CASES OF SURFACE CORROSIVE BURNS IN MAYO HOSPITAL, LAHORE FROM 2013-PRESENT

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ABSTRACT

Background: South Asian society has a long history of surface corrosive burns. Acid throwing or vitriolage results in physical, social and psychological challenges and remains a major issue worldwide.

Objective: To collect data regarding frequency, age and gender distribution, burnt surface area, nature, major body parts damaged and mortality in surface corrosive burns at the medico-legal clinic of Mayo hospital, Lahore (Pakistan) from 1st January, 2013 upto September, 2018.

Methodology: It was a cross-sectional study at the medico-legal clinic of Mayo hospital, Lahore. The data of 38 surface corrosive burn cases was collected from 1st January, 2013 to September 2018 by consecutive sampling. All cases involving any surface chemical/corrosive burn were selected, while excluding wet burns, flame burns, substance poisoning etc. The data was obtained on a data collection proforma and analyzed by using SPSS version 23.0. These cases were categorized on the basis of the year of presentation, gender & age, burnt surface area, nature of burns, damage to any sensory or vital function and any resulting mortality. The research was conducted after obtaining an ethical approval by Institutional Review Board of King Edward Medical University, Lahore.

Results: Surface corrosive burns constituted almost 0.0026% of the 14,550 medico-legal cases during the said duration. There were 21 males and 17 females. About 1/3rd of cases were between 21-30 years of age. Almost 42% cases had 9-18 % of body surface area burnt and 34.2% had less than 9% surface area burnt. Nearly 66% had been the victims of homicidal burns while 26.3% were burnt accidentally. About 42% individuals were subjected to vitriolage, involving face and eyes. No mortality was seen.

Conclusion: Surface corrosive burns specially vitriolage, although rare (0.0026%), cause a significant threat to the facial identity. They were mainly homicidal/accidental in nature, more frequent in males with a higher occurrence from 11 to 50 years of age.

Keywords: Surface Corrosive Burns, Vitriolage, Homicidal.

INTRODUCTION

Surface corrosive burns include skin damage, caused by chemical agents like acids or alkalis. Numerous chemical agents are being used at industrial, agricultural & domestic level, most of which are notorious for causing skin, ophthalmic & gastro-intestinal damage (upon ingestion) to the human body. [(1)] The use of acids as a weapon of domestic violence, known as vitriolage, especially against females, is not uncommon at all. [(2)] Vitriolage is defined as the act of throwing a corrosive onto the face of a person with the intention of disfiguring that individual, out of hatred or vengeance. [(3)] Acids like sulphuric acid (Oil of Vitriol), hydrochloric acid, nitric acid & bases like caustic soda or caustic potash are commonly used in such heinous crimes. [(4, 5)] The long term sequelae of these attacks include blindness and permanent scarring of the face and body, along with numerous other physical, psychological and socio-economic difficulties. [(6, 7)] Death is rare but may result from shock or infection when there is involvement of an extensive body surface area. [(8)]

The nature of such burns can be classified as homicidal, accidental or even suicidal. Major causes of

intentional (homicidal or suicidal) acid burns are marital issues, domestic disputes, business conflicts and so on. Moreover, a number of cases are also reported due to accidental chemical burns in the industries. [9, 10] Statistics show corrosive burn incidents to be common in the Indo-Pak sub-continent alongwith other countries like Cambodia, Vietnam, Laos, Hong Kong, the African continent including countries like South Africa, Kenya and Ethiopia. [5] However, surface corrosive burn cases are quite uncommon in the western countries like United Kingdom. Human Rights Commission of Pakistan (HRCP) states that nearly 400 vitriolage incidents on females occur annually in Pakistan. According to a research carried out by Pakistan National Emergency Department Surveillance Program (Pak-NEDS), a total of 403 burn patients presented to the medical emergencies of 7 major hospitals of Pakistan within a 5 month period (including Mayo Hospital, Lahore), among which about 10 individuals (2.5%) were inflicted with corrosive burns (involving acid ingestion as well). [11] Apart from this work, no other significant research has been performed in this field in Pakistan.

A major proportion of corrosive burn cases requires significant surgical intervention, making them one of the most costly traumatic injuries. Hence, their pre-hospital care, clinical management and treatment are vital in order to preserve the aesthetic aspect & identity of the human body. Moreover, it is essential to work out the data of the catastrophic damage caused by surface chemical burns so as to highlight their medico-legal significance. Hence, the following study was designed to find out the frequency & nature of surface corrosive burns, damage resulting from them, gender & age distribution of cases as well as mortality rate in the victims.

