

Received: 2016.01.06
Accepted: 2016.05.11
Published: 2016.08.15

ISSN 1941-5923
© Am J Case Rep, 2016; 17: 580-583
DOI: 10.12659/AJCR.897445

A Case Report of Poisoning Caused by Incorrect Use of Salvia

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

A 1 **Xianyi Yang**
B 1 **Danyang Chen**
B 1 **Lin Chai**
B 1 **Hui Duan**
B 1 **Hui Guo**
C 1 **Shuang Li**
AG 1 **Min Xiao**
DEF 2,3 **Hongxia Chen**

1 Department of Emergency, Taihe Hospital, Hubei University of Medicine, Shiyan, Hubei, P.R. China
2 Institute of Biomedicine, Taihe Hospital, Hubei University of Medicine, Shiyan, Hubei, P.R. China
3 Department of Environmental, Occupational, Agriculture Health, Public Health College, University of Nebraska Medical Center, Omaha, NE, U.S.A.

Corresponding Authors: Min Xiao, e-mail: thyxiaomin@163.com, Hongxia Chen, e-mail: hongxia.chen@unmc.edu
Conflict of interest: None declared

Patient: Female, 54
Final Diagnosis: Salvia intoxication
Symptoms: Frequent nausea
Medication: Thyroxine
Clinical Procedure: —
Specialty: Hematology

Objective: Unusual clinical course





Background: Previous reports suggest that homoplantagin, one of the compounds isolated from *Salvia plebeia*, has a protective and therapeutic effect on hepatocyte injury. We present a case of serious liver and kidney damage due to incorrect use of *Salvia plebeia* in a patient with a history of thyroid tumorectomy, who was successfully treated for poisoning with blood purification and systemic, comprehensive critical care.

Case Report: A 54-year-old female patient with salvia intoxication combined with multiple organ dysfunction was transported to our emergency center by ambulance after presenting with nausea, vomiting, and skin yellowing. On arrival, she exhibited fatigue, dizziness, lightheadedness, yellowish discoloration of her skin, breathing difficulties, and low back pain, all of which was suggestive of salvia intoxication combined with multiple organ dysfunction. The treatment strategy was to immediately speed up the excretion of toxins and administered blood purification therapy. She also displayed disseminated intravascular coagulation (DIC), which was successfully treated with plasma infusion of blood coagulation factor combined with LMWH acupuncture therapy.

Conclusions: *Salvia plebeia* should only be considered for use in patients who have infectious disease or oxidative stress related disease and only at an appropriate dose. In addition, for patients with salvia poisoning, prompt administration of blood purification therapy and systemic comprehensive measures involving multiple supportive therapies can save such patients.

MeSH Keywords: Blood Coagulation • Liver Function Tests • Sepsis

Full-text PDF: <http://www.amjcaserep.com/abstract/index/idArt/897445>

 1590  1  —  10



Background

Salvia (*Salvia plebeia*), also known as toad grass, is one type of herbal medicines, which is widely used in the field of traditional Chinese medicine. It is well-known that the salvia has a variety of effects when used for the treatment of infectious disease and pain. Recently, researchers reported that the compounds isolated from the whole plants of *Salvia plebeia* showed potential anti-inflammatory activities [1]. In addition, the effect might be mediated by Nrf2/HO-1 signaling [2]. Previous findings suggested that homoplantagin, one of the compounds isolated from *Salvia plebeia*, has a protective and therapeutic effect on hepatocyte injury, which might be associated with its antioxidant properties [3]. In the majority of rural areas of China, more and more people tend to treat illness by themselves using traditional Chinese medicine. By reporting this case of incorrect use of salvia that caused serious liver and kidney damage will help have a guide the use of salvia as well as inform clinicians about its toxic effects.

Case Report

A 54-year-old female patient was admitted to our hospital with symptoms of nausea, vomiting, and skin yellowing that had continued for two days and was induced by drinking *Salvia plebeia* for one week prior to hospital admittance. The patient reported that one week ago, she suffered from a cold, and self-treated the cold using “litchi grass bulbs”, about 50 g per day for one week. Two days prior to hospital admittance, the patient exhibited frequent nausea, vomiting, diarrhea, and black stools, accompanied by fatigue, dizziness, lightheadedness, yellowish discoloration of skin, and breathing difficulties; she had no fever, cough, sputum, voiding dysfunction or low back pain.

