Paraffin poisoning in children: What can we do differently?

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Abstract

Background: The purpose of this study was to describe the occurrence, health cost and management of paraffin poisoning in a rural South African hospital.

Methods: A retrospective study was undertaken of 145 children admitted with a diagnosis of paraffin poisoning at Philadelphia Hospital, Mpumalanga from January 2000 to June 2001. A pre-tested form was used to collect data from the admission files. Where applicable, the Chi-square test or t-test was used to determine statistical significance.

Results: Children younger than five years of age were affected significantly more than those older than five years of age (91% vs. 9%, p<0.001), and boys were affected more than girls (58% vs. 42%, p=0.034). The average length of stay and cost of treatment were 2.5±2 days and R617.24 respectively. Prophylactic antibiotics were prescribed in 86% of cases (125/145) and the average number of medications prescribed per child was 3.5±1.8.

Conclusions: Although no mortality was reported, paraffin poisoning contributed substantially to the morbidity of, health expenditure for and antibiotic overuse in these children. Provision of child-resistant paraffin container caps, retraining of doctors on appropriate antibiotic use and community education are necessary and crucial in reducing the occurrence of paraffin poisoning in children.

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Introduction

Paediatric poisoning continues to be a cause for the admission of children to hospital throughout the world, although it is associated with low morbidity and mortality.[1,2,3,4,5,6] In South Africa, Reed and Conradie reported that children younger than five years of age admitted with the diagnosis of paraffin poisoning represented 9.1% of total ward admissions for this age group at Shongwe Hospital.[7]

The aim of this study was to describe the occurrence, cost and management of paraffin poisoning in a rural South African hospital.

Methods

A retrospective study was undertaken of all children admitted at Philadelphia Hospital, Mpumalanga with the diagnosis of paraffin poisoning from January 2000 to June 2001. Data were collected from the 145 medical records of children under the age of 12 years using a pre-tested data collection form. The data collected included demographic characteristics, length of stay in the hospital, medicines prescribed and treatment outcomes. The cost per patient was calculated as the product of the length of stay and the daily fee for the paediatric ward.[8] The three drug use indicators were determined using the average number of drugs prescribed per patient, the percentage of patients for whom an antibiotic was prescribed, and the percentage of patients who were prescribed an injection.[9] Where applicable, the Chi-square test or t-test was used to determine statistical significance.[10]

Results

Children younger than five years of age were affected significantly more than those older than five years of age (91% vs. 9%; p<0.001), and boys were affected more than girls (58% vs. 42%; p=0.034) (See Figure 1). The male to female ratio was 1.45:1. The average length of stay was 2.5±2 days and the total length of stay was 366 days. The average treatment cost per patient was R617.24 and the approximate total cost was R89 500.00. The average number of medicines prescribed per child was 3.5±1.8 and the percentage of patients prescribed an antibiotic or an injection were 86% and 17% respectively. Table I shows

Figure 1: Paraffin poisoning in children by age Group and gender (n=145)

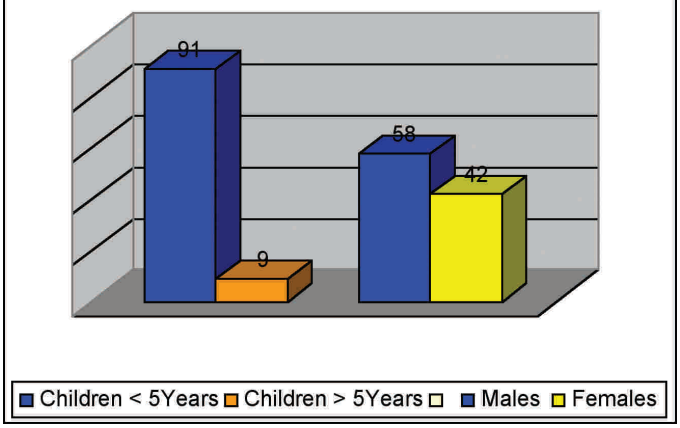

Table I: Antibiotics prescribed (n = 145)

	Frequency	Percentage (%)
Amoxicilin syrup	110	76
Cefuroxime injection	15	10
Cloxacillin injection	10	7
Cotrimoxazole suspension	3	2
Erythromycin syrup	12	8

the frequency of antibiotic prescriptions in these patients, with amoxicillin being the most prescribed antibiotic. The case fatality rate was zero.

