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**STUDY OF VASMOL POISONING CASES IN A TERTIARY CARE
TEACHING HOSPITAL**

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ABSTRACT

The intention with the suicidal thoughts, hair dye (super vasmol-33) poisoning cases are increasing in many parts of world to free their souls. Hence we felt it as a social need to conduct this type of study. Objective to understand the prevalence of “Vasmol” poisoning cases and to analyze the presenting features, clinical course and their outcome in general medicine and emergency units of a tertiary care teaching hospital. This is a Prospective observational Study conducted for a period of six months. Any adult individual who consumed the vasmol poison intentionally were included as the study subjects. A total number of 380 vasmol poisoning cases have been collected. Out of them, 168(44.21%) cases were in the age group of 11-20 years, 120 (31.57%) were in between 21-30 years. 347 (91.31%) patients were illiterates. Out of 380 cases, 258 (67.89%) were recovered with the supportive therapy, 14 (3.68%) were died and 83 (21.84%) were referred to higher institution for better treatment. The death rate was found to be 1:27 i.e. out of every 27 cases 1 death was observed. Out of 14 deaths, 8 were due to cardio-respiratory failure, 3 were due to Myocarditis, 1 due to cardiac arrest, and 2 were due to acute renal failure. Vasmol hair dye ingestion is a life threatening condition and is a serious social issue to be addressed immediately. Early recognition, prompt referral, and supportive therapy are the factors on which clinical outcomes depend.

Keywords: Vasmol Poisoning, Super vasmol 33, Outcomes of vasmol poisoning.

INTRODUCTION

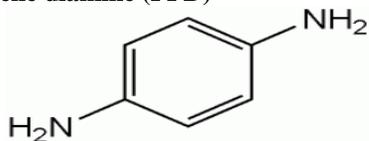
All over human times gone by, intentional use of poison was seen as a method of killing, suicide, and execution [1,2]. The history of poison [3] bounces from before 4500 BC to the current day. As per law, any substance, irrespective of its quality or quantity, when given with an intention to endanger, injure, or kill a person is called a poison[4]. The term poison with regards to biology and chemistry is often misused due to lack of a universal definition. Biologically speaking, any substance if given in large enough amounts is poisonous and can cause death[5]. The incidence of Hair dye poisoning cases are

increasing in many parts of India[6,7]. It constitutes an important proportion of the poisoning cases in some areas [8]. Hair dyes are easily available in the home for young adults [6] as their parents use hair dye as a need. Among such hair dyes, vasmol is an emulsion based hair dye commonly used in India[9]. Paraphenylene- diamine (PPD), resorcinol, propylene glycol, liquid paraffin, cetostearyl alcohol, sodium lauryl sulfate, EDTA sodium, herbal extracts, preservatives and perfumes are the ingredients. Some of these ingredients like paraphenylene diamine and resorcinol are known toxicants with multi-organ effects, while the toxicity profiles of others are not known [9]. A study measuring the plasma level of paraphenylene diamine in hair dressers showed very low levels in plasma [10]. Many studies relate the toxicity of the dye with the dose ingested [11]. Mortality rates in the larger studies of vasmol poisoning cases varied from 6.8% to 22.48% [12].

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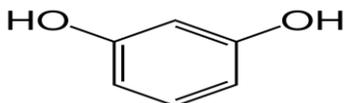
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Paraphenylene diamine (PPD)



Unintentional or suicidal intake of PPD causes systemic poisonousness, displayed by severe edema of neck and face and laryngeal edema with respiratory suffering frequently requiring emergency tracheostomy and mechanical ventilation. It also causes rhabdomyolysis and acute renal failure, ending in death if not treated in a hostile way [9]. Other symptoms include [13] angioneurotic edema, intravascular haemolysis, haemoglobinuria, asphyxia and respiratory failure, Severe hypocalcaemia and hyperuricaemia, hypercalcaemia, myoglobinuria, myocarditis [14] and arrhythmias leading to sudden death.

