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CASE REPORT | LIVER

Senna Occidentalis Poisoning: An Uncommon Cause of Liver Failure

Pranav Ish, MD, DNB, DM[1,2], Sahaj Rathi, MD, DM[3], Harpreet Singh, MD[2], and S. Anuradha, MD[2]

[1]*Department of Pulmonary, Critical Care and Sleep Medicine, Vardhaman Mahaveer Medical College and Safdarjung Hospital, New Delhi, India*
[2]*Department of Medicine, Maulana Azad Medical College, New Delhi, India*
[3]*Department of Hepatology, Post Graduate Institute of Medical Education and Research, Chandigarh, India*

ABSTRACT

Senna is a commonly found weed used in traditional systems of medicine, often as a laxative. *Senna* poisoning is rarely reported, and its potential for toxicity greatly underestimated. Clinical presentation mimics acute liver failure, which is very difficult to attribute to this seemingly innocuous agent. We report an unusual case of an elderly woman who presented with a hepatoencephalopathic syndrome after ingestion of *Senna occidentalis* and elucidate the multisystem pathophysiology of this rapidly evolving disease. Most importantly, we attempt to provide some perspective on how this knowledge from the East can help prevent severe consequences in the West.

INTRODUCTION

Senna occidentalis is a common weed in agricultural fields of Asia, Europe, Africa, Australia, and North America.[1] Its leaves are used in many systems of traditional medicine for a wide variety of diseases, although all parts of the plant are highly toxic to cattle and small herbivores.[2,3] Its toxicity in humans is reported mainly in children, where it presents as acute liver failure (ALF).[1,4,5] We report a case depicting the consequences of *Senna* toxicity and the possible implications on public health.

CASE REPORT

A 75-year-old woman presented with vomiting and diarrhea, followed by progressive jaundice and altered sensorium. She had no fever, chills, rash, abdominal pain, or cholestatic symptoms. There was no history of alcohol intake, substance use, recent travel, past jaundice, or outbreak of jaundice in the vicinity. She had no known comorbidities except knee osteoarthritis, which never required over-the-counter or prescription analgesics.

The patient was admitted at a small hospital initially and was transferred to our tertiary care center because of rapid deterioration. At presentation, she was comatose with reactive pupils, mute plantars, and no focal neurological deficits. She had deep icterus and anasarca; however, she had stable vitals.

Baseline investigations done by the patient, when at home on day 1 of her illness, revealed mild leukocytosis and thrombocytopenia. However, by day 3 of her illness, which is when she presented to our center, there was marked conjugated hyperbilirubinemia with grossly elevated transaminases. Alkaline phosphatase was preserved. Prothrombin time was prolonged, and arterial ammonia levels were elevated. A detailed evaluation for markers of viral hepatitis and tropical illnesses was unremarkable (Table 1). Ascitic fluid was acellular, high gradient, and sterile on culture. A diagnosis of ALF with indeterminate etiology was made. On probing, the family revealed a 2-week history of self-medication of *S. occidentalis* leaves for knee osteoarthritis preceding her illness.

The patient was immediately shifted to an intensive care facility, sedated, and mechanically ventilated. Prophylactic antibiotics, cerebral decongestion, fresh frozen plasma, and intravenous vitamin K were instituted. As liver transplant facility was not available at our hospital, transfer to a transplant center was being considered. On the next day she developed intermittent seizures. Despite

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Correspondence: Sahaj Rathi, MD, DM, Department of Hepatology, Post Graduate Institute of Medical Education and Research, Chandigarh, India 160014 (sahajrathi@gmail.com).