MATERIALS AND METHODS

The research was conducted as a cross-sectional (observational) study of the surface corrosive burn cases. It was carried out at the medico-legal clinic of Mayo Hospital, Lahore (a Tertiary Care Hospital of public sector). Relevant data was obtained from 1st January, 2013 upto September, 2018. A sample size of 38 cases was calculated by keeping the confidence level as 95%, absolute precision as 5% and probability of surface corrosive burn cases as 2.5%. The sampling technique used was consecutive (non-probability) sampling. All the cases involving a corrosive/chemical burn on the body surface were selected while the medico-legal cases of substance poisoning (even cases of corrosive intake), wet burns, flame burns, electric burns, blast injury, road traffic accidents etc. were excluded. An ethical approval was obtained from the Institutional Review Board of King Edward Medical University, Lahore. The medico-legal certificates were used to obtain the past record of surface corrosive burn victims which was then noted down on a data collection proforma. The proforma was also given an ethical approval by the Institutional Review Board and carried information about the medico-legal case number, date of presentation, name, gender & age of the subject, nature of burn, burnt surface area of body, injury to any major body organ and mortality. The surface area of body burnt was calculated approximately by using the Rule of Nines. [4] All the data was then entered into SPSS (Statistical Package for Social Sciences) version 23.0 and subsequently analyzed to find out the yearly frequency of surface corrosive burns, distribution of cases with respect to gender & age, classification of cases on the basis of nature of burns & burnt body surface area and to find out the major body parts damaged by corrosives. The 'p' value was taken as 0.05. Chi square test was applied to study the significance of relationship between nature of surface corrosive burns and gender of the sufferers.

RESULTS

The past record of 38 cases of surface corrosive burns was observed from the medico-legal certificates of last 6 years, dating from 1st January, 2013 to September, 2018. In the said duration, a total of 14,550 cases were reported in the medico-legal section of Mayo Hospital Emergency department, Lahore. The surface corrosive burn cases showed a frequency of 0.0026%. Thus, on an average, each case of surface corrosive burn was reported after 383 medico-legal cases approximately. Out of these 38 cases, 55.3% were males and 44.7% were females. Males showed a mean of 3.5 cases per year where as females had an average of 2.83 cases per year. Most of the cases were seen in the year 2018. Male victims mostly surpassed female victims in all the years except 2018, as evident from table 1.

About 1/3rd (31.6%) of the subjects (both male and female) were in the age group of 21-30 years. Maximum number of males were in the age group of 11-20 years. On the other hand, maximum number of females were seen within the age group of 21-30 years, as shown by table 2. The rule of nines [4] was employed to calculate the burnt surface area. Almost 16 (42.1%) victims had 9-18% of surface area burnt out of total body surface area (TBSA). This was followed by 13 (34.2%) cases having less than 9% burnt surface area (Figure 1). By using chi-square test through SPSS analysis, a significant relationship was found between gender of surface corrosive burn victims and nature of

burns (p value = 0.018). About 2/3 i.e. 25 cases (66%) were homicidal in nature. The data showed that 16 (42.1%) of the total burn cases were of vitriolage (affecting face), with a male-female ratio of 7:9. Out of 9 (23.7%) of homicidal surface corrosive burns (inflicting body parts except face), male-female ratio was 3:6. On the contrary, all of the 10 victims (26.3%) of accidental surface corrosive burns were males (100%), as depicted in table 3. Therefore, females mostly had homicidal burns (88.2% of females) whereas males suffered from homicidal/accidental burns equally (47.6% cases of each nature). A number of major sensory or motor parts of the body were affected by burns. Face (including eyes) was burnt in 16 cases (42.1%), body extremities i.e. limbs & hands were damaged in 4 cases (nearly 11%), breast was damaged in 2 cases (5.3%) while external genitalia were damaged in 1 case (2.6%). In addition to this, no death was reported in any of the 38 surface corrosive burn cases (as per medico-legal records).

