Letter to the Editor

A “Saga” of Adenanthera Pavonina Seed Ingestion in a Toddler

First Author
Dr Vigil James, MD
Children’s Emergency, KK WOMEN’S AND CHILDREN’S HOSPITAL PTE. LTD.
100 BUKIT TIMAH ROAD, SINGAPORE 229899
Email: vigiljames@gmail.com

Second Author:
Dr Aswin Warier, MBBS, DCH, MD, MRCPCH,
Department of Emergency Medicine,
Raffles Hospital,
585 North Bridge Rd, Singapore 188770
Email: aswinwarier@gmail.com

Third Author and Corresponding author:
Dr Gene Ong Yong-Kwang
Senior Consultant, MBBS, MRCPCH
Children’s Emergency, KK women’s and Children’s Hospital,
100 BUKIT TIMAH ROAD, SINGAPORE 229899
E-mail: geneong@yahoo.com
ORCID ID: 0000-0002-9879-0594
Fax: +65 6394 1172

Institution where the work originated:
KK WOMEN’S AND CHILDREN’S HOSPITAL PTE. LTD., 100 BUKIT TIMAH ROAD,
SINGAPORE 229899

Name of the ethics board:
[1] Central Institutional Review Board, SingHealth
Dear Editor,

Adenanthera pavonina tree is commonly found in Southeast Asia, India, Southeast China and has been introduced into some countries of America (United States, Brazil, Costa Rica, Venezuela, Trinidad, Tobago, Cuba, Jamaica, and Puerto Rico) (1,2). The trees are usually planted in many countries along roadsides, parks, and gardens to provide shade and as ornamental trees. The Adenanthera pavonina seeds are seen inside the curved hanging pods, which split open into two twisted halves to reveal the hard seeds. The seeds are glossy scarlet red (Image 1) and are commonly used as toys and ornaments. Children are attracted to these seeds due to the appealing look and use them as playthings. Often, toddlers might mistake these seeds for sweets and may ingest them due to their attractive appearance.

Most adverse effects of this seed ingestion are limited to local gastrointestinal symptoms, like vomiting and diarrhea. However, the majority of the Adenanthera pavonina seed ingestions often cause few or mild symptoms because the shell remains intact, and there is limited exposure to the toxic contents within the seed. We report a case of a child with the unintentional ingestion of raw Adenanthera pavonina seeds resulting in gastrointestinal toxicity requiring hospitalization. To our knowledge, this is the first pediatric case report on Adenanthera pavonina toxicity.

Case Report

A 3-year-old boy who was previously well presented to the pediatric emergency department (PED) with one episode of vomiting, which was non-bilious, non-projectile, and four episodes of non-bloody diarrhea. There was also severe abdominal distention noted by the parents. The child was playing with the Adenanthera pavonina seeds in front of the house. After coming inside the
house, a few minutes later, the child suddenly had an episode of vomiting, the contents of which showed multiple scarlet red-colored fragments. Four hours after the ingestion, the child began complaining of intermittent abdominal pain lasting a few minutes during each episode, the intensity of which gradually worsened over time. Subsequently, the parents also noticed progressively worsening abdominal distention. There was no history of fever, lethargy, or decreased urine output, although the oral intake was reduced to less than half of the normal. There was no history of contact with a person with symptoms of acute gastroenteritis, nor was there a significant travel history.

Upon arrival to the pediatric emergency department, he was awake, alert, and oriented, and the initial vital signs revealed a blood pressure of 91/59 mmHg, pulse of 103 beats/minute, respiratory rate of 22 breaths/minute, and a temperature of 36.7°C. Cardiac monitoring showed sinus tachycardia without ectopy or arrhythmias. On physical examination, his head, neck, heart, lung, and neurological exams were normal. The abdominal exam revealed gross distention, with generalized mild diffuse tenderness and hyperactive bowel sounds. The hernial orifices and external genitalia were normal. The rectal examination revealed no blood on the examining finger, and the anal tone was normal. The initial blood gas analysis was normal, and the ECG showed normal sinus rhythm with a QTc 444 msec.

Laboratory tests revealed: sodium of 139 mEq/L, potassium of 4.2 mEq/L, chloride of 106 mEq/L, bicarbonate of 20 mEq/L, urea of 17 mg/dL, creatinine of 0.27 mg/dL and glucose of 106 mg/dL. Liver function tests, PT, APTT, and complete blood counts were normal. Abdominal x-rays done showed dilated small and large bowel loops till the descending colon with absent
rectal gas (Image 2&3). Multiple air-fluid levels were also noted in the erect abdomen x-ray (Image 2&3). There was no air under the diaphragm, and no radio-opaque foreign bodies were seen in the abdomen.

