International Journal of Contemporary Pediatrics
Sunilkumar MN et al. Int J Contemp Pediatr. 2016 Aug;3(3):1022-1025
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20162384

Research Article

Clinical presentation, treatment and outcome of acute dettol poisoning in children

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Received: 31 May 2016
Accepted: 02 July 2016

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ABSTRACT

Background: Despite various statutory warning, accidental ingestion of poisonous substances by children remains a major challenge to clinicians working in a tertiary care hospital. Accidental ingestion of dettol, a common household disinfectant is one among them where the clinical presentation was found to vary according to the amount ingested. This study was aimed to understand the clinical profile of accidental ingestion of dettol (AID), its treatment and outcome.

Methods: A descriptive study was conducted in children, who admitted with special reference to AID in the paediatric intensive care unit (PICU) between January, 2010 and December, 2015. A standard performa which included age, sex, time of presentation to PICU after ingestion, clinical presentations, treatment given and the outcome were taken.

Results: Among 5806 children admitted during the study period, 401 (6.9%) were due to acute poisoning. About 62 poisonous substances were identified. AID was found in 5/401 (1.2%) cases. Nausea, vomiting with burning sensation of oral mucosa, and abdominal pain were the symptoms when ingested a small amount (10-20 ml) of dettol. Stomach washing and antiemetic were the first line therapy. No mortality was evidenced from AID.

Conclusions: Nausea, vomiting with burning sensation of oral mucosa, and abdominal pain were the clinical presentations of AID at mild quantity ingestion which were effectively managed by stomach washing and antiemetic therapy. Though AID was a rare accidental poisoning in children, it can be completely prevented by educating the society to keep the poisonous substance out of the reach of children.

Keywords: Poisons, Accidental childhood ingestion, Dettol, Chloroxylenol, Pine oil, Isopropyl alcohol

INTRODUCTION

Major causes of morbidity and mortality in children in the developing as well as the developed countries is due to the accidental ingestion of poisons.[1,2] Dettol, a common household disinfectant solution comprises chloroxylenol (4.8%), pine oil (9%), and isopropyl alcohol (12%). Since, it is commonly found in majorities of houses, children are an easy prey to accidental ingestion of dettol (AID). Though AID is one of the rare morbidity causing poisoning in children, many reports were published previously.[1,3,4]

The clinical presentation found to vary from the volume of dettol ingested. The reported clinical presentations in children were related to the central nervous system, cardio-pulmonary and gastro-renal systems.[5] Therefore, the management of cases with ADT will vary from case to case depending up on the volume ingested. This study was aimed to evaluate the clinical presentation, treatment and outcome of accidental dettol poisoning in children which will help to design the proper management of cases presented with poisoning in tertiary care hospitals.

METHODS

A descriptive study was conducted by analysing the hospital records of children admitted with accidental poisoning during the last 5 years (between January, 2010 and December, 2015) in the paediatric intensive care unit (PICU). Among the 62 different types of poisonous substances found during the last 5 years period, cases with definite history of AID were analysed in this study. All the cases were analysed for age, sex, clinical presentation, and time of admission of these children after ingestion, laboratory investigations, treatment that had given and the outcome. History such as route of poisoning and socio-economic status of the family (according to the modified Kuppuswamy scale) was also analysed. Children admitted with suspected cases of AID or dettol ingested with other poisons were excluded from the study. The study design was approved by Institutional Ethics Research Committee.

RESULTS

Among the 5806 cases admitted in the PICU, 401 children (6.9%) were with acute poisoning due to various agents in the study period. Among the 401 cases, we found only 5 cases (1.2%) were due to AID. Gender wise distribution revealed that male children were dominant (60 %) and females were 40 % (Figure 1)**.** Majority of the cases with AID, 4/5 (80 %) were 2 years old and 1 was 3 years old (20%). Common symptoms during the presentation were incessant crying with vomiting and nausea (80%). Most of them had complaint of burning sensation on tongue and oral mucosa (60%). Abdominal pain (40%) and coughing 40% were also presented (Figure 2).

