ORIGINAL ARTICLE

Examine the Frequency of Myocarditis and Associated Mortality in Patients with Paraphenylene Diamine Poisoning

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ABSTRACT

Aim: To determine the frequency of myocarditis and associated mortality in patients presented with paraphenylene diamine (PPD) ingestion.

Study Design: Prospective/observational study

Place & duration: Department of Medicine Shahida Islam Medical & Dental College Lodhran from 1st October to 31st October 2019.

Methods: One hundred adult patients of both genders presented with paraphenylene ingestion were enrolled in this study. Patients demographics including age, sex and reasons of ingestion of PPD were recorded after taking written consent from patients/attendants. Clinical presentation including sign and symptoms were recorded. Diagnosis of myocarditis was made solely on the basis of the clinical signs/symptoms suggestive of myocardial damage, electrocardiography changes, elevated cardiac biomarkers and abnormalities on trans-thoracic echocardiography. Mortality associated with myocarditis was examined.

Results: Eighty two (82%) were females while 18% were males. The mean age of patients was 27.25±7.48 years. Suicide was the most common reason of ingestion of PPD found in 94% cases. Cervico-facial edema was the commonest symptom found in 85% cases. Myocarditis was found in 21 (21%) patients. From 21 myocarditis patients 8 (38.10%) patients were died. Overall mortality rate was 28%.

Conclusion: Myocarditis is highly associated with praphenylene diamine ingestion with high rate of mortality.

Keyword: Paraphenylene diamine poisoning, Myocarditis, Mortality

INTRODUCTION

Poisoning is one of the preferred means of suicide and deliberate self harm. A common method of selfpoisoning worldwide is pesticide ingestion, that is responsible for high mortality in such cases.[1]In the developing world, rodenticides and aluminium phosphide are also commonly used poisons particularly in populations from rural areas. Other frequently used domestic poisons include dettol (chloroxylenol), bleach, acids, kerosene oil, and hair dye (paraphenylenediamine)[2]. Among these, paraphenylene-diamine (PPD), commonly known as 'Kala Pathar' (black stone) by the local population, is emerging as a major poison. Recently, a large number of cases of hair dye poisoning have been reported from Africa and South-East Asia.[3-5]Paraphenylenediamine is a skin and body dye, and is used for coloring hair, palms; and forming temporary tattoos. PPD in its raw state is available as powder as well as in rock form. PPD is a common ingredient of commercial hair dyes, and, in Asia and Africa, it is also mixed with henna to form black henna. This darkens its color and reduces the time of application. While henna is a natural product and is seldom associated with adverse effects, PPD, a coal tar derivative, on oxidation is converted into a highly toxic and allergic compound. Acute allergic reactions following absorption from skin are well described.[6] Transdermal absorption of PPD during prolonged occupational exposure has been linked to interstitial fibrosis and chronic renal failure[7].

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Myocarditis is a fatal and commonly neglected complication of paraphenylenediamine poisoning, due to lack of awareness about this complication in medical community and paucity of data in medical literature. Oral ingestion of paraphenylenediamine in doses more than 10 g, especially unbranded stone hair dyes, results in extensive myocardial damage leading to decrease in blood pressure, fatal life threatening arrhythmias in the form of ventricular tachycardia or ventricular fibrillation and sudden death.[8-10] The present study was conducted to examine the frequency of myocarditis in patients presented with paraphenylenediamine (Kala Pathar) poisoning, also examine the mortality associated with myocarditis.

MATERIALS AND METHODS

This prospective/observational study was conducted at Department of Medicine Shahida Islam Medical & Dental College Lodhran during from 1st October 2018 to 31st October 2019. Total 100 adult patients of both genders presented with paraphenylene ingestion were enrolled. Patients demographics including age, sex and reasons of ingestion of PPD were recorded. Patients with other than PPD poisoning, patients with history of cardiac issues and surgery, patients who died within 5 hours of PPD ingestion were excluded.Patients complete clinical examination was done and sign/symptoms were recorded. Diagnosis of myocarditis was made solely on the basis of the clinical signs/symptoms suggestive of myocardial damage, electrocardiography changes, elevated cardiac biomarkers and abnormalities on trans-thoracic echocardiography.

Mortality associated with myocarditis was examined. All the data was analyzed by SPSS 22.

