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Clinical Profile and Immediate Outcome of Kerosene Poisoning in Children

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Abstract: ***Introduction:****Childhood poisoning is responsible for serious morbidity and mortality. Accidental poisoning from household materials like kerosene, pesticides and drugs is most commonly encountered in pediatric practice. Kerosene poisoning is the most common (46%) form of acute accidental poisoning occurring in children. This study was conducted to determine the clinical profile and immediate outcome of kerosene poisoning in children.*

Methodology: *This was anobservational study done in the department of pediatrics of Chattogram Medical College Hospital involving fifty children who were admitted for accidental kerosene ingestion from April to September 2008.*

Results: *Mean age of kerosene poisoning was (2.56±1.19) years among them (52%) were male. Ninety four percent children came from lower middle class family. Seventy percent patients were admitted within three hours of ingestion of kerosene. Tachycardia, tachypnea, cough and ronchi were the most common symptoms. Four percent patientspresented with cyanosis. Chest x-ray was abnormal in (38%) patient.*

Conclusion: *Kerosene is the most common hydrocarbon poisoning among poor socio-economic group. If ingested amount is small and reported early in the hospital, patient become well within 24 hours without any sequel.*

Key word: *Kerosene, Hydrocarbon, Accidental poisoning.*

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I. Introduction

A poison has been defined as a substance which when introduced into or absorbed by living organisms causes injury or death[1]. Childhood poisoning run the entire gamut from accidental ingestion in toddlers and preschool children falling prey to their own curiosity[2] .The poisonous agents used in our country are different from those of other countries because of social structure, economic status, educational level, awareness of our people and availability of poison[3]. Small children aged 9 months to 5 years are more prone to accidental poisoning because of curiosity, spontaneous activity, innocence, mouthing of objects, negativism and imitation of adults. The incidence of poisoning tends to be higher among children from lower socioeconomic class of society due to poor storage facility and parental negligence[4]. Study reports revealed that kerosene poisoning is the most common (46%) form of acute accidental poisoning occurring in childrenin many developing countries[5]. Kerosene ingestion occurs mainly during summer because it is available in most of the housesas cooking fuel and for lighting. Kerosene is normally kept in fruit and soda bottles which makes it attractive for children[6]. Kerosene is a hydrocarbon that affects mainly the respiratory system, central nervous system and also a gastrointestinal irritant[7]. Respiratory symptoms (gasping, choking, grunting, coughing and intercostal retractions) are the earliest signs of kerosene ingestion and pulmonary pathology is the most serious complication[8,9,10]. Kerosene poorly absorbed from the gastrointestinal tract and therefore are not expected to produce systemic effects[7,11,12,13,14].The viscosity of kerosene is lower (<60SSU)[15], so kerosene ingestion has higher chance of aspiration.Respiratory symptoms generally begin in the first few hours of exposure and usually

resolve in 2-8 days[16]. Besides pulmonary complications there may be central nervous system depression, tachycardia, dysrhythmia, autonomic dysfunction and skin eruptions[17]. Significant pneumonitis occur in (<2%) of all hydrocarbon ingestion[18]. Lung radiograph changes usually take place within 2-8 hours peaking in 48 to 72 hours. Treatment is generally supportive with oxygen, fluids and ventilation support as necessary[18].Around 100-120 pediatric patients with accidental kerosene ingestion are admitted annually in Chattogram Medical College Hospital(CMCH), so this study was conducted to see the clinical profile and immediate outcome of kerosene poisoning in children.

II. Methodology

This is a hospital based observational study conducted in the department of Pediatrics of CMCH from April to October 2008. This study involved 50 children of both sex aged 1-12 years who were previously healthy and admitted due to accidental kerosene ingestion. Children previously treated in or referred from other hospital, treated in outpatient department of CMCH, came after 24 hours of poisoning and having congenital heart disease (CHD), bronchial asthma or any other chronic disease were excluded. Kerosene ingestion was confirmed by kerosene smell in breath in the admitted patients. After immediate management detail history related to age, sex, socioeconomic status, cause of poisoning, time and amount of ingestion, treatment prior to hospitalization, problems arose after ingestion were documented. All patients underwent complete general and systemic examination and chest x-ray was done 6 hours after ingestion. Patients were followed up regularly according to pre-structured questionnaire. Written informed consent and ethical approval was taken from the appropriate authority. Data was analyzed in SPSS version 14.

