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Clinical effects, outcomes, and disposition of unintentional pediatric cyanogenic glycoside exposures reported to US Poison Centers, 2005-2024

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INTRODUCTION

- Cyanogenic glycosides (amygdalin, linamarin, sambunigrin, taxiphyllin) are organic compounds that get metabolized to hydrogen cyanide (HCN)
- These are found in many plant species including Prunus species (cherry pits, apricot kernels, bitter almonds), cassava root, lima beans, and bamboo shoots
- The concentration of glycoside and amount of HCN that is released can be highly variable and is often dependant on the plant or seed being damaged or chewed to release the glycoside
- The goal of this study is to better understand the severity of pediatric exposures to cyanogenic glycosides and to inform management strategies for ingestions in children age less than 6 years

METHODS

- Retrospective analysis using the National Poison Data System (NPDS) which houses deidentified case data from all 53 United States Poison Centers
- Study period January 2005 to December 2024
- Inclusion criteria:
  - Patients aged < 6 years
  - Single substance ingestion of cyanogenic plants

RESULTS

- Disposition (Table 1)
  - 96.7% did not require hospital care
  - 0.07% admitted to non-critical care unit and 0.04% were admitted to critical care units
- Medical outcomes (Table 2)
  - The majority of patients had no clinical effect (92.7%)
  - There was one major outcome with severe symptoms including cardiac arrest, hypotension, seizure, and coma
- Clinical effects (Table 3)
  - Vomiting, abdominal pain, diarrhea, fever and nausea were the most common symptoms
- Treatments (Table 4)
  - Hydroxocobalamin was administered in 2 case

Table 1. Disposition reported for pediatric cyanogenic glycoside ingestions

DISPOSITION	NUMBER (%) N= 51,703
Managed on Site	49,976 (96.7%)
Treated/ Evaluated and Released	1,294 (2.5%)
Admitted to Noncritical Care Unit	36 (0.07%)
Admitted to Critical Care Unit	18 (0.04%)

Table 2. Medical outcomes for pediatric cyanogenic glycoside ingestions

MEDICAL OUTCOME	NUMBER (%) N= 51,703
Not followed (judged as non toxic exposure)	13,505 (26.1%)
Not followed (judged as minimal clinical effects possible)	24,655 (47.7%)
No effect	10,844 (21.0%)
Minor effects	1,133 (2.2%)
Moderate effects	75 (0.15%)
Major effects	1 (0.002%)
Death	0 (0%)

National Poison Data System definitions of medical effects:
No effect: No clinical symptoms developed from the exposure
Minor effect: Minimally bothersome symptoms resolved quickly
Moderate effect: Pronounced or prolonged symptoms that require treatment but are not life
Major effect: Life-threatening symptoms or those that result in significant disability

Table 3. Clinical effects reported from pediatric cyanogenic glycoside ingestions

CLINICAL EFFECTS	NUMBER (%) N= 51,703
No symptoms	47,938 (92.7%)
Vomiting	1,679 (3.2%)
Abdominal pain	549 (1.1%)
Diarrhea	468 (0.9%)
Fever/ hyperthermia	346 (0.7%)
Nausea	335 (0.6%)
Drowsiness/ lethargy	147 (0.3%)
CNS depression (mild or moderate)	92 (0.2%)
Dizziness/ vertigo	14 (0.03%)
Seizures	6 (0.01%)
Acidosis	5 (0.01%)
Syncope	2 (0.004%)
Coma	1 (0.002%)
Hypotension	1 (0.002%)
Cardiac arrest	1 (0.002%)

Table 4. Treatments given for pediatric cyanogenic glycoside ingestions

INTERVENTIONS	NUMBER (%) N= 51,703
Dilute/irrigate/ wash	23,398 (45.3%)
Antiemetics	72 (0.1%)
IV fluids	48 (0.1%)
Oxygen	3 (0.006 %)
Vasopressors	2 (0.004%)
Hydroxocobalamin	2 (0.004%)
Intubation	1 (0.002%)

CONCLUSION

- Study is limited by lack of definitive plant identification and potential for improperly coded data
- Majority of cases did not have symptoms and were managed safely at home
- Vomiting and abdominal pain were the most commonly reported symptoms
- Severe symptoms were rare and hydroxocobalamin was administered in only 2 cases of 51,703
- No deaths were reported despite cardiac arrest being reported as a symptom
- Further research is needed to identify predictors of severe presentations
- This data supports home management of asymptomatic pediatric ingestions of cyanogenic glycosides

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