

HUMAN PLANT EXPOSURES REPORTED TO A REGIONAL (SOUTHWESTERN) POISON CONTROL CENTER OVER 8 YEARS

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Abstract

Background: There is little published data about human plant exposures reported to US poison control centers (PCC). A review of PCC records was performed to better understand the characteristics of these calls. **Methods:** Retrospective chart review of a single PCC's cases received between 1/1/03 and 12/31/10. Specific generic plant codes were used to identify cases. Calls unrelated to human exposures were excluded. Recorded variables included: patient demographics, plant involved, exposure variables, symptoms, management site, treatments and outcome. Odds ratios (ORs; all p's < 0.001) were determined for clinical effects and hospital admission. **Results:** A total of 6,492 charts met inclusion criteria. The average patient age was 16.6 years (2 months - 94 years); 52.4% were male. The most common exposure reason was unintentional (98%), and the majority (92.4%) occurred at the patient's home. Ingestions (58.3%) and dermal exposures (34.3%) accounted for most cases. Cactus (27.5%), oleander (12.5%), Lantana (5.7%) and Bougainvillea (3.8%) were most commonly involved. Symptoms developed in 47.1% of patients, and were more likely to occur following Datura (66.7%), and Morning Glory or Milkweed (25% each) exposures. Almost 94% of patients were managed onsite (home) and only 5.2% involved evaluation in a health care facility (HCF). The most common treatments were: fluids (57.7% of cases), local wound care (31.1%) and ocular irrigation (4.4%). Only 37 (0.6%) patients required hospital admission, and 2.9% of cases resulted in more than minimal effects. Exposures resulting in more than minimal clinical effects were predicted by several variables: abnormal vital signs (OR=35.62), abnormal labs (OR=14.87) and management at a HCF (OR=7.37). Hospital admissions were increased for patients already at a HCF (OR=54.01), abnormal vital signs (OR=23.28) and intentional exposures (OR=14.7). **Conclusions:** Plant exposures reported to our poison center were typically unintentional ingestions occurring at home. Most patients were managed onsite and few developed significant symptoms.

Introduction

In 2015 there were 46,597 human plant exposures called to US PCCs which represented 1.8% of all exposure calls. This made plants the 21st most common substance category involved in human exposures, and approximately 60% (n=28,213) of these calls involved pediatric patients under the age of 6 years. Unfortunately, there is a common misperception that all plant exposures are benign, despite educational efforts aimed at medical professionals. There is, however, little published data about plant calls to PCCs and none for the state of Arizona. A better understanding of outcomes following plant ingestions may improve patient management and prevent unnecessary evaluations in a health care facility (HCF). With this goal, a review of the records from an urban PCC, in the Southwestern US, was performed to better understand the characteristics of human plant exposures.

Methods

A retrospective review was performed on all human plant exposure calls to a single, urban PCC between January 1, 2003 and December 31, 2010. All charts within the PCC's electronic medical record system (EMR) were searched using Visual Dot Lab Enterprise®. Plant-specific generic (numerical) codes, established by the American Association of Poison Control Centers' (AAPCC) National Poison Data System (NPDS), were used to identify cases. A total of 16 NPDS codes were used to search the EMR for all plant calls during the eight-year study period. Recorded variables included: patient demographics (gender and age), plant(s) involved, NPDS code, exposure variables (location, route and reason of exposure), symptoms, management site, treatments and outcome.

Location	Number of Calls (% of total)
Own residence	5,995 (92.4%)
School	284 (4.4%)
Public place	164 (2.5%)
Other residence	28 (0.4%)
Workplace	17 (0.3%)
Total calls with coded data n= 6,488 (99.94%)	

Table One. Exposure location for human plant cases reported to a PCC.

