

CLINICAL STUDY OF ELECTRICAL BURNS AMONG ALL BURNS CASES- 3 YEARS' EXPERIENCE

Nagabathula Durga Prasad¹, K. Kamadi Rama Rao², R. Ravula Maha Lakshmi³, Gurana Krishna Rao⁴, G. Vamshi Yadhav⁵

¹Assistant Professor, Department of Surgery, Rangaraya Medical College, Kakinada, Andhra Pradesh.

²Assistant Professor, Department of Surgery, Rangaraya Medical College, Kakinada, Andhra Pradesh.

³Professor, Department of Surgery, Rangaraya Medical College, Kakinada, Andhra Pradesh.

⁴Postgraduate Student, Department of Surgery, Rangaraya Medical College, Kakinada, Andhra Pradesh.

⁵Postgraduate Student, Department of Surgery, Rangaraya Medical College, Kakinada, Andhra Pradesh.

ABSTRACT

BACKGROUND

With the advances in technology, electrical injuries are becoming more common and are the leading cause of work-related traumatic death. One third of all electrical traumas and most high-voltage injuries are job related and more than 50% of these injuries result from power line contact. The management of the major burn injury represents a significant challenge to every member of the burns team. Most of electrical burns present with gangrene of toes and limbs with eschar over body parts. Their presentation is mostly due to contact with high-voltage electricity at their work places.

MATERIALS AND METHODS

A retrospective study was made to study the clinico-social profile of patients suffering electric burns admitted into Department of General Surgery.

RESULTS

92 cases were evaluated and studied. Majority of patients developed gangrene of limbs and toes. Amputations and skin grafting was done. Most patients who suffered electric burns were males of age group 21 to 40 years. All cases are accidental and mostly occurred at work places. Most electric burns are high-voltage based and caused deep burns. Major complications like acute renal failure and septicaemia were encountered. Most of them suffered 16 to 30% burns. Most commonly isolated organism from wounds is pseudomonas. Most of them suffered a hospital stay of 1 to 2 months.

CONCLUSION

Electric burns are a burden to the society. Prevention is the best way to deal with them. Electricity-based employees have to be trained properly regarding safety measures to be taken. General education of public regarding safety measures can prevent electrical burn injuries.

KEYWORDS

Electrical Burns, Gangrene of Limbs and Toes, Amputations, Skin Grafting.

HOW TO CITE THIS ARTICLE: Prasad ND, Rao KKR, Lakshmi RRM, et al. Clinical study of electrical burns among all burns cases- 3 years' experience. J. Evid. Based Med. Healthc. 2017; 4(70), 4155-4157. DOI: 10.18410/jebmh/2017/827

BACKGROUND

With the advances in technology, electrical injuries are becoming more common and are the leading cause of work-related traumatic death. One third of all electrical traumas and most high-voltage injuries are job related and more than 50% of these injuries result from power line contact. The management of the major burn injury represents a significant challenge to every member of the burns team. Most of electrical burns present with gangrene of toes and

limbs with eschar over body parts. Their presentation is mostly due to contact with high-voltage electricity at their work places.

MATERIALS AND METHODS

Over the past 3 years, all cases of electrical burns admitted in General Surgery Department, Kakinada, were revised and study of electrical burns was done regarding their aetiological factors, clinical presentation, investigations, line of management and complications.

Inclusion Criteria

All patients admitted with electrical burn injuries.

Exclusion Criteria

All pregnant women, paediatric group and burns due to other causes.

Financial or Other, Competing Interest: None.
Submission 07-08-2017, Peer Review 14-08-2017,
Acceptance 22-08-2017, Published 29-08-2017.
Corresponding Author:
 Dr. K. Kamadi Rama Rao,
 House No. 11-245, Venkata Ramana Nagar,
 Near Water Tank, Indrapalem,
 Kakinada, Andhra Pradesh.
 E-mail: dprasad_dr@yahoo.com
 DOI: 10.18410/jebmh/2017/827



RESULTS

Among 92 patients, 55 (59.7%) patients are from age group of 20-40 years. Males are 88 (95.9%) highest in number.

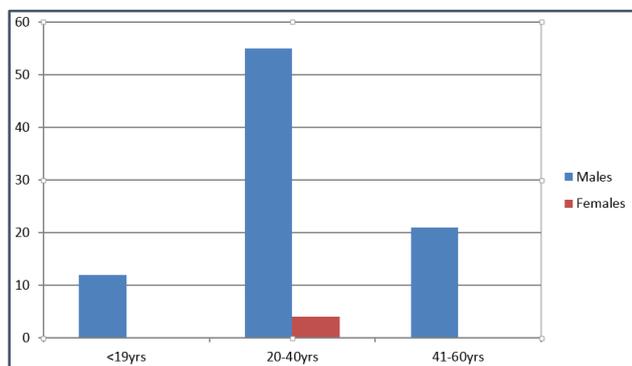


Chart 1

Out of 92 patients, according to the education status, as many as 60 (65.3%) were illiterate.