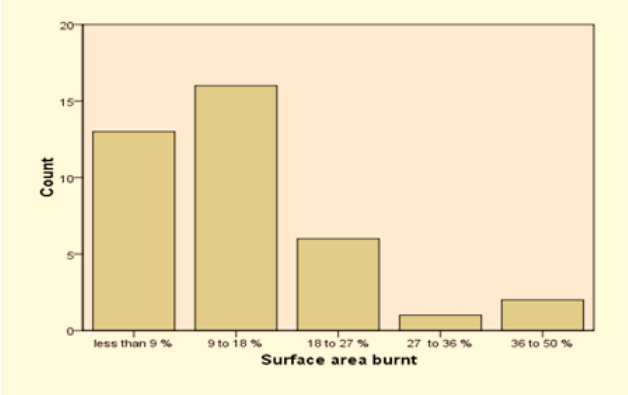

Figure 1: % Burnt Surface area of victims.

Table 1: Yearly distribution of male and female victims of surface corrosive burns.

			Year of incidence						Total
			2013	2014	2015	2016	2017	2018	
Gender of subject	Male	Count	4	4	4	3	2	4	21
		% within Gender of subject	19.0%	19.0%	19.0%	14.3%	9.5%	19.0%	100.0%
	Female	Count	0	4	3	2	1	7	17
		% within Gender of subject	0.0%	23.5%	17.6%	11.8%	5.9%	41.2%	100.0%
Total		Count	4	8	7	5	3	11	38
		% Count	10.5%	21.1%	18.4%	13.2%	7.9%	28.9%	100.0%

			Age of subject								Total
			01 to 10 years	11 to 20 years	21 to 30 years	31 to 40 years	41 to 50 years	51 to 60 years	61 to 70 years	71 to 80 years	
Gender of subject	Male	Count	2	6	5	3	3	0	1	1	21
		% within Gender of subject	9.5%	28.6%	23.8%	14.3%	14.3%	0.0%	4.8%	4.8%	100.0%
	Female	Count	1	5	7	2	0	1	1	0	17
		% within Gender of subject	5.9%	29.4%	41.2%	11.8%	0.0%	5.9%	5.9%	0.0%	100.0%
Total		Count	3	11	12	5	3	1	2	1	38
		% Count	7.9%	28.9%	31.6%	13.2%	7.9%	2.6%	5.3%	2.6%	100.0%

Table 3: Relationship between nature of surface corrosive burns and gender of subjects.

			Nature of the surface corrosive burn					Total
			Homicidal *	Accidental	Suicidal	Homicidal**	Unknown	
Gender of subject	Male	Count	7	10	0	3	1	21
		% within Gender of subject	33.3%	47.6%	0.0%	14.3%	4.8%	100.0%
	Female	Count	9	0	1	6	1	17
		% within Gender of subject	52.9%	0.0%	5.9%	35.3%	5.9%	100.0%
Total		Count	16	10	1	9	2	38
		% Count	42.1%	26.3%	2.6%	23.7%	5.3%	100.0%

Test name	Value	df	Asymptotic Significance/p-value
Pearson Chi-Square test	11.961	4	0.018

DISCUSSION

The research determined the frequency of surface corrosive burn cases presenting in the medico-legal clinic of Mayo Hospital, Lahore which turned out to be 0.0026% (38 out of 14,550 medico-legal cases). It is found to be much lesser than a previous research conducted by Pak-NEDS in 2015 by Siddiqui E, Zia N, Feroze A et al [(11)] where the prevalence of corrosive burns was 2.5%. However, it must be noted that Pak-NEDS found this prevalence of chemical burns among the victims of burns only (10 cases of corrosive burns out of 403 burn cases) while not taking into account medico-legal cases other than burns i.e. substance poisoning, road traffic accidents etc.

Kumar S et al [(12)] observed 234 burn patients admitted to a medical college hospital in Patna, India amongst which there were 4 victims of chemical burns/vitriolage. This showed a prevalence of 1.7%. The present article found that almost 82% of the surface corrosive burns were reported in the individuals having age between 11 to 50 years, almost similar to the figure observed by Rahman FN, Ahmad M, Rahman MZ et al. [(13)] i.e. 85%. About 32% subjects had received damage to face while 11% cases had their eyes damaged. However, these percentages were 41% and 31% respectively, as seen by Rahman FN et al. In addition to this, Tan A, Bharj AK, Nizamoglu M [(14)] showed that in corrosive assault cases presenting to a major burn center in United Kingdom, almost 37% had inflicted damage to the face while 43% had eye involvement. Moreover, 33% had corrosive burns over their limbs (23% upper & 10% lower limbs) as compared to 11% cases noted in the current study. Most of the victims had 0.3-16% of TBSA burnt by corrosives while according to the present research, 3/4th (76.3%) of cases had upto 18% of TBSA burnt. However, it was reported by the NHS (National Health Service) surveys that the yearly frequency of corrosive assaults in United Kingdom is still on the rise, with the yearly frequency rising to more than two times in 2010-11 (110 cases) as compared to 2006-07 (44 cases).

