Original Article

Kala Pather Poisoning and Liver Function Tests in Children

Mohammad Sarwar[1], Nighat Sultana[1], Umar Waqar[1], Fareeha Kausar[1], Anila Jamil[1] and Mohammad Asif[2]

ABSTRACT

Objective: To Study the Kala Pather Poisoning and Liver Function Tests in Children.
Study Design: Experimental study
Place and Duration of Study: This study was conducted in ICU of Children Hospital Lahore during Jan 2014 to Jan 2019.
Materials and Methods: This study was performed in ICU of Children Hospital Lahore. Fifty-two patients with Paraphenylenediamine (PPD) poisoning who came to emergency from 2014 to 2019 were included in it. History was recorded and physical examination was done. All cases were of accidental poisoning. Both males and females were included. Their age was less than 9 years. LFTs were measured. Intubation, tracheostomy and ventilators were needed for proper management.
Results: Maximum level of serum bilirubin, AST and ALT was 3 mg/dl, 760 mg/dl and 784 mg/dl respectively. All the patients showed abnormal LFTs. 77% were intubated, 42% needed tracheotomy and 65% needed ventilator. Only one child died so survival of cases was 96%. Manner of poisoning was accidental in all cases.
Conclusion: Paraphenylenediamine poisoning is fatal one. But if properly managed with tracheostomy or ventilators the mortality can be very much reduced.

Key Words: Paraphenylenediamine, poisoning, cervicofacial edema, human, hair-dye, accidental

Citation of article: Sarwar M, Sultana N, Waqar U, Kausar F, Jamil A, Asif M. Kala Pather Poisoning and Liver Function Tests in Children. Med Forum 2020;31(11): 151-154.

INTRODUCTION

Paraphenylene diamine is a chemical used to give color to the grey hairs, fascinating designs on palms and soles and also used to form different forms of tattoos[1]. PPD is supplied in the market both in grounded and ungrounded form. The products made to color the grey hairs contain PPD. In Pakistan, India and some countries in Africa its mixture with henna is also used. As henna is found in abundance naturally so it's allergic reactions are very rare. On the other hand, PPD, when oxidized produces very lethal product which causes fatal allergic reactions[2]. In Pakistan, India and African countries poisoning cases of PPD, are seen in emergencies of hospitals[3,4]. When taken by mouth, PPD produces very lethal chemicals which harm the body. This action is proportional to amount taken. 7 Gms are enough to cause life threatening damage to the body[5].

[1.] Department of Pediatric, Intensive Care Unit, Children Hospital Lahore.
[2.] Department of Forensic Medicine, Sialkot Medical College Sialkot.

Correspondence: Dr. Mohammad Sarwar, Assistant Professor Pediatric, Intensive Care Unit Children Hospital, Lahore.
Contact No: 03334220546
Email: sarwardr2003@gmail.com

Received: March, 2020
Accepted: August, 2020
Printed: November, 2020

Toxic hepatitis, myocarditis and convulsions are other manifestations[6,7]. Pure PPD is in the form of white crystals, which turns brown on exposure to air. It is produced in Germany, Japan, and the United Kingdom [8,9]. Oral ingestion of PPD can lead to the development of angioneurotic edema, or cardiotoxicity leading to fatal arrhythmias and death within the first six to 24 hours [10,11]. PPD can also cause skin irritation and allergies. Furthermore, its role as a carcinogen in animals has also been described [12,13].

Paraphenylene diamine (PPD) ingestion is manifesting as one of the more common ways of committing suicide in Southern Punjab, Pakistan, especially Bahawalpur. PPD is an ingredient of a compound commonly known "Kala Pathar" which means "Black Stone" in Urdu. Very little is known about the impact of PPD intoxication on liver tissue [6]. In a study LFTS very much deranged from normal[7].

MATERIALS AND METHODS

This was a retrospective study of 52 (32 males and 20 females) patients with history of hair dye (Kala pather) poisoning, admitted in ICU of the children hospital Lahore. This study included patients came to emergency with ingestion of hair dye, from 2014 to 2019. Both genders were included in the study regardless of the age. But children came with poisoning were less than 9 years (although age above 9 was not an exclusion criteria). All the patient was physically and mentally normal before ingestion of poison, according

to history. All these patients gave a history of accidental intake of hair dye containing Kala pather. Data regarding age, sex, time of onset of symptoms, appearance of swelling on face and neck was collected. Blood was taken to measure the serum levels of Bilirubin, ALT and AST.SPSS 25 version was used to do statistical analysis. How many patients needed Intubation, tracheostomy and ventilators was also studied.

Statistical Analysis: SPSS version 25 was used to get graphs, descriptive data and to calculate value of person correlation coefficient between age and serum bilirubin, AST and ALT.

RESULTS

Descriptive data indicated that study included 52 patients (32 males and 20 females). 62 % were males and 38 % females. Other data is given in table no 1.