Table 1. Patient laboratory values

	Day 1	Day 3	Day 5
Hemoglobin (g/dL)	13	13.2	12.9
Total leukocyte count (/mm^3)	12,000	11,000	11,000
Differential leukocyte count	80/18		
Platelet count (10^3/mm^3)	140	170	180
Blood urea (mg/dL)/serum creatinine (mg/dL)	30/1.6		172/1.8
Sodium//potassium (mEq/L)	142/4.2		139/4.1
T. Bilirubin/direct (mg/dL)	0.8/0.4	12.9/10.4	18.7/13.2
ALT/AST/ALP (IU/L)	42/20/105	130/510/43	542/368/184
T. Protein/S. Albumin (g/dL)	6.2/4.0	5.7/3.5	
Ammonia level (μmol/L)		127	
Prothrombin time (INR)		34.8/14.4 (2.68)	19.5/14.4 (1.40)
CT head		Age-related cerebral atrophy	
USG abdomen		Normal liver, spleen, and kidney size and echo-texture. Moderate ascites. USG doppler not suggestive of hepatic/ mesenteric thrombosis	
Ascitic fluid		No cells, sugar-65 mg/dL, protein-1.5 g/dL. No growth on culture	
Cerebrospinal fluid		No cells, sugar-80 mg/dL, protein-40 mg/dL. No growth on culture	
Tropical fever workup		Negative for malaria, dengue, *Leptospira*, and scrub typhus	
Hepatitis panel		Negative for IgM hepatitis A, IgM hepatitis E, HBsAg, and anti-hepatitis C antibody	
Other		Negative for HIV-1, HIV-2, and ANA	

ALP, alkaline phosphatase; ALT, alanine aminotransferase; ANA, antinuclear antibody; AST, aspartate aminotransferase; CT, computed tomography; INR, international normalized ratio; USG, ultrasonography.

antiepileptics, she went into status epilepticus that did not respond to induced midazolam coma, and she died on the third day of admission to our center.

A request for autopsy was denied; however, postmortem liver biopsy was allowed by the family. Histopathology by a team of pathologists revealed massive hepatocellular necrosis, reticulin collapse, with foci of lobular inflammation. Portal tracts were expanded but paucicellular. There was intrahepatic and canalicular cholestasis, and feathery degeneration of hepatocytes. These changes were consistent with drug-induced liver injury (Figure 1). RUCAM score calculated was 4, suggestive of possible drug-induced liver injury.

DISCUSSION

S. occidentalis is a weed common across the world. It is poisonous to cattle and small herbivores, causing muscle, brain, and liver damage. Human toxicity is reported rarely, almost exclusively in children, with up to 76% mortality.[4,5] Vomiting and diarrhea are rapidly followed by a hepatomyoencephalopathy syndrome, and death within 48 hours in most cases, usually due to cardiovascular collapse. Cerebral edema is not seen despite ALF-like presentation.[4] The clinical features are very similar to ALF due to Reye syndrome or viral hepatitis. The role of *S. occidentalis* as the culprit for sporadic cases of ALF thus went unnoticed for many years, until a pattern of annual outbreaks was noticed by Vashishtha et al in 2003–2005.[4]

Commercially available *Senna* is a common laxative derived from *Cassia acutifolia* and *C. angustifolia*, which are known hepatotoxins.[6] However, their toxicity seems grossly underestimated in the Western literature.[7,8] These commercial products do not have any pharmaceutical regulatory standards and are often contaminated with other plants of the same genus (such as the highly toxic *S. occidentalis*).[9] A high index of suspicion for *Senna* toxicity should be kept in patients with a history of complementary medication or herbal product use, who present with vomiting, diarrhea, and a rapidly evolving disease.

Our patient presented with vomiting and diarrhea, followed by liver failure and deep encephalopathy within 2 days. *Senna* poisoning is idiosyncratic, so timing cannot be predicted.[10,11] She developed refractory status epilepticus preterminally, culminating in death within 5 days. The aspartate transaminase was disproportionately elevated initially, probably as a consequence of associated myonecrosis. She had all components of the hepatomyoencephalopathy syndrome noted with this poisoning. There was a clear temporal relationship from ingestion to