According to the place of injury, majority of them had injury at work place 69.4%, followed by injury at home 19.4% and other places 11.2%.

Place	Number	Electric Burns
Home	18	19.4%
Work place	64	69.4%
Other places	10	11.2%

Table 1

All the 92 (100%) patients with electrical burn injuries were accidental in nature.

Of 92 patients studied, 80 (86.9%) were from rural area, 12 (13.1%) were from urban area.

According to the cause of electrical injury, the cause of electrical injury was agricultural field based in majority of patients, 67 cases.

Cause of Electrical Injury	Present Study	%
Agricultural field based electrical injuries	67	72.8%
Contact of livewires	7	7.6%
Electricity work-based injury	13	14.2%
Domestic	5	5.4%

Table 2

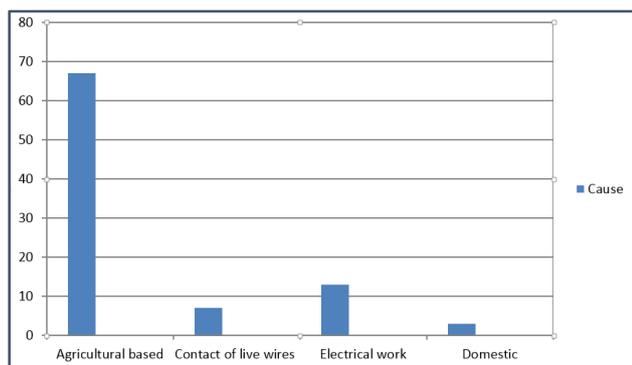


Chart 2

Among 92 patients studied, 37 (41.3%) patients had total body surface area, % of burns between 16-30%.

TBSA	Number	Electric Burns
0-15%	28	30.6%
16-30%	37	41.3%
31-50%	16	17.3%
>50%	10	10.8%

Table 3

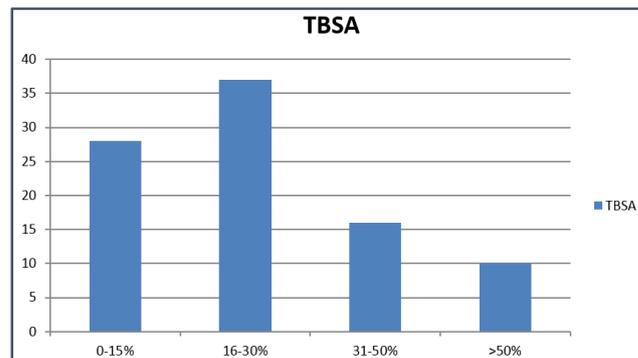


Chart 3

64 (69.6%) patients had high-voltage burns and 28 (30.4%) had low-voltage injuries.

Voltage	Number	Percentage
High voltage	64	69.6%
Low voltage	28	30.4%

Table 4

Investigations were done on 92 patients, haemoglobin was raised in 40% and serum creatinine was raised in 45%. ECG was altered in 40%. Serum electrolytes were altered in 45% of patients.

Of 92 patients, 60 patients had wound infections and 33 (55%) patients had pseudomonas infection.

Infective Organisms	Number	Electric Burns
Pseudomonas	33	55%
Klebsiella	9	15%
Staphylococcal	11	18.3%
Streptococcus	7	11.7%

Table 5

All of them were initially resuscitated with intravenous fluid administration. Majority of the patients underwent amputations 69 (75%), escharotomy in 28 (30%), contracture release 28 (30%), debridement in 18 (19.4%), split skin graft 23 (25%) and fasciotomy 9 (10%), respectively.

Management	Number	Electrical Burns
Resuscitation and fluid management	92	100%
Escharotomy	28	30%
Fasciotomy	9	10%
Debridement	18	19.4%
Contracture release	28	30%
Amputation	69	75%
Split skin graft	23	25%

Table 6

According to the period of hospital stay, 46 (50%) patients had hospital stay of 1-2 months. Majority 60 cases had wound infections, followed by contractures in 28 cases, renal failure in 11 (7.1%) and septicaemia in 5 (3%).