Table No.1: Descriptive Data

	Minimum	Maximum	Mean	Std. Deviation
Age	2.00	8.00	4.7196	1.59007
S_Billirubin	1.10	3.00	1.8538	.52401
ALT	73.00	784.00	264.2308	169.448112
AST	147.00	760.00	431.6538	157.06532
Start_of_Symtomps	.30	1.45	.8558	.37211

Following figures indicate frequency, mean and std Dev of calculated Serum Bilirubin, ALT and AST respectively in fig no 1,2 and 3.

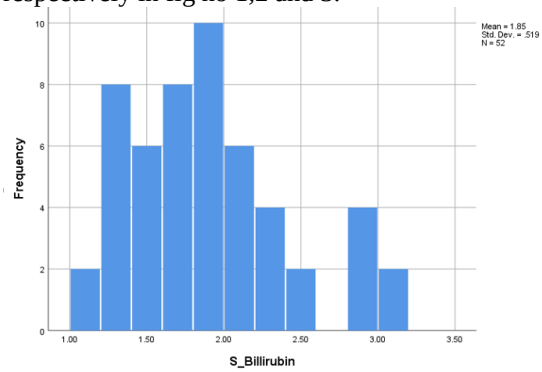

Figure No.1: Frequency distribution of S Bilirubin

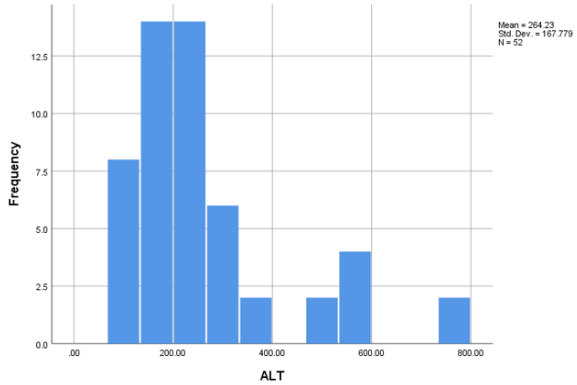

Figure No.2: Frequency distribution of ALT

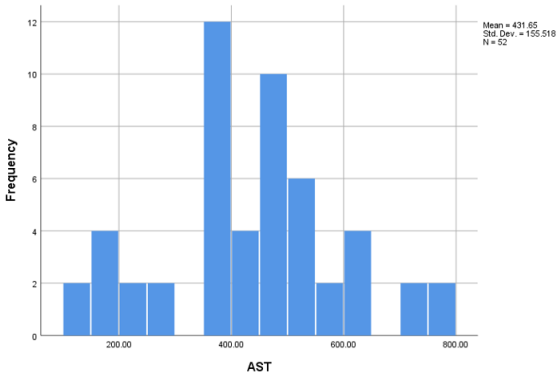

Figure No.3: Frequency distribution of AST

Table No.2: Average number of patients who needed intubation, tracheostomy and ventilator along with facial and neck swellings

	Intubation	Tracheostomy	Ventilator	Facial swelling	Neck swelling
Total no of patients	52	52	52	52	52
No of patients needed/developed	40	22	34	52	51
Average no of patients who needed/developed	77%	42%	65%	100%	96%

Table No 3: Average number of patients who needed intubation, tracheostomy and ventilator (males) along with facial and neck swellings

	Intubation	Tracheostomy	Ventilator	Facial swelling	Neck swelling
Total no of patients	32	32	32	32	32
No of patients needed/developed	26	22	26	32	32
Average no of patients who needed/ developed	82 %	69 %	81 %	100%	100%

Table No 4: Average number of patients who needed intubation, tracheostomy and ventilator (females) along with facial and neck swellings

	Intubation	Tracheostomy	Ventilator	Facial swelling	Neck swelling
Total no of patients	20	20	20	20	20
No of patients needed/developed	14	0	8	20	19
Average no of patients who needed/ developed	70 %	0 %	40 %	100%	96%

Table No 5: Pearson correlation coefficient was also calculated as depicted

	AGE	AGE
	Value of r	Value of p
S Bilirubin	0.419	0.002
AST	0.05	0.706
ALT	0.156	0.269

All cases were that of accidental poisoning. All were discharged other than one who died.

DISCUSSION

This study indicates that in children it is accidental poisoning. Most of previous studies were carried out on adult patients[1,14,15]. Time of appearance of symptoms was from half an hour to 105 minutes. Time of onset of symptoms had no correlation with values of LFTs. Age showed a weak positive statistically significant correlation with serum bilirubin value but there was no significant correlation found with AST and ALT values. Mean value of AST and ALT was 438.1 and 264.2 respectively, which is much less than a study carried out in PMC Nawabshah[8]. In that study it was 1365 and 851 respectively[12]. Some other studies showed elevated values of AST and ALT. But that study was on adults. Facial swelling was found in all cases. Neck swelling was found in all male cases and 96% female cases. In a previous study carried out in Bahawalpur it was concluded that all cases of PPD poisoning had caused elevated serum levels of ALT and AST. It also caused both facial and neck swelling[16]. In Abbotabad a study was done in which it was found that 49.2% of PPD poisoning cases needed tracheostomy and 32.3% needed ventilator. While in this study it was found that 42% needed tracheostomy and 65% needed ventilator. In that study mortality was up. Only 20% were discharged but in this study, survival was 96%. Only one death took place[16]. PPD is not only poisonous in human beings but also in other mammals[17].Mostly it is used for suicidal purposes but in this study all cases were of accidental poisoning[18].

