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Research Article

Emerging Problem Evaluation of Hypocalcemia in Super Vasmol Hair Dye Poisoning Patients: Clinical Study in RIMS, Kadapa

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Abstract

Introduction: One of the most frequent method of suicide attempt in India is intentional super vasmol poisoning. If it is untreated, it leads to many complications such as, rhabdomyolysis, angioedema, acute kidney injury, and hypocalcemia. Of all above mentioned; hypocalcemia can cause pathologies of the neuromuscular, cardiovascular, and respiratory systems. Early detection and treatment of the issue can reduce the diseases and fatalities that are related to it.

Aim: This study aims to assess the incidence, clinical manifestations, and management of hypocalcemia in super vasmol poisoning patients.

Methods: A prospective observational study was undertaken on 50 super vasmol poisoning patients for about six months at the government general hospital, RIMS, Kadapa from November 2021 to April 2022. Only subjects who are willing to give their consent were included in the study. All trial participants were observed for the duration of their hospital stay to evaluate hypocalcemia.

Results: Out of the 50 subjects, 22 (44%) were male, 28 (56%) were female, and the majority (40%) were in between the age group of 21 to 30 years. 15 patients (30%) out of the 50 subjects were developed with hypocalcemia, particularly those who consumed more than 50 ml of super vasmol. We observed that 66.5% of subjects received parenteral calcium gluconate while 33.5% subjects received oral calcium carbonate.

Conclusion: Hypocalcemia is a hidden complication of super vasmol poisoning, and there is a need to raise awareness among the among medical professionals about the necessity of routinely checking serum calcium levels as well as public regarding the dangers of super vasmol.

Keywords: Super vasmol, Toxicity, Hypocalcemia, Hospitalization, Counselling.

INTRODUCTION:

Poisoning is the better choice for suicide.[1] Hair dye is extremely economical and extensively available, making it an enticing option for suicidal ideation.[2] Super vasmol is a marketable emulsion-based hair dye that is commonly used to enhance the colour of hair. It has emerged as a major cause of suicidal ideation.[3] Paraphenylene diamine (PPD), resorcinol, propylene glycol, liquid paraffin, cetostearyl alcohol, sodium lauryl sulphate, sodium EDTA, herbal extracts, fragrances, preservatives, and water are the active components in super vasmol.[4] Cervico-facial edema, angioedema, neck swelling, throat swelling, tongue swelling, dark urine, oliguria, stridor, hypotension, tachycardia, chest pain, dysphagia, dyspnea and burning sensation in the throat are all clinical manifestations of super vasmol poisoning.[5,6,7] There are a number of complications, including rhabdomyolysis, acute tubular necrosis, angioedema, hypocalcemia, myocarditis, metabolic acidosis, and arrhythmias.[8,9] The typical chocolate brown coloured urine could be confirmative proof for hair dye poisoning.

Hypocalcemia is an electrolyte abnormality that can range from asymptomatic to life-threatening. The normal range for serum calcium is 8.8-10.2 mg/dl or 2.20 to 2.55 mmol/lit.[10] Hypocalcemia is caused by active ingredients such as PPD and sodium EDTA of vasmol.[11] PPD cause muscle cell destruction (Rhabdomyolysis) thereby, inorganic and organic components are dissolved and large amount of inorganic phosphorus is released into the plasma leading to hyperphosphatemia. It causes deposition of calcium phosphate on the destroying muscle and other tissues resulting hypocalcemia and also it occurs due to EDTA by complex formation.[12] Clinical manifestations of hypocalcemia include Chvostek's sign, Trousseau's sign, Atopic eczema, Exfoliative dermatitis, muscle cramps, paraesthesia's, laryngospasm, poor memory, psychosis, wheezing, disorientation, dyspnoea, and cardiomyopathy.[13] Prolonged hypocalcemia can result in seizures, QT interval prolongation with arrhythmias, respiratory arrest, neuromuscular tetany, and Parkinson's disease.[14] Acute hypocalcemia (serum calcium levels below 1.9 mmol/lit) management includes Intravenous calcium gluconate is administered via central venous catheter at a dose of 2-10 mL diluted in 50-100 mL of 5% dextrose and infused over 5 to 10 minutes. Phosphate and bicarbonate should be given with calcium to prevent calcium salt precipitation. If necessary, oral calcium and citrate can also be administered.