Due to thyroid cancer, the patient had a thyroid tumor resection operation in 2008 and a history of long-term thyroxine tablet therapy. She had no known allergies. The patient denied suffering from hypertension, coronary heart disease, diabetes, hepatitis or tuberculosis. She reported that she drank alcohol in moderation and did not smoke or use illicit drugs.

Before the patient was transferred to our hospital, her blood tests at a local hospital showed BUN 25.33 mmol/L, Cr 314 umol/L, ALT 1,567 IU/L, AST 153 IU/L, T-BIL 41.2 umol/L, and C-BIL 22.8 umol/L. After 2 days of local hospital treatment (therapeutic schedules unknown), the patient was transferred to our hospital on January 23, 2015. A physical examination during admission was reported: blood pressure 100/75 mm Hg, patient alert and conscious, mucous membranes of skin and sclera obviously yellow stained, superficial lymph node enlargement not painful to touch, lung breath sounds clear with no odor or wet rales, heart rate even with 72 beats/min with

no abnormal sounds, abdomen soft with no whole abdominal tenderness or rebound tenderness, no enlargement of liver or spleen, and palpable ribs, negative in shifting dullness, no edema of both lower extremities, and bilateral pathological signs were negative. Admission laboratory tests were as followed: blood coagulation functions with prothrombin time (PT) 19.3 seconds, partial thromboplastin time (APTT) 40.9 seconds, fibrinogen 5.24 g/L, thrombin time (TT) 14.1 seconds, and platelet (PLT) 10 g/L; suggesting disseminated intravascular coagulation (DIC). Severe abnormal liver function indicators (such as ALT 881 IU/L, AST 689 IU/L, r-GT 18 IU/L, TP 44 g/L, Alb 26 g/L, T-BIL 54.2 umol/L and C-BIL 40.1 umol/L) renal dysfunction indicators (such as urea 13.93 mmol/L, Cr 151.8 umol/L and UA 217.5 umol/L). Spleen, gallbladder ultrasonography, and chest CT showed no abnormalities. Urinalysis and a chest radiograph were normal. Other test results are shown in Table 1.

Salvia intoxication can cause multiple organ dysfunction (liver function, kidney function), and blood coagulation. The main principle of treatment is to speed up the excretion of toxins, and monitor and protection impaired organ functions. Early catharsis can reduce poison absorption, expansion, and act as a diuretic. By using bedside blood purification treatment, effective removal of toxins from the body can reduce liver and kidney dysfunction. In addition, regulating the balance of water, salt, and electrolytes, as well as reducing the kidney and liver burden, can avoid and further deterioration of liver and kidney function. Appropriate supplements may include of vitamin C, vitamin B family, glutathione, glycyrrhetate amine to protect liver function and as antioxidant, and albumin supplement for appropriate nutritional support, paying attention to avoid drugs that can damage the liver and kidney. The treatment must focus on patient hydration for gastrointestinal management and support [4,5], improving the intestinal blood supply, restoring intestinal microflora balance using microbial agents, enteral nutrition in the early stage, supplement glutamine, protecting the gastrointestinal mucosa and promoting mucosal regeneration. Plasma infusion of blood coagulation factor was given and combined with LMWH acupuncture therapy to manage DIC. After 10 days of treatment, the patient was clinical cured with liver, kidney function, blood coagulation, and other indicators completely back to normal.

Discussion

Salvia plebaia R. Brown, is known as toad grass, hsehchien grass, wrinkled fur, *Salvia* (Labiatae); the whole plant can be used as a alternative medicine [6]. The main chemical ingredients extracted from *Salvia plebaia* include flavonoids, glycosides, terpenes, phenylpropanoids, and polysaccharides. Previous studies have shown that *Salvia plebaia* possesses

Table 1. Laboratory data findings on admission.