Discussion

The findings of this study show that paraffin poisoning in children occurs more frequently in those younger than five years, with a male to female ratio of occurrence of 1.45:1. This age and gender distribution pattern is consistent with previous studies by other investigators.[11,12,13,14,15,16] Possible reasons for these observations include the exploratory nature of young children and the improper storage of paraffin in the household. Paraffin remains the leading toxic agent in paediatric poisoning because it is widely available and used by more than half of the South African population as a source of energy for cooking, lighting and heating.[17,18] The mean length of stay was 2.5 days and is similar to that found in the study by Ho and colleagues in Singapore.[19] This suggests that these poisonings were of such a low severity that they could have been managed as ambulatory cases and points to the need for clear clinical criteria for the admission of these children.[20,21]

Regarding the drug use indicators, the average number of drugs prescribed was 3.5±1.8, which was higher than but not statistically significant when compared with the provincial average of 2.5 drugs, suggesting that, in general, there was no polypharmacy in the management of paraffin poisoning in this study.[22] The number of children who had antibiotics prescribed to them, namely 125/145 (86%), was disturbing . This percentage is higher than the average of 40.5% antibiotic use reported during a provincial survey, suggesting that antibiotics, especially amoxicillin, were overused in these children. The main reason for the use of antibiotics in these patients was to prevent secondary respiratory infections.[23] Simmank and colleagues reported that secondary infections due to paraffin ingestion are uncommon.[24] This is supported by Reed and Conradie, who recommend that antibiotics should not be routinely used in the management of paraffin poisoning.[7]

The treatment of paraffin poisoning in children by using antibiotics in 86% of the cases reported in these studies, including the provincial survey, is a cause for concern because of possible increasing antibiotic resistance.[25,26] The percentage of children prescribed an injection was 17%. This percentage is lower than the 21.1% injection use reported during the same provincial survey, indicating that injections were not overused in this study. No deaths were reported in this study. A substantial proportion of paediatric poisoning does not result in clinical toxicity because paediatric poisoning is primarily accidental. In the majority of cases, therefore, the doses of toxic agents ingested are not high enough to lead to fatalities.[27]

Conclusions

Paraffin poisoning at Philadelphia Hospital affected mainly boys, contributed substantially to the morbidity of children below the age of five years and to health expenditure, and resulted in the overuse of antibiotics, especially amoxicillin. The provision of child-resistant paraffin container caps, the retraining of doctors in appropriate and rational antibiotic use, and community education are necessary to reduce the occurrence of paraffin poisoning in children.

References

1. Litoviz TL, Baily KM, Schmitz BF, Holm KC, Klein-Schwartz W. 1990 Annual Report of the American Association of Poison Control Centers' Data Collection System. *Am J Emerg Med* 1991;9:461-509.
2. Lawson GR, Graft AW, Jackson RH. Changing pattern of poisoning in Newcastle, 1974-1981. *BMJ* 1983;287: 15-7.
3. Dawod ST, Genelin RS, Asfoura EG. Accidental poisoning of children in Qatar. *Ann Saudi Med* 1989;9:243-6.
4. Al Hifze IS, Kuman P, Talol W. Hospitalization due to acute poisoning in children: Tabouk Experience. *J Fam Comm Med* 1995;2:27-30.
5. Mahdi AH, Taha SA, Al-Rifai MR. Epidemiology of accidental home poisoning in Riyadh (Saudi Arabia). *J Epidemiol Community Health* 1983;37:291-5.
6. Khalil AHA. Accidental poisoning in Saudi