Time of presentation to hospital after the AID ingestion was found to vary from 15 min. to 1 hr. Out of the 5 children, 3 presented within 1 hour, one child brought within 15 min. and another child within 30 min. The quantity of ingestion in 2 children was unknown. The others were ingested volume of approximately 10-20 ml. The clothes of these children might be contaminated with dettol, hence were immediately removed. In order to prevent the possible absorption through skin, they were given bath with soap and water to decontaminate the skin and hair. Out of the 5 children, 4 children received stomach wash within 1 hour. The average period of stay in the PICU was about 10 hours (3 children) and two children were shifted out of the PICU after about 4-6 hours. Apart from the stomach wash children were treated for proper hydration and antiemetics as a supportive care. There was no mortality found.

Majority (4/5; 80%) of the children were belonged to middle socio-economic families. The incidence of AID was seen in the months of January (20%), February (20%), September (40%) and November (20%). Analysis of complete hemogram revealed minimal leucocytosis ($12.6 \pm 1.8 \times 10^3/\mu L$) in all cases. Serum electrolyte and SGPT activity values were within normal limits (Table 1).

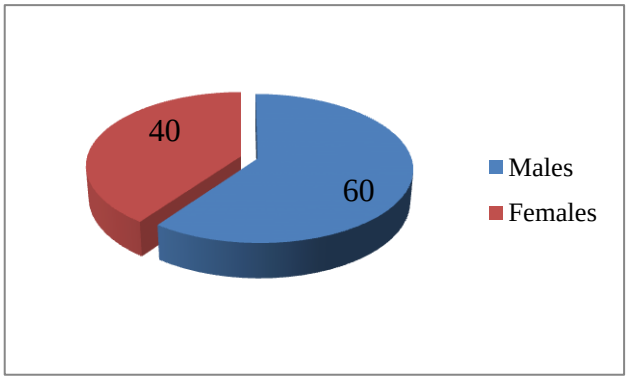

Figure 1: Distribution of gender.

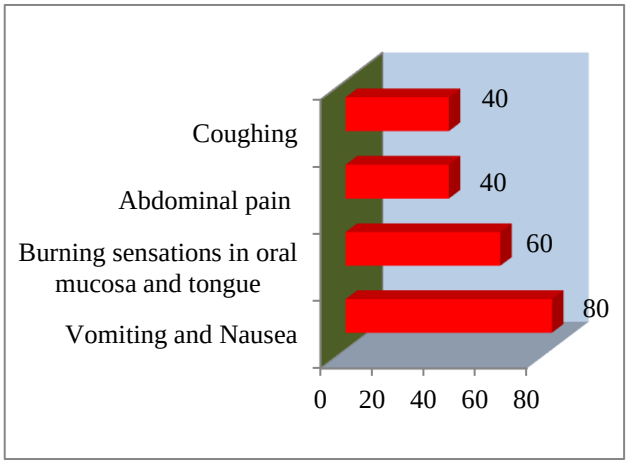

Figure 2: Clinical presentation of dettol poisoning.

DISCUSSION

Accidental ingestion of poisonous substances by children was found as one of the urgent medical interventions with utmost critical care. Among the numerous household poisonous substances which can cause serious morbidities in children, poisoning by dettol was very rarely reported. It is a well-known house hold disinfectant used for cleaning wounds, washing clothes and also added to water for mopping the floor. The solution is made up off ingredients such as 1) Parachlorometaxylenol (PCMOL); 2) Isopropyl alcohol (IPOL) and 3) Essential pine oils (POIL). Though poisoning by dettol was reported in about 8-10% of self-poisoning-related hospital admissions, report this study during the last 5 years found only 1.2% of cases.[4] Gender wise distribution revealed that male children were more dominant which is consistent to the observation of other studies.[6] Male dominance with younger age group, less than 5 years, were also reported in many previous studies.[1,2,5,6]

Table 1: Laboratory parameters of children ingested with dettol.