Calcium, vitamin D, and its metabolites are crucial in chronic conditions. A starting dose of elemental calcium 500-1000 mg is recommended, followed by a titration to 1 to 2 gm. Early detection of serum calcium levels, regardless of hypocalcemic clinical presentation, as well as continuous monitoring of super vasmol poisoning are crucial for minimising its complications. We attempted to assess the number of hypocalcemic patients, their clinical presentations, and the treatment provided in this study.

RESEARCH METHODOLOGY

Design of the study: A prospective observational study was conducted among Super vasmol recruited patients admitted to the emergency department at the Government General Hospital, RIMS, Kadapa, between November 2021 and April 2022.

Study population: All patients willing to participate in the study and provide consent, were included. Super Vasmol poisoned patients who were discharged or be referred or left the hospital within 48 hours of admission were excluded.

Ethical statement: The institutional review board (IRB) at GGH gave ethical approval and clearance for this study, and the hospital was permitted to collect data. Before taking part in the study, all patients gave written permission, and all information about the patients was kept confidential.

Sample size: Sample size was 50 patients.

Data collection: The data collection form was created based on the study's requirements. It includes the patient's demographics, such as age, gender, time of poisoning and admission, amount of poison, clinical features, complications, and management. Data of the patient were collected from case sheets and also from the responsible person in each family via a direct interview with a questionnaire.

Data analysis: The information gathered about the subject was entered. The data was analyzed by using M.S. Excel.

RESULTS:

During the study period 150 poisoning cases were observed. Among them 50 were found to be poisoned with vasmol. We have categorized the study subjects with respect to their age, and gender. Out of 50 subjects, 30 (60%) subjects were aged between 21-30 years and the detailed distribution was represented in Table 1. Out of 50 subjects 22 (44%) were males and 28 (56%) were females, results were represented in Figure 1.

Table 1: Distribution of subjects based on age

Age Group (Years)	Number of subjects (N=50)	Percentage (%)
11-20	8	16%
21-30	30	60%
31-40	5	10%
41-50	5	10%
51-60	1	2%
61-70	0	0%
71-80	0	0%
81-90	1	2%
Average	**28.3**	
Standard deviation	**12.3590**	

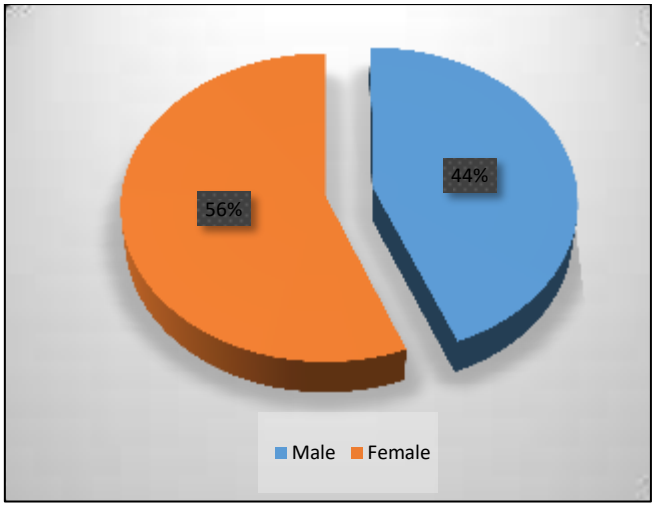

Figure 1: Percentage distribution of subjects based on gender

We categorized the subjects according to the various reasons for intentional poisoning. The majority of subjects consuming vasmol were due to family problems with 58%, with economic problems 10 %, with psychiatry problems 8 % and with other problems 12 %. All the details were represented in Figure 2.