children seen at Riyadh Al-Kharj Military Hospitals. *Saudi Med J* 1986;7:613-7.
7. Reed RP, Conradie FM. The epidemiology and clinical features of paraffin poisoning in rural African children. *Ann Trop Paediatr* 1997;17(1):49-55.
8. Mpumalanga Provincial Government. Hospital fees manual. Nelspruit: Department of Health and Welfare; 1998.
9. WHO. Guidelines to study drug use in health facilities. Geneva: World Health Organisation; 1993.
10. Armitage P, Berry G. Statistical methods in medical research. 2nd ed. Oxford: Blackwell Scientific Publications; 1994.
11. Korb FA, Young MH. The epidemiology of accidental poisoning in children. *S Afr Med J* 1985; 68(4):225-8.
12. Ellis JB, Krug A, Robertson J, Hay IT, MacIntyre U. Paraffin ingestion: the problem. *S Afr Med J* 1994;84(11):727-30.
13. Dutta AK, Seth A, Goyal PK, et al. Poisoning in children: Indian scenario. *Indian J Pediatr* 1998;65(3):365-70.
14. Joubert PH. Poisoning admissions of black South Africans. *J Toxicol Clin Toxicol* 1990;28:85-94.
15. Du Plooy WJ, Jobson MR, Osuch E, Mathibe L, Tsipa P. Mortality from traditional medicine poisoning: a new perspective from analysing admissions and deaths at Ga-Rankuwa Hospital. *S Afr J Science* 2001;97:70.
16. Dudin AA, Rambaud-Cousson A, Thalji A, Jubeh II, Ahmad HM, Libdeh BA. Accidental kerosene poisoning: A three-year prospective study. *Ann Trop Paediatr* 1991;11(2):155-61.
17. South African Petroleum Industry Association (SAPIA). Second annual report August 1997. SAPIA; 1997.
18. Yach D. Paraffin poisoning: partnership the key to prevention. *S Afr Med J* 1994;84:717.
19. Ho L, Heng JT, Lou J. Accidental ingestions in childhood. *Singapore Med J* 1998;39(1):5-8.
20. Lashley PM, St John MA. A review of accidental poisoning in Barbados – a new perspective (1981-1985). *Ann Trop Paediatr* 1991;11(2):149-53.
21. Persson HE, Sjoberg GK, Haines JA, Pronczuk de Garbino J. Poisoning severity score – Grading of acute poisoning. *J Toxicol Clin Toxicol* 1998;36(3):205-13.
22. Medunsa School of Pharmacy. The problems of irrational drug use. In: Promoting Rational Drug Use Course. Pretoria; 2001: 1-28.
23. Standards treatment guidelines. Hospital level. National Department of Health: Pretoria; 1998.
24. Simmank K, Wagstaff L, Sullivan K, Filteau S and Tomkins A. Prediction of illness severity and outcome of children symptomatic following kerosene ingestion. *Ann Trop Paediatr* 1998;18(4):309-14.
25. Samore MH, Magill MK, Alder SC, Severina E et al. High rates of multiple antibiotic resistance in *Streptococcus pneumoniae* from healthy children living in isolated rural communities: association with cephalosporin use and intrafamilial transmission. *Pediatrics* 2001;108(4):856-65.
26. Gupta S, Govil YC, Misra PK, Srivastava KL. Trends in poisoning in children: experience at a large referral teaching hospital. *Natl Med J India* 1998;11(4):166-8.
27. Shou-Zheng X, Song-Ling Zhong, Shi-Xin Yang, Jin-Ling Li et al. The role of health-service units n monitoring and prevention of pesticides poisoning. In: International Development and Research Centre. Impact of pesticide use on health in developing countries. Ottawa; 1993.