Case no	Hb g/dL	WBC 10^3/uL	DC %	PLT (10^3/uL)	ESR (mm/h)	SGPT (U/L)	Na^+ (mmol/L)	K^+ (mmol/L)	HCO_3^- (mmol/L)	Cl^- (mmol/L)
1	11.0	11.26	N-43.9 L-43.1 E-8.3 M-4.4 B-0.3	362	17	23	136	4.0	19	115
2	12.5	13.6	N-45 L-49 E-5 M-1	212	12	35	143	4.7	18	114
3	11.8	15.4	N-20.1 L-64.4 E12.4 M-2.6 B-0.5	322	2	32	136	4.9	20	116
4	10.7	11.3	N-42.5 L-44.5 E-2.1 M-10.5 B-0.4	399	28	21	141	3.4	22	106
5	9.8	11.6	N-59.3 L-31.1 E1.7	417	55	19	143	4.0	22	107

DC: Differential count; N: Neutrophils, L: Lymphocytes; E: Eosinophils; M: Monocytes; B: Basophils; PLT: Platelets; ESR: Erythrocyte sedimentation rate; SGPT: Serum glutamic oxaloacetic transaminase; Hb: Hemoglobin

Among the ingredients, PCMOL has antibacterial activity due to its effect on the inactivation of bacterial enzymes as well as the effect on cell wall synthesis. The toxicity of PCMOL, at moderate level, to CNS was mainly due to its phenol nature which can solubilise the lipid content of brain and eventually result in the depression of central nervous system.[4,5] Further, nephrotoxic effect of PCMOL was also reported.[7,8] Such toxic effect was not evidenced in our study which may probably due to the small amount ingested. IPOL is usually oxidized to acetone which can excrete vis lungs and also in urine.[6-8] The slow rate of metabolism of IPOL present in dettol was the major reason for its toxicity. Juncos and Taguchi reported the elevated transminase, SGOT activity following mild poisoning with IPOL who later developed myopathy.[9] A similar elevations of SGOT activity, respiratory and renal failure with depression of CNS were reported for the toxic effect of the constituent POIL.[10] This indicates that the mild elevation of SGOT can either be due to the toxicity of POIL or IPOL on the enterocytes or hepatocytes. The cases presented in this study had no such elevation of transaminase activity.

The management of ADI was similar to the standard recommendations that explained for managing cases of suspected poisoning. It is important to determine the ingested poison, the route of ingestion, time and the quantity of poison ingested. Further, the history should include enquiry about any co-ingestants, vomiting or coughing prior to the admission at the hospital and also about whether any prior treatment had given.[11] In our study, the substance and approximate quantity were identified by the caretakers which helped to take treatment at the earliest.

A physical examination had been recommended on the emergency triad such as patient's airway, breathing as well as the circulation. In our study, all these were analysed. The common symptoms were incessant crying, vomiting and nausea, burning sensation on tongue and oral mucosa, abdominal pain and coughing. These observations were in agreement with the previous studies.[11,12] While in adult, inspiratory stridor, erythema of the chin and anterior chest wall were reported following ingestion of large quantity (125 ml) of dettol.[13] No cases in this study had these findings probably due to the low quantity of dettol ingested. Inflammation of buccal mucosa and vomiting were the common manifestation associated with AID.

Gastric emptying was generally advised in cases of potential ingestion of dettol. If gastric lavage is carried out, or vomiting occurs or is induced, it is recommended to do with all precaution such as facilities for tracheostomy.[13] Various interventions that found to enhance the detoxification of PCMOL includes oral administration of liquid paraffin in order to solubilise and prevent the PCMOL absorption from intestine[11], forced alkaline diuresis to increase the excretion of PCMOL in urine, exchange transfusion and early dialysis.[1,8-10,12,14] Haemodialysis and peritoneal dialysis were found to be effective in removing the IPOL.[14]

CONCLUSION

Nausea, vomiting with burning sensation of oral mucosa, and abdominal pain were the clinical presentations of acute ingestion of dettol at mild quantity. Stomach washing and antiemetic therapy were found as effective treatments. Most of the children were from the middle socio-economic families. Though AID was a rare accidental poisoning in children, it can be completely prevented by educating the society to keep the poisonous substance out of the reach of children.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sunilkumar MN, Ajith TA, Parvathy VK. Clinical presentation, treatment and outcome of acute dettol poisoning in children. Int J Contemp Pediatr 2016;3:1022-5.