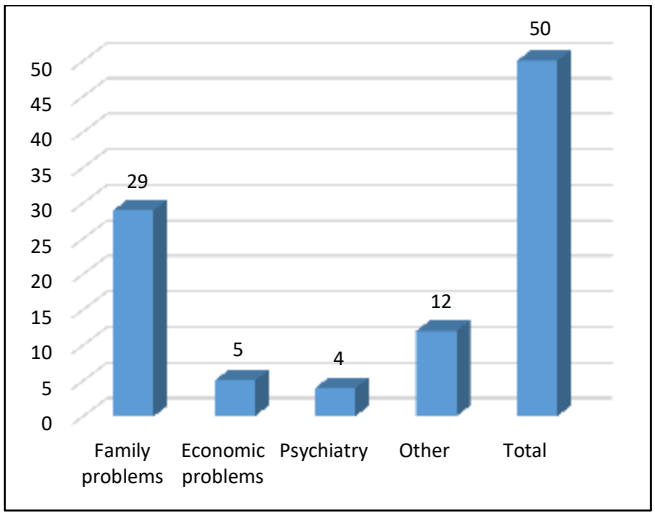

Figure 2: Distribution of subjects based on various reasons

Out of 50 subjects, majority of subjects 38 (76%), were consumed 25 to 50 ml of vasmol, represented in Table 2. We have also categorized the signs and symptoms of super vasmol poisoning. In a total of 77 clinical signs, brown coloured urine was observed in 23 (30%), sublingual swelling was observed in 7 (10%), throat pain was observed in 4 (5%), tongue swelling, neck swelling and oliguria was observed in 5 (6.5%); 13 (16.5%) were asymptomatic. The detailed results were represented in Table 3.

Table 2: Amount of vasmol consumed

Vasmol consumed	Number of subjects (N=50)	Percentage (%)
<25 ml	3	6%
25-50 ml	38	76%
>50 ml	9	18%
Total	**50**	**100%**

Table 3: Clinical manifestations of super vasmol poisoning

Clinical manifestations	Number of symptoms (N=77)	Percentage (%)
Normal	13	16.5%
Sublingual swelling	7	10%
Submandibular swelling	2	2.5%
Tongue swelling	5	6.5%
Neck swelling	5	6.5%
Throat swelling	4	5%
Throat pain	6	8%
Oliguria	5	6.5%
Myalgia	4	5%
Brown colour urine	23	30%
Burning sensation	3	4%

We categorized the subjects according to the treatment procedures of super vasmol poisoning. All the study subjects (50, 100%) were received intensive care, 11 subjects have received Forced Alkaline Diuresis, 9 subjects received gastric lavage; results were represented in Table 4. We categorized the subjects according to the length of hospital stay. Out of 50 subjects, majority of subjects i.e., 38 (76%) were in between 4-8 days, 9 (18%) subjects had < 4 days of hospitalization and 3 (6%) patients had > 8 days of hospitalization, represented in Figure 3.

Table 4: Treatment procedures of super vasmol poisoning

Treatment procedures	No. of subjects (N=50)	Percentage (%)
Gut decontamination	4	8%
Gastric lavage	9	18%
ICU (Intensive Care Unit)	50	100%
Tracheostomy	3	6%
FAD (Forced Alkaline Diuresis)	11	22%
Haemodialysis	0	0%
Disability	0	0%
Death	0	0%

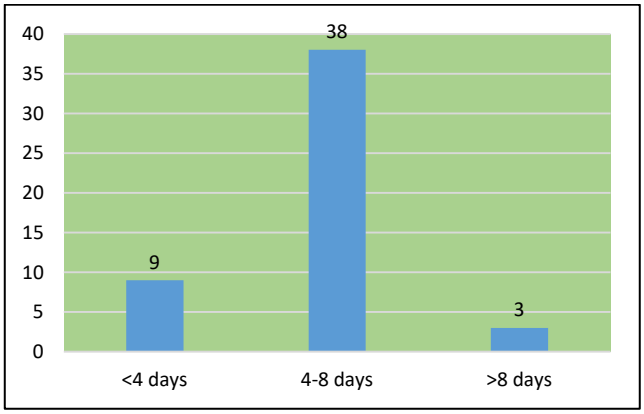

Figure 3: Length of hospital stay

We have assessed the complications of super vasmol poisoning. Out of 50 subjects, 15 (30%) subjects developed hypocalcemia, 11 (22%) subjects developed angioedema, 3 (4%) subjects developed AKI, 4 (8%) subjects developed rhabdomyolysis. Complete results were represented in Figure 4. We categorized the subjects based on serum calcium levels. In a total of 15 hypocalcemia subjects, serum calcium was done and values were represented in Table 5. We categorized the subjects according to the management of hypocalcemia. Among 15 hypocalcemia subjects, 10 (66.5%) subjects were prescribed with parenteral calcium gluconate and 5 (33.5%) were prescribed with oral calcium carbonate; results were represented in the following Figure 5.