III. Results

Among the study population minimum age was 1 year and maximum 5year,mean age was (2.56±1.19) year. Only 2(4%) patents were more than 5 year old. Male children were 26(52%) and female 24(48%), male: female was 1.08. Children from Muslim communityand low middle class family were affected most, 41(82%) & 47(94%) respectively. Poisoning was first noticed by mother in 38(76%) cases and the rest 4(8%) cases were identified by other relatives or neighbor. Kerosene poisoning mostly occurred during summer (May-June). Thirty five(70%) studied children reached hospital within three hours of ingestion. Apart from kerosene smell 50(100%) in breath;ronchi 34(68%), tachycardia 30(60%), tachypnoea 29(58%) followed by cough 28(56%) were the most common presenting features of kerosene poisoning. Two (4%) patients presented with cyanosis. Chest indrawing, intercostal and suprasternal recession and nasal flaring werepresent in 1(2%) cases[**Table-1**].Amount of kerosene ingestion was estimated by history from mother/informant in teaspoon of kerosene; accordingly maximum amount of kerosene ingestion was 15 ml & minimum amount was 1 ml. In[**Table-2**] only 2(4%) patients had cough and crepitation on auscultation during discharge and none of the patient had cyanosis, chest indrawing, nasal flaring or suprasternal recession.**Table-4**depicted that 41(82%) patients left the hospital after 24 hours of admission. Only 2(4%) patients stayed in the hospital for 3-5 days between whom one developed secondary bronchopneumonia and one arrived in the hospital after 12 hours of ingestion. There was no mortality.In [**Figure-1**] 19(38%) patient had abnormal chest x-ray in the form of unilateral or bilateral patchy opacities. None of the patient had pleural effusion.

Table-1: Clinical profile of the study population(n=50)
Data are presented as number (%)

Clinical profile	
Age	
1- 2 yrs	19(38%)
2 – 3 yrs	18(36%)
3 – 4 yrs	8(16%)
4 –5 yrs	3(6%)
> 5 yrs	2(4%)
Sex	
Male	26(52%)
Female	24(48%)
Religious community	
Muslim	41(82%)
Hindu	9(18%)
Social status	
Lower middle class	47(94%)
Middle class	3(6%)
Poisoning identified by	
Mother	38(76%)
Father	8(16%)
Others	4(8%)

Peak season of poisoning	
Summer(May-June)	28 (56%)
Time elapsed from ingestion to hospitalization	
Within 3 hours of ingestion	35 (70%)
Clinical presentation	
Kerosene smell in breath	50(100%)
Cough	28(56%)
Cyanosis	2(4%)
Restlessness	8(16%)
Vomiting	13(26%)
Tachycardia	30(60%)
Tachypnoea	29(58%)
Grunting	2(4%)
Nasal Flaring	1(2%)
Chest indrawing	1(2%)
Intercostal recession	1(2%)
Suprasternal recession	1(2%)
Ronchi	34(68%)
Crepitation	24(48)

Table-2: Comparison of clinical parameters on admission and during discharge(n=50)

Data are presented as number(%)