Resorcinol



Resorcinol is a Phenolic chemical used in taking pictures (photography), tanning (to go brown) and cosmetic industry. It is also a pharmaceutical agent applied topically in skin ailments. Resorcinol is a moderately toxic and corrosive substance. After taking orally, resorcinol is freely absorbed from the gastrointestinal tract, metabolized, and excreted by male and female rats, indicating little potential for bioaccumulation in animal tissues. It is known to cause eye, skin, oral and gastrointestinal injuries. Systemic toxicity is demonstrated as vomiting, dyspnea, methemoglobinemia, hypothermia, tachypnea, pallor, profuse sweating, hypotension and tachycardia [9]. Other symptoms include [13] renal and neurotoxicity, pulmonary edema, bronchospasm, seizures followed by CNS depression.

Mechanism of Rhabdomyolysis

Demolition or breakdown of striated muscle is called Rhabdomyolysis. This condition is characterized by muscle breakdown and necrosis brings about in the escape of intracellular muscle constituents into the circulation and extracellular fluid. Rhabdomyolysis ranges from an asymptomatic illness with increase in the creatine kinase

(CK) level to a life intimidating condition associated with extreme elevations in CK, imbalance in electrolytes and acute renal failure (ARF) [15]. With the intention of suicidal thoughts, usage of vasmol to free their souls has become more common in our area. Also we had increase in number of queries from the physicians and other health professionals about chemical contents in vasmol and protocol in management of vasmol poisoning to our drug information center located at Rajiv Gandhi institute of medical sciences, run by P Rami Reddy College of Pharmacy, Kadapa. Hence we felt it as a social need to conduct this type of study.

Aim

To understand the prevalence of “Vasmol” poisoning cases and to analyze the presenting features, clinical course and their outcome in general medicine and emergency units of a tertiary care teaching hospital.

METHOD

This is a Prospective observational Study conducted in general medicine and emergency (ICU) units at “Rajiv Gandhi institute of medical sciences”, Kadapa, an 850 bedded tertiary care teaching hospital. The study was conducted for a period of six months from January 2014 to June 2014. Any adult individual who consumed the vasmol poison intentionally were included as the study subjects. A total number of 380 cases were studied from all general medicine and emergency (ICU) units. We have prepared a patient data collection sheet which was set by slight changes from the standard case sheet. Poisoning cases were categorized based on the type of poisoning, amount of poison taken, reason for ingestion and on other demographic limits. Data was collected by studying the Patients case sheets and the following were collected i.e., age, gender, education particulars, occupation, other available laboratory data, quantity of dye consumption, reason for poisoning, vital signs, colouration of urine, clinical presentations, patient medication were clearly detected and the results were evaluated. Primary care details right after consumption onwards till reporting to the hospital, were investigated and recorded. The collected and analyzed data were correlated with reported data in different articles.

Table 1. Gender wise categorization of vasmol poisoning cases

Name of poison substance	Men	Women	Total
Vasmol	124 (32.63%)	256 (67.36%)	380

Table 2. Age wise categorization of vasmol poisoning cases

Name of poison substance	Age in years												Total
	11-20		21-30		31-40		41-50		51-60		>61		
	M	F	M	F	M	F	M	F	M	F	M	F	
Vasmol	63	105	32	88	12	30	12	17	4	14	1	2	380

Table 3. Socio demographic status of vasmol poisoning cases

Literates		Illiterates					Total
Students	Working	Coolie	House wives	Farmers	Drivers	Others	
12	21	195	49	78	3	22	380

Table 4. Month wise categorization of vasmol poisoning cases

Month	Vasmol cases		Total
	Men	Women	
September	21	35	56
October	14	30	44
November	29	45	74
December	21	44	65
January	17	52	69
February	22	50	72
Total	124	256	380

Table 5. Reasons for intentionally consuming vasmol poison

Reason	Number of cases
Financial problems	162
Family problems	171
Psychiatry problem	26
Others	21

