
APTT (secs)	27.0					28.5					
Prothrombin time (secs)	11.2					11.4					
Other indicators											
Creatine kinase (U/L)	7224			4755	2863	754		84			84
PTH (pg/mL)	11.0										
Urine creatinine (μmol/L)			5233					3862	7747		8035

APTT: Activated partial thromboplastin time; PTH: Parathyroid hormone.

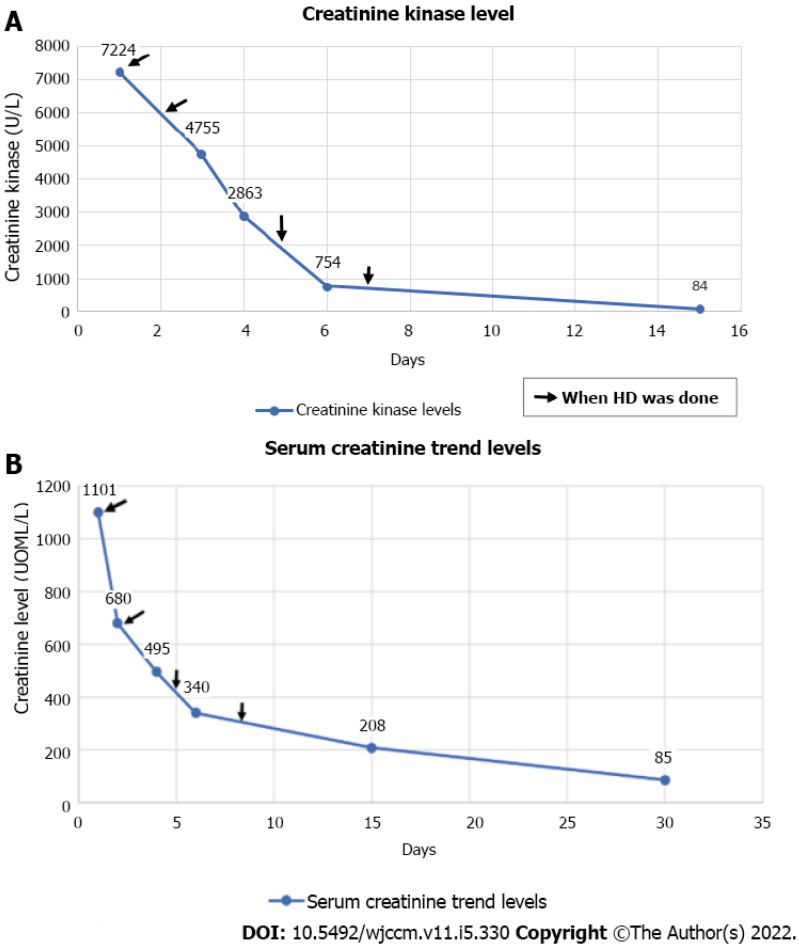
of hemodialysis, blood tests to determine renal function were repeated. Progressive improvement in renal function was noted with each session of hemodialysis.

OUTCOME AND FOLLOW-UP

The patient's renal function returned to normal.

DISCUSSION

Starfruit has several toxins including caromboxin, an excitatory central nervous system stimulant and oxalate a nephrotoxic agent[5-7]. The sour type of starfruit has higher levels of oxalate than the sweet type. Homemade and medicinal supplements often have high levels of oxalate. When consumed in large amounts, especially when fasting or dehydrated, deposits of calcium oxalate crystals in the renal tubules lead to kidney damage[6]. Chronic kidney disease



DOI: 10.5492/wjccm.v11.i5.330

Figure 1 Laboratory examination results. A: Trend in creatinine kinase following hemodialysis; B: Trend in serum creatinine.

has been identified as a major risk factor for starfruit-induced kidney toxicity. Starfruit juice volume of approximately 25 mL is known to cause nephrotoxicity in patients with chronic kidney disease. Other known risk factors include dehydration, the amount of starfruit ingested, and consumption on an empty stomach. Patients with starfruit toxicity show gastrointestinal symptoms such as nausea, vomiting, and abdominal discomfort immediately after ingestion. These symptoms are believed to be due to the direct corrosive effects of dietary oxalates rather than systemic effects[8]. This may be followed by a decrease in urinary output, which can lead to renal dysfunction and acute renal failure. Typical histological findings are the intraluminal and intraepithelial deposition of colorless oxalate crystals. There is no specific treatment for acute kidney damage from starfruit. In patients requiring renal replacement therapy, hemodialysis and hemoperfusion are preferred[9].

Our patient had no evidence of pre-existing renal failure or other contributory factors predisposing to AKI such as sepsis, dehydration, nephrotoxic drugs or obstructive urological causes based on clinical evaluation and tests done. In addition, over the course of four sessions of hemodialysis, he had gradual restoration of his renal function. The temporal relationship between the ingestion of large amount of fruit juice and the onset of symptoms in this case strongly suggests starfruit intoxication as the transient and reversible etiology likely due to resolving oxalate nephropathy.

CONCLUSION

In Asian countries where starfruit is commonly consumed as a traditional remedy, it is imperative for emergency physicians to be aware of starfruit toxicity in patients with unexplained AKI. This will help identify and treat these patients promptly to prevent starfruit-induced nephrotoxicity. Patient history is the key to reaching an early diagnosis. It is essential to prevent starfruit nephrotoxicity by educating the public and especially diabetics on the risks of consuming excess starfruit. Consumption of starfruit as a traditional remedy to control blood sugar levels in diabetics should be discouraged by educating the public.

ACKNOWLEDGEMENTS

We thank the staff of both the Emergency Department and Nephrology Departments for their major contributions in the daily care of this patient.

FOOTNOTES

Author contributions: Zuhary TM and Ponampalam R equally contributed to this case study.

Informed consent statement: Informed written consent was obtained from the patient.

Conflict-of-interest statement: All authors report no relevant conflict of interest for this article.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Country/Territory of origin: Singapore

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S-Editor: Wu YXJ
L-Editor: Webster JR
P-Editor: Wu YXJ

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