Clinical presentation	
Cough	
On admission	28 (56%)
During discharge	2(4%)
Cyanosis	
On admission	2(4%)
During discharge	0(0%)
Restlessness	
On admission	8 (16%)
During discharge	0(0%)
Vomiting	
On admission	13(26%)
During discharge	0(0%)
Tachycardia	
On admission	30 (60%)
During discharge	3(6%)
Tachypnoea	
On admission	29(58%)
During discharge	4(8%)
Grunting	
On admission	2 (4%)
During discharge	0(0%)
Nasal Flaring	
On admission	1 (2%)
During discharge	0(0%)
Chest indrawing	
On admission	1 (2%)
During discharge	0(0%)
Intercostal recession	
On admission	1 (2%)
During discharge	0(0%)
Suprasternal recession	
On admission	1(2%)
During discharge	0(0%)
Ronchi	
On admission	34(68%)
During discharge	0(0%)
Crepitation	
On admission	24 (48%)
During discharge	2(4%)

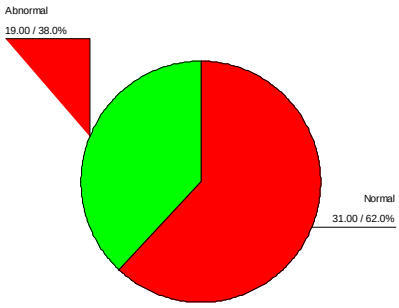
Table-3: Comparison of vital signs before and after treatment of kerosene poisoning.

Vitals	Minimum	Maximum	Mean
Pulse(Per minute)			
On admission	100.00	122.00	108.12
During discharge	80.00	102.00	88.12
Respiration(Breath/minute)			
On admission	29.00	62.00	45.92
During discharge	28.00	46.00	38.34
Temperature(°F)			
On admission	99	103	100.30
During discharge	99	100	99.08

Table-4: Duration of hospital stay in the study population(n =50)

Hospital Stay(Day)	Patient Number(%)	Minimum	Maximum	Mean
1	41 (82%)	1	5	1.084
2	7 (14%)			
3-5	2 (4%)			

Figure-1: X-ray findings of the study population



IV. Discussion

This was an observational study carried out involving fifty children to see the clinical profile and immediate outcome of kerosene poisoning. All the casesin this survey were accidental poisoning which was similar to the study conducted by Kohli et al. in India[18] which revealedthat almost all (96.9%) cases of kerosene poisoning were accidental. Kerosene poisoning was more in male children 26(52%) among the study subjects and ninety percent were in the age group of 2 to <5 years, which corresponds to the study by Rashid MM et al[19]in whichthe most prevailed age group was 1-3 years. In the study conducted by Mamun et al[20], kerosene poisoning was most common (17.09%) during summer. NagiNA[21] showed in a study that (94%) patient came from lower socio-economic group where kerosene is used widely and proper storage, care and supervision of children is minimum. These findings were almost similar to our study. Respiratory sign-symptoms like cough (56%), ronchi (68%) and crepitation (48%) were the most common presentation. Baldachin et al[22] found similar incidence of respiratory symptoms in kerosene poisoning in children. Tachycardia was found in (60%) cases and tachypnoea was found in (58%) cases. LifshitzM[23] found tachycardia in (73.7%) cases and tacypnoea in (68.7%) cases which is comparable to our study. Gastroenterological finding like vomiting was found in (26%) patients. LifshitzM[23] found vomiting in (51%) cases. Amount of ingestion and associated pneumonia might influence this difference. Among the CNS complications restlessness was found in (20%) patients but no patient developed convulsion or coma. LifshitzM[23]showed that one third of his study population developed CNS manifestations which was similar to this study. In our study (62%) patients had abnormalities in chest x-ray. Baldachin et al[22] found (87%) radiological abnormalities. Patients admitted due to kerosene poisoning was treated conservatively with supportive care and discharged within 24 hours of hospitalization. Only one patient who developed secondary bronchopneumonia required antibiotic without any gross respiratory, CNS or other complications.

V. Conclusion and Recommendation

Kerosene poisoning is common during summer and in the poor socio-economic group and the most common presentation is respiratory symptoms. If patient is hospitalized earlier almost all the cases can be treated and cured by supportive management without any sequel. Parents should be educated regarding kerosene storage out of reach of the children and in a designated container above ground level.

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