

Dioscorea Quinqueloba Induces Acute Kidney Injury: Two Case Reports

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Abstract

Context: We report two cases of acute kidney injury that developed after taking *Dioscorea quinqueloba* for healthy diet. *Dioscorea quinqueloba* is a medicinal herb that is widely used to treat cardiovascular disease and various medical conditions. Acute kidney injury associated with the use of herbal medicine is common throughout the world, but acute kidney injury cause by *Dioscorea quinqueloba* has not been reported so far. **Case details:** 68-year-old man and his brother, who is 58-years-old, ingested the extract of *Dioscorea quinqueloba* as traditional remedy. The following day, they complained symptoms of nausea, vomiting and diarrhea. Eventually, they were diagnosed with oliguric or non-oliguric acute renal failure, but improved without complications. **Discussion:** *Dioscorea quinqueloba* should be correctly prepared for traditional medicine; otherwise it may cause a life-threatening acute kidney injury.

Keywords: Acute kidney injury; *Dioscorea quinqueloba*

Introduction

The use of herbal medicine has increased substantially in western countries as well as oriental countries for using traditional remedies. Since the kidney plays an important role in the metabolism and excretion of exogenous compound, acute kidney injury is one of the frequent complications due to toxicity of herbal medicine [1,2]. Most herbal therapies were not regulated as medicines, and their adverse effects often were underreported.

Dioscorea is a genus of over 600 species of flowering plants in the monocotyledonous family *Dioscoreaceae*. Several species, known as yams, are important agricultural crops in tropical regions, grown for their large tubers. Many of these are toxic when fresh, but can be detoxified and eaten, and are particularly important in parts of Africa, Asia, and Oceania [3]. *Dioscorea quinqueloba* is used widely in medical practice, mainly for arthrosclerosis, myocardial infarction and asthma. However, the toxic effects including nephrotoxicity by *Dioscorea* species have rarely reported to cases [4] and not been investigated. We experienced two cases of acute kidney injury that occurred simultaneously after ingestion of *Dioscorea quinqueloba*. This is first report on the renal toxicity of *Dioscorea quinqueloba*, which was not shown previously.

Case Report

Case 1

A 68-years-old man was referred to our hospital for generalized edema, vomiting and diarrhea from local hospital. He had a history of hypertension, hyperlipidemia and diabetes mellitus. About one week ago, he had taken the extract from tubers of *Dioscorea quinqueloba* for using dietary supplement after he heard that it is good for diabetes mellitus. He was oliguric state at admission. Physical examination was normal except for pitting edema of low extremities. His serum creatinine level was checked to 4.6 mg/dL. The level of another electrolyte were sodium 133 mEq/L, potassium 4.7 mEq/L, chloride 105 mEq/L, creatinine kinase 66 U/L (normal range, 35-172), and blood urea nitrogen 56.6 mg/dL. Arterial blood gas analysis revealed a pH 7.436, pCO₂ 28.7 mmHg, pO₂ 88.1 mmHg, HCO₃⁻ 18.9 mmol/L and 97.7% O₂ Saturation. His urine sodium and creatinine were 50 mEq/L and 32.2 mg/dL, respectively. The fractional excretion of sodium into urine (FE_{Na}) was 3.5 %. The level of urine osmolality was 199 mOsm/kg. The urine analysis was clear. Therefore, he was admitted under the

impression of intrinsic acute renal failure. The extract from *Dioscorea quinqueloba* was thought to be nephrotoxic agent. We performed hydration. Six days later, generalized edema was improved. The level of serum creatinine slowly decreased from 5.9 to 1.2 mg/dL. Kidney ultrasound examination revealed increased cortical echogenicity, but renal biopsy was not performed in this patients. He was discharged without any complications, has followed up regularly.

Case 2

A 58-years-old man, who is younger brother of case-1 patient, also referred to our hospital for pitting edema of low extremities, vomiting, diarrhea and polydipsia. About one week ago, he had taken the extract of *Dioscorea quinqueloba* for health tonics with his brother. The urine amount was not decreased, but his serum creatinin level was increased to 5.8 mg/dL. Other physical examination showed normal. Blood urea nitrogen increased to 48.2 mg/dL. The FE_{Na} was also increased to 6.4 %. Arterial blood gas analysis revealed a pH 7.456, pCO₂ 32.5 mmHg, pO₂ 94.3 mmHg, HCO₃⁻ 22.6 mmol/L and 97.6% O₂ Saturation. The urine analysis showed protein 3+, 1 to 4 red blood cells/high power fields. As in the case of his brother, he was diagnosed as intrinsic acute renal failure due to toxicity of *Dioscorea quinqueloba*. We treated him with hydration. Renal function recovered slowly, and creatinine improved to 1.3 mg/dL about 10 days later. He was also discharged without complications with his brother.

Discussion

The use of traditional herbal medicine is common worldwide, with rates of use over 80% in some population [5]. In Africa, up to 80% of the population depends on traditional medicine for primary health care, moreover herbal preparations account for up to 50% of the total

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consumption of pharmaceutical agents in China [6]. However, most traditional remedies do not meet the requirements of consistency in composition and biological activity. Therefore, herbal medicines may be the source of kidney injury. Indeed, the use of traditional medicine is accounting for up to 35% of cases of acute kidney injury [7,8]. The common causes of acute kidney injury are acute tubular necrosis, cortical necrosis, and interstitial nephritis [6].

Although the pathogenesis by which *Dioscorea quinqueloba* induced acute renal failure remained unknown, several factors are thought to influence the acute kidney injury in both patients. Such factors may be the contamination of the remedy, the erroneous preparation of plants, the incorrect use of administration of remedy, concurrent disorders, age and sex of patients, and interaction of the remedy with other medication.

First, *Dioscorea* species contain the ingredients of the dioscorine and dioscorine, which have convulsive, analeptic, local anesthetic, and antidiuretic effects [9]. In normal use, the tubers are detoxified before eating by placing them in running water for a few days, soaking in salt water, boiling for several hours appropriately, but incorrectly prepared tubers can lead to symptoms of convulsion, hepatic failure and renal failure [4]. Therefore, we are supposed that our patients may have little experience in detoxification of tuber, or have lack of preparation knowledge. In the second place, many traditional remedies frequently cause gastro-intestinal complications including vomiting or diarrhea, up to half of patients [8], so concomitant volume depletion can induce renal ischemia. In both cases, such concurrent disorders which symptoms of severe vomiting and diarrhea may affect to the risk factor of nephrotoxicity. In addition, our patients had a history of hypertension and/or diabetes mellitus that requires a variety of medications. The concomitant use of traditional medicine has potential

interactions with previous medications that can result in considerable complications, including renal injury [10].

In summary, we encountered first cases of acute renal failure associated with ingestion of *Dioscorea quinqueloba*. We emphasize that this tuber should be correctly prepared for traditional medicine, otherwise it may cause a life-threatening acute kidney injury.

Declaration of Interest

None of the authors have any competing interests to declare.

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