RESULTS

There were 82 (82%) were females while 18% were males. The mean age of patients was 27.25±7.48 years. Suicide was the most common reason of ingestion of PPD found in 94% cases followed by accidental in 4 (4%) patients and homicidal in 2 (2%) patients (Table 1). According to the sign and symptoms, cervicofacial edema was the commonest symptoms found in 85 (85%) patients, dysphagia found in 76 (76%) patients, brown urine in 75 (75%) patients, pain of limbs in 79 (79%) patients, respiratory issues in 61 (61%) patients, tachycardia found in 30%, chest pain found in 20%, hypotension in 11%, palpitation in 10%, anuria in 3%, oliguria in 8%, convulsion in 5% and nasal regurgitation in 4% patients (Table 2).According to the incidence of myocarditis, we found 21 (21%) patients had myocarditis (Fig. 1).From 21 myocarditis patients 8 (38.10%) patients were died. Overall mortality rate was 28% (Table 3),

Table 1: Demographics of all the patients

Variable	No.	%
Age (years)	27.25±7.48	
Gender		
Male	82	82.0
Female	18	18.0
Reasons of PPD ingestion		
Suicide	94	94.0
Accidental	4	4.0
Homicidal	2	2.0

Table 2: Clinical presentation of all the patients

Variable	No.	%
Cervicofacial Edema	85	85.0
Dysphagia	76	76.0
Brown Urine	75	75.0
Pain Of Limbs	79	79.0
Respiratory Issues	61	61.0
Tachycardia	30	30.0
Chest Pain	20	20.0
Hypotension	11	11.0
Palpitation	10	10.0
Anuria	3	3.0
Oliguria	8	8.0
Convulsion	5	5.0
Nasal Regurgitation	4	4.0

Fig. 1: Frequency of myocarditis in PPD poisoning patients

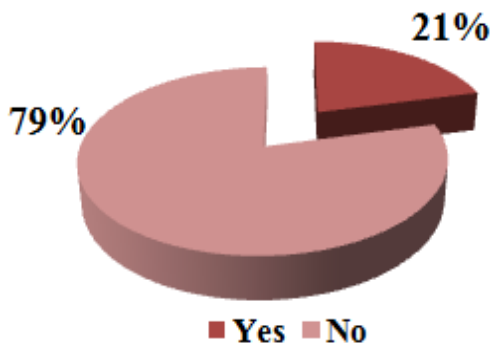

Table 3: Mortality associated with myocarditis

Mortality	Myocarditis		Total
	Yes	No	
Yes	8 (38.10)	20 (25.32)	28 (28)
No	13 (61.90)	59 (74.68)	72 (72)
Total	21 (100)	79 (79)	100 (100)

DISCUSSION

Poisoning is one of the most common clinical presentation found all over the world with high rate of mortality and morbidity.[11]ParaphenyleneDiamine (Kala Pathar) is one of the most common poisoning substance because of its easy availability. In developing/low income countries parapheylene diamine (PPD) is widely used for hair dyes, that's why the incidence rate of paraphenylene diamine poisoning is so high in Asian countries due to easy access.[12,13] The present study was conducted aimed to examine the frequency of myocarditis and associated mortality in patients with PPD poisoning. In this regard 100 patients presented with PPD ingestion were analyzed. In present study majority of patients were females 82% as compared to males 18% and the mean age of patients was 27.25±7.48 years. Suicide was the most common reason of ingestion of PPD found in 94% cases followed by accidental in 4 (4%) patients and homicidal in 2 (2%) patients. These results showed similarity to many of previous studies in which female patients population was high 70% to 90% as compared to males and the most common age group was 20 to 40 years and majority of patients had suicide intention for PDD ingestion.[14,15]

In our study cervicofacial edema was the commonest symptoms found in 85 (85%) patients. A study by Tanweer et al[16] reported that cervico-facial edema was the commonest symptoms associated with PPD ingestion patients. We found that dysphagia found in 76 (76%) patients, brown urine in 75 (75%) patients, pain of limbs in 79 (79%) patients, respiratory issues in 61 (61%) patients, tachycardia found in 30%, chest pain found in 20%, hypotension in 11%, palpitation in 10%, anuria in 3%, oliguria in 8%, convulsion in 5% and nasal regurgitation in 4% patients. These results were comparable to several previous studies[17,18].

In present study we found that the frequency of myocarditis was 21%. A study conducted by Jain et al[19] reported that the incidence of myocarditis in patients with PPD poisoning was 15%. Another study by Bhagavathula et al[20] reported that The occurrence of angioneurotic edema in hair poisoning patients was 67.1% (95% CI=56.6–77.6), and tracheostomy intervention was considered in 47.9% (95% CI = 22.7–73.2) patients with respiratory distress. Acute renal failure was noticed in 54.7%. Some other studies revealed that the frequency of cardiac issues in PPD poisoning patients was high 15% to 40% with high rate of morbidity and mortality.[21]In this study we found the overall mortality occurred in 28% patients and from 21 myocarditis patients 8 (38.10%) patients were died. These results were similar to study conducted by Jain et al[19] in which mortality due to myocarditis was 29%.

CONCLUSION

Myocarditis is highly associated with praphenylene diamine ingestion with high rate of mortality.

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