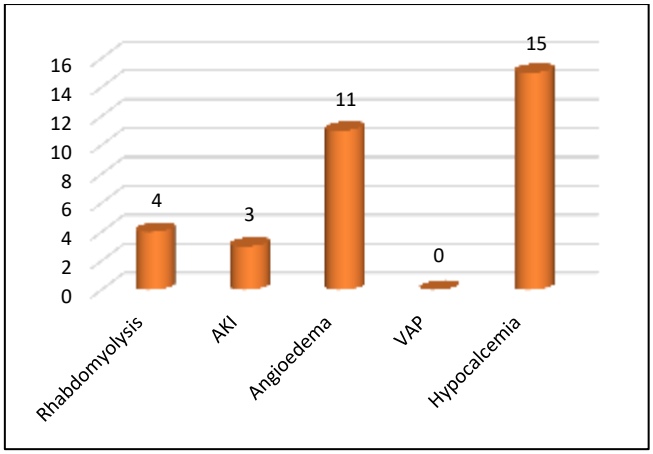

Figure 4: Complications of super vasmol poisoning

Table 5: Calcium levels in hypocalcemia

Patient IP Number	Serum Calcium levels (mg/dl)
3972	8.2mg/dl
6149	6.9mg/dl
3762	6.9mg/dl
42819	8.6mg/dl
3622	6.9mg/dl
46300	8.9mg/dl
708	8.1mg/dl
5633	8.6mg/dl
438609	8.2mg/dl
46917	8.1mg/dl
8934	8.9mg/dl
7410	7.3mg/dl
12898	6.9mg/dl
3841	7.1mg/dl
76902	7.4mg/dl
8142	7.3 mg/dl
67609	6.5 mg/dl

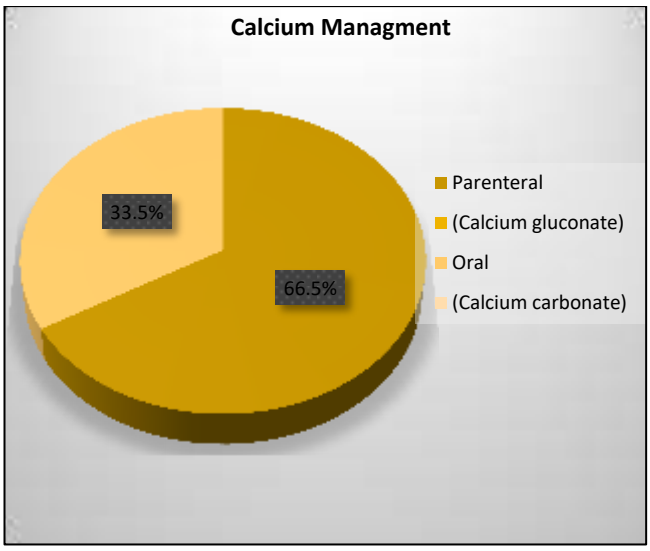

Figure 5: Management of Hypocalcemia

DISCUSSION:

Poisoning is one of the common modes of suicide in India; majorly super vasmol poisoning is common in particular region due to easy availability and low cost. Age and gender places an important role in the behaviour of some human beings. Teenagers and young adults were tending to take emotional decisions especially in the female population. Suicide is one of the emotional decision and poisoning is one the way of attempting suicide.

According to our study, females were more predominant than males in consuming super vasmol poison. In addition, it was proved that majority (15 patients, 30%) of the super vasmol study subjects were suffering from hypocalcemia, in which (6 patients, 40%) belonged to 21- 30 years of age. Varun Kumar et al.,[15] study showed almost similar results.

In the current research, we have seen that higher number of subjects were present in those who consumed more than 50 ml of hair dye developed hypocalcemia. In our study, it was noted that hypocalcemia subjects were more predominant with the time gap duration of 4-6 hrs. We also observed that 66.5% of subjects received parenteral calcium gluconate while 33.5% of subjects received oral calcium carbonate.

CONCLUSION:

There is a high incidence of vasmol poisoning day by day in our region. Toxicity is based on amount of poisoning and time gap between poisoning and hospital admission. Most of the subjects who consumed vasmol were young women due to family problems. Hypocalcemia is rare finding in subjects who consumed vasmol, but it leads to life threatening condition if untreated so, treatment with calcium supplements like calcium gluconate and calcium citrate is necessary to prevent the consequences of hypocalcemia. Many of them develop severe clinical manifestations within a few hours of consumption. So, reaching the hospital promptly and timely medical help has a major impact on mortality.

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Conflicts of interest

There are no conflicts of interest.

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