



A Retrospective Study - Electric Burn as A Cause of Amputation : Analysis of Negative Predicting Factors & Evaluation For Prophylactic Measures

KEYWORDS

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ABSTRACT Introduction- As the use of electricity increased in household and industry, electric burn has been emerged an important cause of amputation. Object-To identify the factors leading to major amputation in electric burn patients. Patients and method-This was a retrospective study of 84 electric burn patients who underwent amputation over a period of 24 months from March 2014 to February 2016. Results-Most common age group underwent amputation was 21-30 yrs (58.3%) with a M:F=9.5:1. Upper limb amputation outnumbered than lower limb amputation. Rural/suburban population affected more (83.3%). Contact with high voltage (>1000V) (82.1%) and delayed fasciotomy (92.8%) were consisting factors. Conclusions-High voltage electric burn in rural/suburban adult population which present late at tertiary centre without any prior intervention is at high risk. Education of safety measures and awareness of morbid consequences of electric burn as well as reducing time interval to reach these patients to trained personnel/centre equipped with facility to deal electric burn will be effective for prevention of amputation as a consequence of electric burn.

Introduction

Use of electricity has been reached to its maximum in household as well as industry. Parallel to this ; electric burn & its morbid consequences are also increasing[1]. A lots of patients who admitted for treatment of electric burn undergo major amputation of upper limb (above elbow & below elbow) & lower limb (above knee & below knee)[2]. This have a negative impact on socio-economic and psychological aspect of life[3].

Objects

Object of this study was to identify the factors responsible for amputation to:

Identify the potential candidates for amputation out of the admitted patients.

Establish the prophylactic measures to prevent amputation as a consequence of electric burn.

Material & method

A total no. of 84 pts. underwent major amputation out of the patients who admitted in Burns & Plastic Surgery Department, SMS hospital over a period of 24 months from March 2014 to February 2016. We conducted a retrospective study of these pts. with detail analysis of age, sex, history, clinical examination, lab. Investigation, intervention prior to and after admission and final outcome. All ampu-

tations above level of wrist for upper limb & above level of ankle for lower limb were considered as major amputations.

Results

A total no. of 84 pts who underwent major amputation were included in this study. Upper limb amputations were more (84.5%) than lower limb (15.5%). Male outnumbered female with a ratio of M:F=9.5:1. Range of their age was from 7 yrs. To 68 yrs. With most common age group was 21-30 yrs. (58.3%) followed by 31-40 yrs. (25%). Most of these pts were from rural/suburban area (83.3%). Most of the pts. (72.6%) were farmers by occupation. 82.1% pts had history of contact with high voltage (>1 KV) [4]. Only 10.7% pts. admitted within 24 hrs. of burn and fasciotomy was done only in 8.3% pts., out of which half pts had inadequate fasciotomy by means of depth or extent. 86.9% pts underwent fasciotomy after admission. Charring/gangrene/flexion contracture of hand or feet present in 70.2% pts. Dark and concentrated urine on admission was present in 80.9% pts. However many pts had history of fall but only 6% pts sustained significant injuries. Comorbidities due to preexisting illness like diabetes, hypertension, epilepsy were present in 7% pts. Out of these amputees 91.7% discharged, 6% expired and 2.3% absconded.

Discussion

Our study revealed that most common age group was 21-30 yrs. & male outnumbered the females, farmers were

DISTRIBUTION OF PATIENTS ACCORDING TO VARIOUS PARAMETERS

1.AMPUTATED LIMB							
UPPER LIMB	RIGHT	45 (53.57%)	LEFT	23 (27.37%)	BILATERAL	3 (3.57%)	71 (84.5%)
LOWER LIMB	RIGHT	7 (8.33%)	LEFT	5 (5.95%)	BILATERAL	1 (1.19%)	13 (15.5%)
2.AGE GROUPS (YRS.)							

0-10	1 ((1.19%)	11-20	3 (3.57%)	21-30	49 (58.33%)	31-40	21 (25%)
41-50	5 (5.95%)	51-60	3 (3.57%)	61-70	2 (2.38%)	71 & ABOVE	NIL
3.SEX							
MALE	76 (90.5%)			FEMALE	8 (9.5%)		
4.COMMUNITY							
RURAL/SUBURBAN	70 (83.3%)				URBAN	14 (16.7%)	
5.OCCUPATION							
FARMER	61 (72.6%)	ELECTRIC WORKER	10 (11.9%)	INDUSTRIAL WORKER	8 (9.5%)	OTHER	5 (5.95%)
6.TYPE OF VOLTAGE							
HIGH VOLTAGE (>1000 V)	69 (82.1%)				LOW VOLTAGE (<1000 V)	15 (17.9%)	
7.TIME OF ADMISSION							
<24 HRS	9 (10.7%)			>24 HRS	75 (89.3%)		
8.FASCIOTOMY							
<24 HRS	7 (8.3%)		>24 HRS	73 (86.9%)	NOT DONE	4 (4.8%)	
9.GANGRENE/CHARRING/FLEXION CONTRACTURE							
PRESENT	59 (70.2%)			ABSENT	25 (29.8%)		
10.URINE							
DARK & CONCENTRATED	68 (80.9%)			NORMAL	16 (19.1%)		
11.COMORBIDITIES							
PRESENT	6 (7.1%)			ABSENT	78 (92.9%)		
12.ASSOCIATED SIGNIFICANT INJURIES							
PRESENT	5 (5.95%)			ABSENT	79 (94.05%)		
13.OUTCOME							
DISCHARGE	77 (91.7%)			EXPIRE	5 (6%)	ABSCOND	2 (2.3%)

suffered most . It was because of exposure of this population to high voltage EB [5] while illegally connecting their electricalequipments to high tension line, which they hide in history. This group is also active in industrial wok.Rural/ suburban population was more susceptible due to lack of awareness and unsafe use of electricity.More involvement of right upper limb wasobvios due to common right handedness. Most of the pts did not receive fasciotomy in early period due to lack of expertise . Most of the pts underwent fasciotomy in our institution how ever admitted after 24 hrs after burn. So, delayed fasciotomy did not prevent the amputation ; Still we did it as a potential tool to decrease the level of amputation except who admitted very late(3-4days after burn)with gangrenous limb[6,7]. Dark concentrated urine was due to extensive myonecrosis in these pts[8,9]. Gangrenous changes, charring or flexion contracture which presents in three quarters of pts was due to deep burn including muscles and rupture of tendons[10]. Most of the ptswere discharged except 6% who expired due to systemic insult and 2.3% who absconded. Comorbidities and injuries were in very few pts indicating that electric burn itself was the dominant factor for amputation.

Conclusions

This retrospective study identified that negative predicting factors leading to major amputation in electric burn pts admitted in our institution are:-

- Age 21-30 yrs
- Male

- Rural/suburban population
- Contact with high voltage
- Delayed fasciotomy
- Unavailability of expertise in acute phase
- charring/gangrenous changes/flexion contracture on admission
- dark and concentrated urine on admission

Guidelines for prevention of amputations as a consequence of electric burn are:-

- education and awareness of rural/suburban population about the risk and safety measures of electric burn
- decreasing the time interval of needy pts to reach the expertise doctors and centres dedicated to management of electric burn
- training of doctors working at PHC/CHC level for timely intervention and referral of pts
- early fasciotomy

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