Complications	Number	Percentage
Wound infections	60	54%
Septicaemia	5	5.4%
Acute renal failure	11	11.9%

Table 7

DISCUSSION

In this study, it is observed that majority of cases were in the age group of 21-40 years. Our observations are consistent with studies conducted by Ambikavathy Mohan and Kumar Srinivasan.² Regarding place of electrical burn injury - Rural patients (86.9%) outnumbered urban patients in the present study, findings are similar to findings of S. Jain³ who found that out of 113 patients, 81.9% were from rural area and 28.9% were from urban region. Majority of patients acquired electrical injury in their work place as compared to study conducted by Ghavami Y, Mobayen MR, Vaghardoost R.⁴ Out of 92 patients, 65.3% were illiterate and 34.7% were literate similar to study by Haralkar Santosh Jagannath, Tapare Vinay S, Rayate Madhavi V⁵ shows that among 450 patients 60% were illiterate and 40% were literate. Mode of electrical burn injury 100% were accidental in our study, majority occurring at work place. Study conducted by Jayant D Deshpande, Padmakar K. Baviskar and Deepak B. Phalke⁶ results show that accidental burns were 80%. In our study, majority of the victims were agricultural workers as in Ambikavathy Mohan and Kumar Srinivasan² study shows agriculture-based injuries were more followed by domestic injuries. Management in this study was, initially the patients were resuscitated properly with intravenous fluid administration and then dead tissue debridement, amputation, fasciotomies, etc. were done. Many of them underwent amputations followed by debridement and fasciotomies. Study by Ambikavathy Mohan, Kumar Srinivasan² showed that out of 47 patients, 30 underwent debridement, 10 fasciotomy, 26 amputations and 25 split skin grafting. In a Study by Rimdeika R, Maslauskas K,⁷ many underwent debridement, then necrectomies. Period of hospital stay in this study showed that majority had 1-2 months of treatment in the hospital. S. Segu, V Jaganathan, A. Biradar et al⁸ observed mean range of hospital stay as 7-82 days. Complications are mostly wound infections, then followed by amputations in our study. A study by Esses SI, Peters WJ⁹ also had mostly amputation of limbs and then neurological injuries. A study by Haberal M¹⁰ on 226 patients showed that many patients with electrical injuries had wound infections and high-voltage injuries showing internal organ damage in 4 patients.

CONCLUSION

The present study gives an insight into the sociodemographic aspects in electrical injuries. Commonest cause of injury is work based, because of lack of safety measures, illiteracy and poverty. Improvement of literacy can decrease the incidence of burn injuries. Mostly, males of working young age group from 20-40 yrs. are affected. Electricity-based employees have to be trained properly regarding safety measures to be taken. Most of the patients are managed in aggressive manner to avoid complications. Many of them underwent amputations, debridement, etc. and all patients were treated with fluid resuscitation. Many had amputations as most of them sustained high voltage electrical burns followed by wound infections, contractures, renal failure and septicaemia, respectively. Disability and mortality are more with electrical burns. Deformities and contractures are lifelong physical problems and affect normal functioning of the individual. General education of public regarding safety measures can prevent electrical burn injuries.

REFERENCES

- [1] Lee RC. Injury by electrical forces: pathophysiology, manifestations, and therapy. *Curr Probl Surg* 1997;34(9):677-764.
- [2] Mohan A, Kumar S, Ashokan B. Clinico-etiological profile and outcome of electric burns at RLJH, a tertiary care centre of south India. *Indian Journal of Burns* 2014;22(1):79.
- [3] Jain S, Sharma SC, Sinha SP, et al. Electric burns injuries of head and neck region: a retrospective study. *International Journal of Scientific Study* 2014;1(4):47-49.
- [4] Ghavami Y, Mobayen MR, Vaghardoost R. Electrical burn injury: a five-year survey of 682 patients. *Trauma Mon* 2014;19(4):e18748.
- [5] Haralkar SJ, Tapare VS, Rayate MV. Study of socio-demographic profile of burn cases admitted in Shri Chhatrapati Shivaji Maharaj General Hospital, Solapur. *National Journal of Community Medicine* 2011;2(1):19-23.
- [6] Deshpande JD, Baviskar PK, Phalke DB. Epidemiological study of hospitalized burn patients in rural area. *International Journal of Biomedical and Advance Research* 2012;3(4):263-267.
- [7] Rimdeika R, Maslauskas K. Analysis of treatment outcomes after electric injuries (1991-2000). *Medicina (Kaunas, Lithuania)* 2002;38(8):816-820.
- [8] Segu S, Jaganathan V, Biradar AV, et al. A review of 5 years' experience in management of electrical injuries. *Indian Journal of Burns* 2014;22(1):104-108.
- [9] Esses SI, Peters WJ. Electrical burns; pathophysiology and complications. *Can J Surg* 1981;24(1):11-14.
- [10] Haberal M, Ucar N, Bayraktar U, et al. Visceral injuries, wound infection and sepsis following electrical injuries. *Burn* 1996;22(2):158-161.