Table 6. Clinical presentations of vasmol poisoning cases

Clinical presentation	Number of cases	Percentage (%)
Cervico-facial Edema	284	74.73
Myalgia	87	22.89
Stridor	75	19.73
GI disturbances	103	27.10
Head numbness	53	13.94
Seizures	16	4.21

Table 7. Mean of Serum Creatinine and Blood urea nitrogen values in vasmol poisoning patients

Renal function test	Mean value
Serum creatinine	1.58 mg/dL
Blood urea nitrogen	26.68 mg/dl

Figure 1. showing quantity of vasmol consumed vs. number of cases

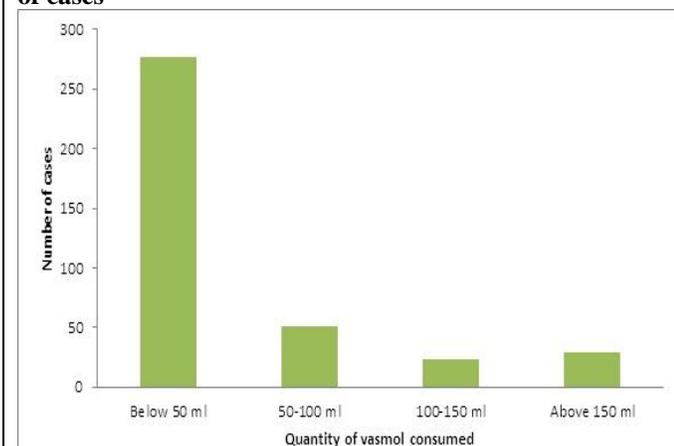


Figure 2. Outcome of vasmol poisoning cases

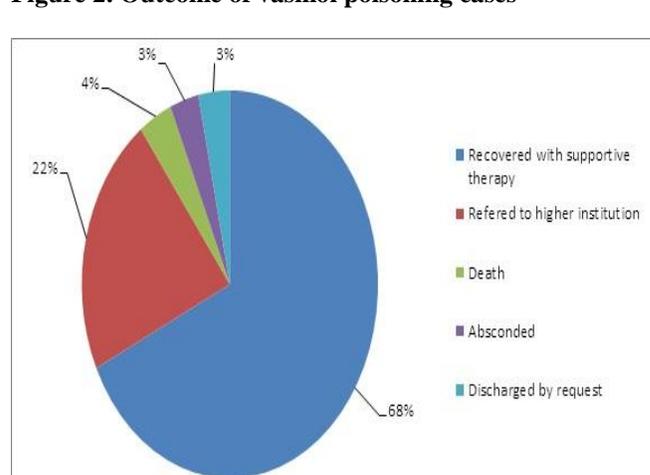


Figure 3. Percentage of cases in which Tracheostomy done and not done

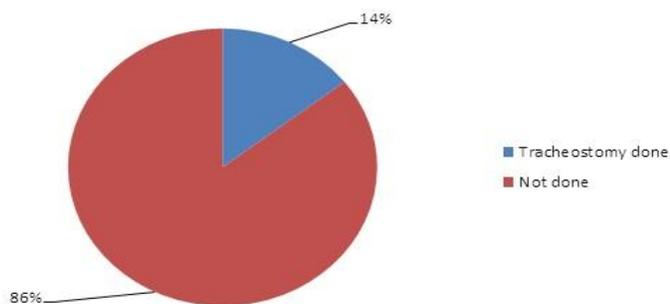


Figure 4. Complications which lead to death in vasmol poisoning cases

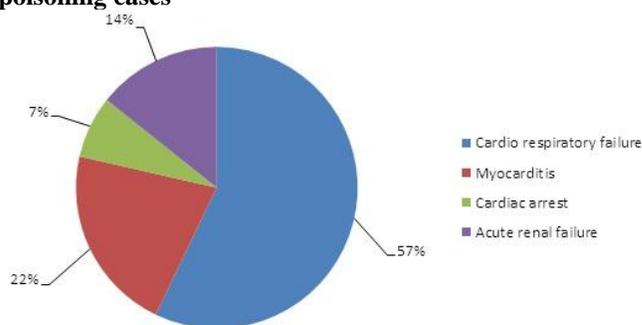
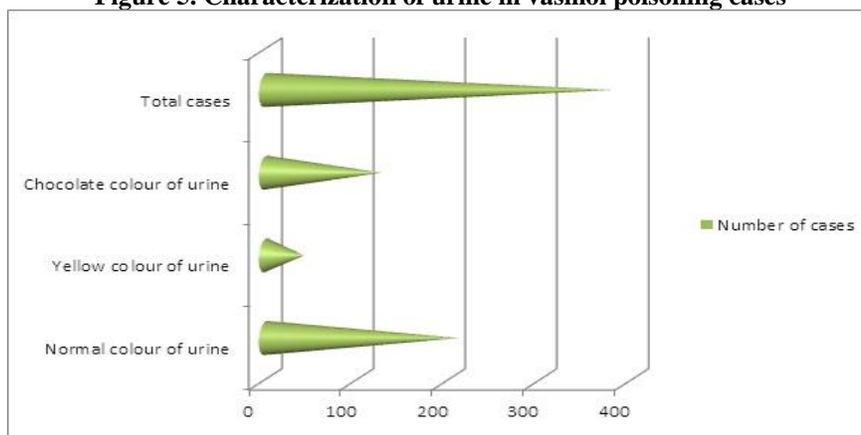


Figure 5. Characterization of urine in vasmol poisoning cases



RESULTS AND DISCUSSION

A total number of 380 vasmol poisoning cases have been collected in the departments of General Medicine and Emergency (ICU). Out of 380 Vasmol poisoning cases, 256 (67.36%) were women and 124 (32.63%) were men. All of them had taken the poison intentionally. Results were shown in table-1. Out of 380 cases, 168(44.21%) cases were found between the age group of 11-20 years, 120 (31.57%) were in between 21-30 years, 42 (11.05%) were in between 31-40 years, 29 (7.63%) were in between 41-50, 18 (4.73%) were in between 51-60 years and 3 (0.78%) were above 61 years, results were shown in table-2. Out of 380 cases, 347 (91.31%) patients were illiterates, and remaining were literates (8.68%). Majority of them were coolies (195) and farmers (78). Results were represented in table-3. Table-4 shows month wise distribution of cases. Out of 380 cases majority of cases were observed in the month of November 74 (19.47%) followed by February 72 (18.94%), January 69 (18.15%), December 65 (17.10%), September 56 (14.73%) and October 44 (11.57%). Majority of the patients 171 (45%) consumed poison because of their family problems, 162 (42.63%) due to financial difficulties, 26 (6.84%) due to psychiatry problems and 21 (5.52%) were due to other reasons like health problems, to threat their family members and few were unexplainable problems. Results were shown in table-5. Categorization of patients based on quantity of vasmol poison consumed was

done. Out of 380 cases, 277 (72.89%) consumed < 50 ml of Vasmol hair dye, 51 (13.42%) consumed 50-100 ml, 23 (6.05%) consumed 100-150 ml and 29 (7.63%) consumed above 150ml. Results were represented in figure-1. Out of 380 cases, 258 (67.89%) were recovered with the supportive therapy given by the hospital and discharged. 14 (3.68%) were died and 83 (21.84%) were referred to higher institution for better treatment, 12 (3.15%) cases were absconded and 13 (3.42%) were discharged by request. Results were represented in figure-2. The death rate was found to be 1:27 i.e. out of every 27 cases 1 death was observed. Out of 380 Vasmol poisoning cases, 55 were undergone tracheostomy. And all 55 patients were found to be taken more than 150 ml or in the range of 100-150 ml vasmol poison (figure-3). Out of 14 deaths, 8 were due to cardio-respiratory failure, 3 were due to Myocarditis, 1 due to cardiac arrest, and 2 were due to acute renal failure (figure-4). Out of 380 cases the important clinical features (table-6) was edema in Cervico-facial region observed in 284 (74.73%) cases, followed by myalgia 87 (22.89%) cases, stridor 75 (19.73%) cases, gastrointestinal disturbances 103 (27.10%), head numbness 53 (13.94%), and seizures 16 (4.21%). Out of 380 cases, Rhabdomyolysis was observed in 127 (33.42%) cases, the severity elucidated with chocolate brown colour of urine, 42 (11.05%) patient’s urine was found to be yellow colour