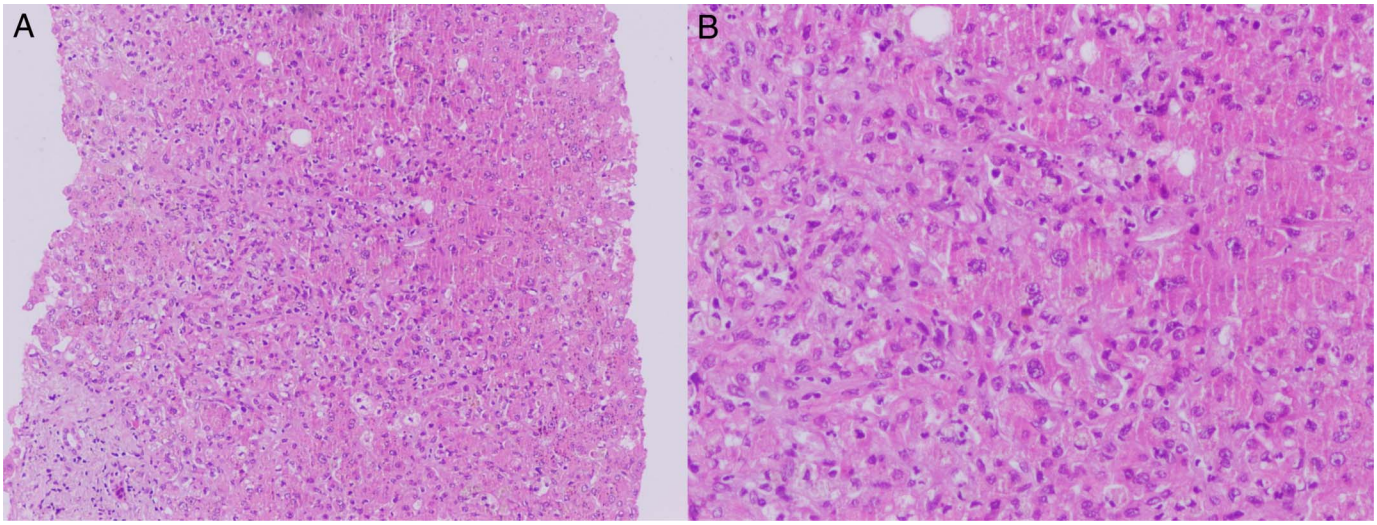

Figure 1. Postmortem liver biopsy showing (A) focal areas of liver cell necrosis and collapse, a few foci of lobular inflammation, expanded portal tracts showing minimal-to-mild inflammatory infiltrate, which is consistent with drug-induced liver injury (40×). (B) Intrahepatic and canalicular cholestasis, feathery degeneration, and microvesicular and macrovesicular steatosis consistent with drug-induced liver injury (100×).

presentation, she ingested no other confounding drugs, and all the other suspected etiologic agents were ruled out. Moreover, the histopathologic image of massive hepatocellular necrosis with cholestasis and minimal inflammatory infiltration, along with the clinical-biochemical image, was consistent with drug-induced ALF. However, unlike ALF, there was no cerebral edema, the liver was morphologically normal on ultrasound, and the transaminase elevation was preceded by hyperbilirubinemia. In addition, unlike other reported cases of *S. occidentalis* toxicity, our patient was an adult, survived longer, and developed poisoning with leaves. The only other reported case of adult *Senna* toxicity too developed poisoning with leaves, and required mechanical ventilation for 16 days before showing complete recovery.[11]

In conclusion, *S. occidentalis* toxicity is a rapidly progressive hepatomyoencephalopathic disease with high mortality rates. All parts of this plant are poisonous. Toxicity might be underrecognized due to the lack of awareness and absence of prescription information. A high index of suspicion in patients presenting with vomiting and diarrhea, followed by rapid evolution of liver failure, would be prudent. There is no antidote, and whether a liver transplant may improve survival is not known. It is of utmost importance to identify and systematically study these cases to have a better understanding of the pathophysiology of this disease and possible treatment options.

DISCLOSURES

Author contributions: P. Ish drafted the manuscript, reviewed the literature, and cared for the patient. S. Rathi critically edited the manuscript, reviewed the literature, and is the article guarantor. H. Singh cared for the patient and reviewed the literature. S. Anuradha cared for the patient and critically edited the manuscript.

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