Intravenous access was secured, maintenance volume of intravenous fluid, and intravenous anti-emetic were administered. The patient was initially kept nil by mouth and was admitted for further monitoring. Upon re-evaluation in the inpatient ward, the patient persisted to have abdominal distension with diffuse tenderness, and the bowel sounds were sluggish on auscultation. He had intermittent episodes of diarrhea, but the vomiting had subsided. Over the next 72 hours, the abdominal distension and pain gradually resolved. The oral feeds were steadily escalated, and the patient was able to achieve good oral intake. There were no further episodes of vomiting, diarrhea, or abdominal discomfort. The patient was discharged home after 72 hours of inpatient monitoring. Two weeks follow up after the ingestion revealed no further sequelae from the ingestion.

**Discussion**

*Adenanthera pavonina* is an ornamental tree, which produces scarlet red, glossy seeds commonly used as toys and ornaments. The raw *Adenanthera pavonina* seeds are poisonous. However, after cooking, the seeds are edible. The seeds are considered to possess medicinal value (3,4,6) and are used in traditional medicine. Powdered seeds are made into plastering pastes to quicken the removal of pus from the furuncle, cure headaches, and rheumatism (5). *Adenanthera pavonina* is a source of simple aromatic natural products like (2,4-dihydroxybenzoic acid), flavonoids (ampelopsin, butein, dihydrorobinetin, and robinetin) and aliphatic natural products (O-
acetylethanolamine and 1-octacosanol) (2). It also contains carbohydrate (galactitol), terpenoids (echinocystic acid and oleanolic acid), steroids (daucosterol, β-sitosterol, and stigmasterol), amino acids and peptides (2-amino-4-ethylidenepentanedioic acid and γ-methyleneglutamine), and alkaloids (O-acetylethanolamine and 1H-imidazole) (2,6). The exact content within the seed which acts as the toxin is unknown, but the presence of aromatic and aliphatic natural products, flavonoids, terpenoids, natural steroids, amino acids, peptides, and alkaloids could act as gastrointestinal irritants (2,6).

Due to the presence of the hard seed shell, which insulates the toxin from gastrointestinal absorption, oral ingestion of whole seeds most often does not produce serious illness. Symptomatic ingestions are more likely to happen after the consumption of new crops with immature seeds, which have a softer shell. In the case of older seeds, consumption, after chewing or grinding will disrupt the hard shell resulting in exposure of the gastrointestinal tract to the toxic contents of the seed. This mechanism likely increases the severity of toxicity and decreases the time to onset of symptoms.

The main symptoms from ingestion of these seeds are gastrointestinal in origin. These symptoms include nausea, vomiting, and diarrhea, which, if untreated, could lead to severe dehydration. Significant abdominal distention due to toxic paralytic ileus, which happened in our pediatric patient, has not been reported previously in the literature. Severe toxicity could result in central nervous system stimulation and seizures. The Adenanthera pavonina seed ingestion could also cause tachycardia, mydriasis, headache, hallucinations, weakness, and tremors. The plant may be irritating to the skin and the eye (7–9). Due to the irritative properties of the plant and seed
contents, corrosive burns of oral mucosa and hematemesis may be often apparent within hours after ingestion (7–9). There is no known toxicity level in humans. Gastric emptying techniques, including induced emesis, activated charcoal, gastric lavage, and whole bowel irrigation, has not been found to be useful in this ingestion. However, in case of eye or skin exposure to the plant, copious irrigation has been recommended. There is no specific antidote for *Adenanthera pavonina* seed poisoning. The treatment is mainly supportive with intravenous fluids, anti-emetics, and correction of electrolyte abnormalities. The stool and vomitus should not be discarded until the diagnosis is confirmed, as seed remnants may be present within these specimens.

**Summary**

The majority of cases of *Adenanthera pavonina* seed poisoning in children involve the ingestion of a small number of intact seeds resulting in minimal or mild symptoms. However, the ingestion can be associated with significant gastrointestinal toxicity like toxic paralytic ileus, when the seeds are chewed. Intravenous fluids and supportive care in such cases will likely result in good outcomes. Emergency physicians should be aware of this toxic exposure and provide appropriate advice to parents.
REFERENCES


**Image 1**: Adenanthera pavonina seeds
Image 2: X ray abdomen erect showing dilated small and large bowel loops with multiple air fluid levels and no air under the diaphragm or radio-opaque foreign bodies
**Image 3**: X ray abdomen supine showing dilated small and large bowel loops till the descending colon with absent rectal gas