Variable	Reference range	On admission in local hospital		On Admission in Taihe hospital				1 d	2 d	3 d	7 d	10 d
		Day 1-2	Day 3	Day 6	Day 13	Day 4	Day 5	Day 6	Day 10	Day 13		
White cell count (per mm ³)	3.5–9.5	14.00	6.05	14.12	5.79	6.05	10.37	14.12			5.79	
Platelet counts (10 ⁹ /L)	125–350	113.00	10	34	48	6	13	34			48	
Red cell count (10 ¹² /L)	3.8–5.1	4.12	3.38	2.46	2.57	3.38	2.66	2.46			2.57	
Hemoglobin (g/L)	115–150	120.00	106	74	80	106	80	74			80	
Hematocrit	0.35–0.45	0.32	0.3	0.22	0.24	0.3	0.24	0.22			0.24	
Alanine aminotransferase (IU/L)	0–40	1567.00	1858	383	66	881	532	383	110		66	
Aspartate transaminase (IU/L)	0–35	1531.00	1802	222	24	689	375	222	24		24	
Total bilirubin (µmol/L)	2–20.4	41.20	60.9	51.2	41	54.2	59.2	51.2	24.5		41	
Unconjugated bilirubin (µmol/L)	1–13.7	18.40	17.1	19.9	24	14.1	21.9	19.9	11.2		24	
Conjugated bilirubin (µmol/L)	0–6.8	22.80	43.8	27.8	17	40.1	37.3	27.8	13.3		17	
Total protein (g/L)	65–85	60.00	58.3	51.2	68.2	44	48	51.2	47.1		68.2	
Albumin (g/L)	40–55	29.00	36.4	34.9	43.5	26	33.1	34.9	30.8		43.5	
Globulin (g/L)	20–40	31.00	21.9	16.3	24.7	18	14.9	16.3	16.3		24.7	
Glucose (mmol/L)	3.9–6.1	6.42	7.48	6.79	5.08	9.82	6.72	6.79	5.46		5.08	
Blood urea nitrogen (mmol/L)	1.7–8.3	25.33	29.29	13.49	3.32	13.93	8.39	13.49	8.2		3.32	
Serum creatinine (µmol/L)	44–120	314.00	348.7	131.7	69.1	151.8	113.1	131.7	80		69.1	
Cystatin-C (mg/L)	0–1.03	2.77	0.95	0.82		1.14	1.37	0.82	0.67			
Creatinine kinase (IU/L)	25–170	2470										
Creatinine kinase-MB (IU/L)	0–17	59										
Lactate dehydrogenase (IU/L)	100–240	1153										
Prothrombin time (s)	9–13	19.3	12.9	14		13.2	13.4	14	13.2			
Activated partial thrombin time (s)	25–35	40.9	69.9	50.2		74.1	66.1	50.2	34.8			
International normalized ratio	0.8–1.5	1.77	1.18	1.28		1.21	1.23	1.28	1.21			
D-dimer (µg/mL)	0–0.25	1.68	0.91				1.08					
Fibrinogen degradation product (µg/mL)	0–2.01	3.46	6.56				6.28					
C-reactive protein (g/L)	0–5	129.21					55.16					

potential pharmacological effects [7], such as anti-inflammatory, antioxidant, antibacterial, and antiviral effects, as well as the ability to protect the liver and stomach from damage, and can act as an anti-angiogenic and anti-atherosclerosis agent [8,9]. In our case, the patient suffered from multiple organ dysfunction induced by incorrect use of “litchi grass”, that likely increased the burden to the liver and kidney when the active chemical ingredients in *Salvia plebaia* were metabolized

in vivo, causing multiple organ dysfunction (liver and kidney) as the main toxic manifestation.

Blood purification treatment is the key to cure multiple organ dysfunction caused by ingestion of salvia. Severe liver and renal dysfunction occurred in our patient after taking salvia for one week. However, bedside continuous renal replacement therapy (CRRT) treatment was shown to clear the toxic small

molecules in her blood, as well as the small inflammatory molecules induced by the poisoning. In addition, bedside CRRT has clinical value in treating patients with multiple organ damage and is one of the main treatments for acute kidney injury and SIRS. CRRT treatment can correct water and electrolyte imbalances, and improve the survival rate of patients suffering from poisoning. At the same time, strategies to absorb the bilirubin in the blood using hemoperfusion can aid in treatment of patients suffering from poison ingestion.