Results

The PCC received 823,489 total calls between 1/1/03 and 12/31/10; of these, 6,492 (0.79%) met inclusion criteria for human plant exposures. The average patient age was 16.6 years (SD 21.7 years; range: 2 months - 94 years) and most (52.4%) were male. Almost 93% of the exposures occurred at a home; either the patient's (92.4%) or another (0.4%) residence. The ten most commonly involved plants are listed in table two, and included cactus (27.5%), oleander (12.5%), Lantana (5.7%), Bougainvillea (3.8%) and Philodendron (2.2%); 3.2% of cases involved an unknown plant. The most common route of exposure was ingestion and accounted for 58.3% of all cases. Dermal (34.3%), ocular (5.7%), inhalational (0.6%), parenteral (0.01%; n=1) and combined routes of exposure were also recorded (table three). The most common reason for exposure was unintentional (98%). All exposure reasons are listed in table four. A total of 3,168 (48.4%) charts had clinical signs and/or symptoms coded within the EMR, but only 3,059 (47.1% of all case) were attributed to the plant exposure. The most commonly reported (attributable) signs/symptoms were: 'puncture' (n=1,489); 'throat' or 'tongue irritation' (n=753), 'rash/redness' (n=634), 'vomiting' (n=437) and 'ocular' irritation (n=203). Symptoms were most likely to occur following Datura (66.7%), Morning Glory or Milkweed (25% each), and Pencil cactus (18.2%) exposures. Interestingly, only 2.6% (25 out of 927) of all other (non-pencil) cacti exposures developed symptoms. The most common treatments were: providing fluids (57.7% of cases), local wound care (31.1%) and ocular irrigation (4.4%). The vast majority (93.8%) of patients were managed (received treatments) onsite, which was usually the patient's home, and only 5.2% involved evaluation in a HCF (table seven). Only 37 (0.6%) patients required hospital admission.

Rank	Plant / Species	% of Total Calls
1	Cactus	27.5
2	Oleander spp.	12.5
3	Lantana spp.	5.7
4	Bougainvillea spp.	3.8
5	Unknown	3.2
6	Philodendron spp.	2.2
7	Pothos (<i>Epipremnum</i> spp.)	1.9
8	Poinsettia	1.7
9	Pyracantha spp.	1.7
10	Ficus spp.	1.6

Table Two. Most common plants involved in human exposures reported to a PCC.

Variable	Odds Ratio (95% CI)
Abnormal vital signs (attributed to the exposure)	35.62 (7.69-165.1)
Abnormal laboratory data (attributed to the exposure)	14.87 (3.42-64.7)
Management Site (in a HCF compared to non-HCF sites)	7.37 (5.08-10.7)
Age (increase/yr)	1.02 (1.01-1.03)
Route of exposure (inhalation/ingestion v. all other routes)	0.56 (0.37-0.87)

Table Three. Multiple regression: Developing > Minor Clinical Effects.

Plant Type/Species	Patients with Moderate/Major Symptoms (Case / Total number of calls)	Percentages
Datura spp.	14/21	66.7%
Morning Glory	2/8	25%
Milkweed	2/8	25%
Pencil Cactus	48/263	18.2%
Aloe	4/39	9.3%
Mexican Bird of Paradise	4/46	8%
Palm	4/89	4.3%
Poison Ivy	2/46	4.2%
Oleander	29/762	3.7%
Other Cactus (NOS)	25/927	2.6%

Table Four. Plants exposures resulting in moderate or major symptoms.

Discussion and Conclusions

Human plant exposures, reported to a single Southwestern US poison center, were typically unintentional ingestions occurring at home. The majority of patients were managed onsite and few developed more than minor symptoms. The development of significant clinical effects, and need for hospital admission, were each associated with several variables. There are limitations with all retrospective PCC-based studies, including the potential for reporting bias (e.g. only being called about symptomatic patients) and accuracy of reported and coded data. Unfortunately, the information coded in our charts could not be independently verified. Also, abstractors were not blinded to the purpose of this work and may have interpreted data in a biased manner. Some calls were excluded due to callers refusing our recommendations (not going to an ED) or follow-up attempts; other calls were simply lost to follow-up. The outcomes of these cases were unknown and may have affected findings. Inevitably, some plant exposures were not reported to our PCC, including some that involved evaluation at a HCF.

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