Ramakrishnan K, Mathivanan T et al have recorded the corrosive burn admissions to the Burn Unit of a Medical college hospital in Chennai, India from 2001 to 2010, including a total of 75 adults and 38 children. [(15)] The gender and age distribution of corrosive burn victims is found comparable to those determined by the current article. The said research article showed that maximum number of subjects i.e. 38 (33.6%) were in the young age group of 19-30 years, similar to 31.6% of cases as seen through this research. Moreover, Ramakrishnan K et al showed that male victims were 64 out of 113 victims i.e. 56.6% and females were 49 (43.4%) almost similar to 55.3% and 44.7% as seen in the current study. These comparable results are most likely due to the greater exposure of the adult male workers to acids or other corrosives on industrial scale. The current article states that almost 92.1% subjects suffered from burns over <30% of total body surface area (TBSA) whereas Ramakrishnan K et al showed this percentage to be at 83.2%, only a minor difference. However, there is a significant difference between natures of corrosive burns. The said article showed that about 62% subjects suffered corrosive burns due to accidental means while the current research found the same percentage to be 26.3%. Nearly 38 pediatric admissions due to chemical burns were also reported in the same article. Children become victims of corrosive burns when they accidentally ingest or spill toilet cleaning substances (which contain mainly hydrochloric & sulphuric acids). Children may also

become victims of domestic abuse by means of corrosives. Ramakrishnan K et al found the mortality rate due to corrosive burns to be 13.3%. However, the current research did not find any mortality resulting from surface corrosive burns. Afify MM, Mahmoud NF et al [16] included 106 victims of various burn deaths (through autopsy reports) in their study at Cairo, Egypt but could not find a single case of chemical burn during a period of 5 years. Thus, it may be said that surface chemical burns are less likely to cause a victim's death as long as the burnt surface area is minimal.

Vathulya M, Tiwari VK [17] carried out an epidemiologic study at a burn center of a tertiary care hospital in India. Nearly 6,190 burn patients attended the burn emergency during the year 2008 out of which 60 patients (1%) belonged to chemical burns. Male-female ratio was recorded as 42:18. Maximum number of cases (27) belonged to age group of 21-30 years. Three-fourth (44/60) of the cases were accidental in nature while 15 were homicidal in nature, including vitriolage. Most of the cases had 0-20% of surface area burnt out of total body surface area. Head & neck and thorax were the most injured body parts. Mortality rate was found to be 8%.

Rahman FN et al found these major reasons behind homicidal/suicidal chemical burns in Bangladesh; marriage (22%), extra marital affairs (30%), dowry (8%), family disputes (11%), business issues (8%) etc. Kapur R [18] states the following major causes of non-accidental surface corrosive burns; domestic issues such as rejection of marriage offers, dowry, masculine ego, marital disputes, extra marital affairs, business discord and other minor conflicts. Victims of acid burns suffer not only from physical trauma and socio-economic difficulties but are also subjected to a psychological torture in the long run. Kapur R also showed that some of the psychological problems which the victims of vitriolage had to endure were agitation, nightmares, anxiety & depression, lack of social communication, sense of being isolated from the society and suicidal ideation.

CONCLUSION

The research showed the frequency of surface corrosive burns in a major tertiary care public hospital of Pakistan (0.0026% of all medico-legal cases). These incidents were relatively more common in males as compared to females, being predominant in people aged between 11-50 years. Majority of victims showed no more than 18% of TBSA burnt. Almost 2/3 of the victims suffered homicidal burns. Most commonly injured areas included the facial parts i.e. cheeks, eyes etc. Moreover, no mortality was reported in any case. However, the most notable point is that 11 cases were observed in the first 9 months of 2018 which is more than any of the previous years. This data clearly indicates that the rate of surface corrosive burns is by no means, declining with time. These results should be helpful for the concerned organizations to take necessary steps to bring down the number of morbidities owing to surface corrosive burns.

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