As far as we known, there are no other reports of cases of poisoning due to an overdose of *Salvia plebeia* in China or abroad, perhaps because its complex components cannot be clinically identified using toxicity analysis [10]. As we known, according to ancient medicinal books in China and recent research, *Salvia plebeia* has been mainly used in the treatment of vaginitis, chronic bronchitis, hemoptysis, and edema. The medicinal part of *Salvia plebeia* is the over-ground part of the plant, rather than the bulb. The general dosage of the herb is 15 g to 60 g. The general course of treatment is from 5 days to 10 days based on different indications for use. In our case report, the patient reported using the herb to treat a cold, which is not one of the main recommended uses of the herb. Furthermore, the patient used the “litchi grass bulbs” instead of the over-ground part of the plant, which might have contributed to the toxic phenomena. In this case, the patient self-reported daily use of 50 g of “litchi grass bulbs” to cure herself from a cold. But the accurate quantitative way of using the bulb is unknown. We speculate that people in rural areas cannot accurately estimate the therapeutic correct amount of herbs to use, which may lead to the occurrence of excessive use of herbs. In addition, in this case, the patient has a long-term history of taking thyroxine tablets drugs since 2008. It is possible there was an adverse reactions between the thyroxine tablets and the ingested salvia (toad grass). The exact cause of the patient’s poisoning needs further clarification.

References:

1. Jin MR, Xu H, Duan CH, Chou GX: Two new flavones from *Salvia plebeia*. *Nat Prod Res*, 2015; 29: 1315–22
2. Akram M, Syed AS, Kim KA et al: Heme oxygenase 1-mediated novel anti-inflammatory activities of *Salvia plebeia* and its active components. *J Ethnopharmacol*, 2015; 174: 322–30
3. Qu XJ, Xia X, Wang YS et al: Protective effects of *Salvia plebeia* compound homoplantagin in on hepatocyte injury. *Food Chem Toxicol*, 2009; 47: 1710–15
4. İşik A, Deniz Firat Y, Peker K et al: How could such a wide piece of tree root pass through the narrow pyloric orifice? An extremely rare case. *Am J Case Rep*, 2014; 15: 284–87
5. Isik A, Firat D, Peker K et al: A case report of esophageal perforation: Complication of nasogastric tube placement. *Am J Case Rep*, 2014; 15: 168–71
6. Qing H, Yun F: The effect of Litchi grass particles outside the compound on antibacterial anti-inflammatory *in vivo* study. *Chinese Pharmacy*, 2008; 9: 657–59
7. Peng MM, Fang Y, Hu W et al: The pharmacological activities of compound *Salvia plebeia* granules on treating urinary tract infection. *J Ethnopharmacol*, 2010; 129: 59–63
8. Qiwen S, Woosung, Hang L et al: New Progress on chemical constituents and pharmacological effects of *Salvia*. *Chinese Pharmacists*, 2014; 3: 481–83
9. Wu F, Wang H, Li J et al: Homoplantagin in modulates insulin sensitivity in endothelial cells by inhibiting inflammation. *Biol Pharm Bull*, 2012; 35: 1171–77
10. Ren DB, Qin YH, Yun YH et al: Separation of nine compounds from *Salvia plebeia* R.Br. using two-step high-speed counter-current chromatography with different elution modes. *J Sep Sci*, 2014; 37: 2118–25

There is no specific antidotes for salvia poisoning, and therefore removing toxins from the body, as well as paying attention to systematic, comprehensive medical treatment, such as the protection of the gastric mucosa and liver, providing nutrition to protect the cardiac system, preventing against infections, and providing nutritional support, are all measures that are of importance for successful rescue. We present a case of successful treatment, with rapidly recovery of liver and kidney function, as a result of early, effective medical treatment that included blood purification and an emphasis on systemic, multimodality therapy. To avoid similar cases of poisoning, people should be reminded of the importance of only taking the appropriate dose, not increasing the dose on their own, paying close attention to the adverse reactions when taking multiple drugs or herbal remedies or combining drugs and herbal remedies together, and in particular to avoid possible toxicity related to home remedy ingestion of herbs such as *Salvia plebeia*.

Conclusions

Salvia plebeia should only be considered for use in patients who have infectious disease or oxidative stress related disease and only at an appropriate dose. The medicinal part of *Salvia plebeia* is the full over-ground part of the plant, not the bulb. The mistaken use of the whole medicinal plant or taking the herb together with other drugs might lead to the toxic phenomena reported in this case study. The prompt administration of blood purification treatment, systemic and comprehensive patient management involving multiple organ supportive therapies can save such patients.

Conflict of interest

There is no conflict of interest to declare.