and 211 (55.52%) patients had normal urine colour (figure-5). Renal function was also evaluated in all 380 cases with serum creatinine and blood urea nitrogen. The mean of serum creatinine in the range of 0.5-2.6 mg/dl was found to be 1.58 mg/dl and the mean of blood urea nitrogen in the range of 2.10-57.0 mg/dl was found to be 28.68 mg/dl (table-7). Para-phenylenediamine (PPD) 4 % and resorcinol are the major ingredients contained in vasmol. PPD intoxication is most harmful than resorcinol, which is the reason for most of the complications in Vasmol poisoning. Generally Para-phenylenediamine has moderate acute toxicity by the oral route and low toxicity by the dermal route, in our study entire poisoning was by ingestion. It is worth mentioning that the amount of PPD that can cause systemic poisoning is only three grams, while the lethal dose is 7-10 grams. In this study the consumed concentration was found to be around 4 grams. The main toxicities of this compound include severe edema of the face and neck frequently requiring emergency tracheostomy. This is followed by Rhabdomyolysis and acute renal failure (ARF), culminating in death if not treated aggressively. Treatment is mainly supportive depending on clinical features at presentation. Tracheostomy is a life saving measure for an obstructed airway, and some patients may need endotracheal intubation. Antihistamines and steroids are commonly used because of the possibility of a hypersensitivity reaction to Vasmol poisoning but there is no evidence to support this mode of treatment. There is no specific antidote availability, and the trials of Vasmol poison removal using haemoperfusion and haemodialysis had variable results, even though, dialysis is an effective supportive measure in case of oliguria.

CONCLUSION

Super Vasmol poisoning is becoming a serious

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social issue which is to be addressed immediately. Vasmol hair dye ingestion is a life threatening condition. Early recognition, prompt referral, and supportive therapy in collaboration with different specialties are the factors on which clinical outcomes depend. Even though the label of Super Vasmol 33 is showing that Para-phenylenediamine (PPD) concentration is not exceeding 4%, but the exact concentration has not been mentioned. The PPD at various concentration i.e., 0.3 – 7% can be fatal to the humans if consumed orally. The other toxic component of the hair dye was resorcinol, which is a corrosive and also causes renal toxicity. The present study highlights the major toxicities of hair dye and also the importance of a detailed review of the toxicology of all components of any ingested substance. This study showed that Vasmol hair dye poisoning mortality had 4%. Deaths occurred by the following reasons, they are: Cardio respiratory failure, Myocarditis, Acute renal failure and cardiac arrest. The poisoning of PPD was not more common in this region during past few years. Organo Phosphorous (OP) poisoning cases were more common but due to the strict control of sale of OP, poisoning of hair dye (PPD) has become common in recent days. The measured supervision over dealing of hair dye is necessary to stop super Vasmol poisoning. This has to be reported to the concerned poisoning control experts to make sure about the concentration of PPD in Super Vasmol 33. This will help in introducing appropriate treatment approaches. We recommend that the selling of Vasmol hair dye containing PPD should be controlled and public education programme should be initiated in this regard, so that mortality from Vasmol poisoning may be prevented, because availability of Vasmol hair dye containing PPD in home causes easy availability of this poison. Awareness must be created in public for not to do such actions which put their lives in risk.

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