Only serum bilirubin and age showed statistically significant and positive correlation i.e., 0.419 with p value less than 0.05. AST and ALT did not have statistically significant correlation with age with p value far greater than 0.05.

CONCLUSION

Poisoning with kala pather is very fatal until managed properly. It causes drastic effects upon liver functions. It causes swelling on face and neck. If tracheostomy is not done and ventilators are not provided mortality is very high. But in this study only one child died of poisoning and survival was upto 96%.

Author's Contribution:

Concept & Design of Study:	Mohammad Sarwar, Nighat Sultana
Drafting:	Mohammad Sarwar, Nighat Sultana, Umar Waqar
Data Analysis:	Muhammad Asif, Fareeha Kausar, Anila Jamil
Revisiting Critically:	Ghazala Shaffqat, Muhammad Asif, Ambreen Aslam
Final Approval of version:	Mohammad Sarwar, Nighat Sultana

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Khan H, Khan N, Khan N, Ahmad I, Shah F, Rahman AU, et al. Clinical presentation and outcome of patients with paraphenylenediamine (kala-pathar) poisoning 2016;14(1).
2. Krishnaswamy S, Sooraj YJ, Jo E. Trauma, Shock. Hair dye poisoning and the developing world 2009;2(2):129-31.
3. Abdelraheem M, Hamdouk M, Zijlstra EEJAJoN. Transplantation. Paraphenylenediamine (hair dye) poisoning in children 2010;3(1):39-44.
4. Sultan MO, Khan MI, Ali R, Farooque U, Hassan SA, Karimi S, et al. Paraphenylenediamine (Kala pathar) poisoning at the National Poison Control Center in Karachi: a prospective study 2020;12(5).
5. Soni S, Nagarik A, Dinaker M, Adikey G, Raman AJIjoms. Systemic toxicity of parapheny-lenediamine 2009;63(4):164-6.
6. Pathar KJAM, Khaliq SA, Malik NA. Nishtar Med J, et al. intoxication; a study at Nishtar Hospital Multan 2010;2:111-5.
7. Kondle R, Pathapati RM, Saginela SK, Malliboina S, Makineedi VPJIEM. Clinical profile and outcomes of hair dye poisoning in a teaching hospital in Nellore 2012.
8. Khuhro BA, Khaskheli MS, Shaikh AAJA, Pain, Care I. Paraphenylene diamine poisoning: our experience at PMC Hospital Nawabshah 2019; 243-6.
9. Shafiq M, Maqbool F, Iqbal A, Baqai HJJ. Kala Pathar poisoning 2015;19(1):98-9.
10. Qasim AP, Ali MA, Baig A, Moazzam MS. Emerging Trend of Self Harm by Using 'Kala Pathar'Hair Dye (Paraphenylene diamine): An Epidemiological Study. Annals of Punjab Medical College (APMC) 2016;10(1):26-30.
11. Irshad R, Tahir N, Iqbal S, Hussain T, Shafi S. Paraphenylene diamine poisoning. Platelets 127(199):187.
12. Arafa ES, Buabeid MA, Hassan W, Murtaza G, Chohan TA, Ahmed H. Protective Effects of Cocos

Nucifera Oil in Paraphenylene Diamine Toxicity. Current Pharmaceutical Biotechnol 2020.

13. Iqbal J, Hussain M, Hussain A, Ghafoor MB. paraphylene diamine/kala. Pathar poisoning; to study the demographic profile, clinical manifestations and outcome of paraphylene diamine/kala pathar poisoning at sheikh zayed hospital rahim yar khan. Professional Med J 2019; 26(5).
14. Naqvi R, Akhtar F, Farooq U, Ashraf S, Rizvi SA. From diamonds to black stone; myth to reality: Acute kidney injury with paraphenylene diamine poisoning. Nephrol 2015;20(12):887-91.
15. Ishtiaq R, Shafiq S, Imran A, Ali QM, Khan R, Tariq H, Ishtiaq D. Frequency of acute hepatitis following acute paraphenylene diamine intoxication. Cureus 2017;9(4).
16. Ansari RZ, Khosa AH, Yadain SM, Shafi S, ul Haq A, Khalil ZH. Incidence of paraphenylene-diamine poisoning in three district headquarter hospitals of Pakistan. J Ayub Medical College Abbottabad 2019;31(4):544-7.
17. Devi M. Toxicological effects of hair dye paraphenylene diamine: A threat to cosmetic world. Int J Res Anal Rev 2016;3(2):19-23.
18. Aydin GB, Kahveci K, Örnek D, Demirkapu I, Özgün G. Suicidal Ingestion of Henna Mixed With Para-Phenylenediamine: A Case Report. J Anesthe Clin Res 2011;2:158-9.