EDITORIAL

Spectrum of Plant Toxin and Deliberate Self-poisoning

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Deliberate self-poisoning (DSP) is a significant global problem and a rising cause of total death worldwide. The incidence of poisoning in India is among the highest in the world with estimated 50,000 deaths per year.[1] Despite the vast number, evidence on prevalence patterns in India is yet limited. Different causes of poisoning include insecticides, household agents, pesticides, industrial chemicals, plants, and animal bites and stings. In India, toxic exposures related to plants account for 6–15%, however, the incidence is much higher in the rural population.[2] There are more than 4,000 species of medicinal plants, growing as shrubs and herbs, many of them are potentially poisonous and fatal when consumed in high doses.[3] They include oleander (cardiotoxin), Oduvanthalai (*Cleistanthus collinus*) (miscellaneous toxin), strychnine (nux vomica—neurotoxin), Datura (neurotoxin), and others (castor, cactus, henna, etc.). India being a large country, literature data are still limited in relation to common plant poisons consumed, method of ingestion, demographic profile, seasonal variation, socioeconomic data, toxicology pattern, case fatality, and outcome. It is very important to understand the toxicology mechanism and clinical manifestation of different plant poisons consumed as toxicological pattern differs based on culture, availability, and geographic locations across world over.[4] The current study by Kundavaram Paul Prabhakar Abhilash and others from Christian Medical College Vellore intends to fill the above mentioned gaps.

Oleander *(Thevetia peruviana)* poisoning is toxic to cardiac muscles and leads to dysfunction of the autonomic nervous system due to the high concentration of cardiac glycosides. Clinical manifestation includes cardiac dysrhythmias, electrolyte imbalance, and cardiac shock being an important cause of death. Gastric lavage with activated charcoal, cardiac monitoring, adequate hydration, and correction of electrolyte abnormalities with probable temporary cardiac pacing is the principles of symptomatic management.[5] Specific antibodies, such as Digoxin-specific Fab fragment have been successfully used in adult patients, but lack of availability in India restricts their use.[6] Oduvanthalai (*C. collinus*) poisoning affects cardiac, renal, metabolic system leading to intractable metabolic acidosis, electrolyte imbalance (hypokalemia), neuromuscular blockade, type 2 respiratory failure leading to death due to toxic constituents cleistanthin and cleistanthin B (glycosides), and diphyllin (arylnaphthalene lignan lactones) found in them. Gastric lavage, correction of electrolyte abnormalities, fluid balance, and cardiac monitoring are the mainstay of management.[7] Datura (*Datura stramonium*) poisoning is due to highly toxic anticholinergic properties leading to agitation, tachycardia, delirium, hyperthermia, dilated pupils, and hallucination. Treatment such as gastric lavage and supportive measures are indicated.[8] Nux vomica (*Strychnine nux-vomica*) contains highly toxic alkaloids (strychnine and brucine) and has a deleterious effect on the central nervous system. Clinical features include severe metabolic acidosis, opisthotonus, hyperthermia, rhabdomyolysis, renal failure, and respiratory failure leading to death. Treatment is symptomatic with adequate hydration, cardiac, and neurological monitoring.[9]

In the current study by Kundavaram Paul Prabhakar Abhilash and others from Christian Medical College Vellore, 8.2% (150/1821) of DSP cases were with plant poisoning, incidents were higher in the young age group (16–30 years) with female predominance (60%). A seasonal pattern with an increasing trend in the month of April was observed. Those who consumed plant poisons (48%) attributed it to domestic violence. The other factors were unknown (32%), personal issues (0.06%), relationship issues (0.04%), financial issues (0.04%), health (0.02%), and workplace issues (0.02%). A literature search from other studies also showed similar findings with a significant increase of incidences in rural subjects, rural females, and low/middle socioeconomic class.[2,10] Most common ingested poison was oleander *(T. peruviana)* (59%), Oduvanthalai (*C. collinus*) (30.7%), nux vomica (*S. nux-vomica*) (3%), Datura (*D. stramonium*) (3%), and others (5.3%) included henna (1.3%), cactus (1.3%), and a case each of castor, *Gloriosa superba*, *Adentera pavonina*, and *Abrus precatorius*. The various methods of ingestion were crushed/ground seeds (49%), decoction of leaves (28%), followed by crushed/ground leaves (27%), and chewing and swallowing (9%). There is very limited data available on relative incidence for each of the plants. One study in a tertiary care center in Southern India has detected Oduvanthalai (*C. collinus*) as the commonest plant poison followed by oleander, strychnine, kalli paal (a poisonous cactus), Datura, papaya, and chrysanthemum in this region.[11] Consumption of decoction (OR: 5, 95% CI: 2.27–14.00, *p*-value: <0.001) and metabolic acidosis (pH <7.35) (OR: 11.48, 95% CI: 4.17–31.57, *p*-value: <0.001) were more common in Oduvantahlai poisoning as compared to oleander.

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In-hospital mortality in the study was (9.3%) little higher with other similar studies (6.7%).[12]

Time has come for more research-related work in this field at the community level to eliminate selection bias considering the diverse geographic locations, addressing the socioeconomic issues, understanding common plant poisons consumed, toxicology patterns, clinical manifestations so that the emergencies can be dealt more effectively. Few of these plant poisons have any specific antidotes that also need to be addressed. This further emphasizes the need for developing new strategies taking into consideration socioeconomic factors, demographic profile, and medical management options including means to reduce poison absorption which in turn can rapidly reduce deaths resulting from DSP across India.

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