

Original Article

Study of deaths due to Electrocution at Government Stanley Hospital, Chennai - An Autopsy Based Study

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Abstract

Background : Since its invention, electricity has gradually progressed from being a luxury to a necessity. Electricity and electrical appliances are indispensable in today's life. Industrialization and urbanization have greatly increased the expense of electricity. It is a source of much productivity and enjoyment. When used without adequate care and precaution the same can result in injuries resulting in morbidity and mortality. Accidental electrocution is a frequent mode of potentially preventable death in our modern civilization. **Objective :** To study the demographic and other features of deaths due to Electrocution, brought for autopsy. **Materials and Methods :** In this retrospective study done at Government Stanley Medical College, Chennai during a 2year period, we studied 28 cases of deaths due to electrocution. **Results :** All cases were accidental in nature. Maximum age incidence was in the age group 21-30 (32.14%) years followed by 41-50years (32.14%). All cases were male. Domestic accidents (75%) were more when compared to industrial accidents.

Key Words: Electrocution, electric shock, electricity.

Introduction

Injuries due to electrocution are very common in today's life. Statistics of electrical injuries may not be accurate due to under-reporting of injuries. Injuries are brought to the notice of treating and investigating authorities only when they are gross or fatal. Accidental electrical injuries are common in households and industries¹. Suicidal and homicidal electrocution deaths have also been reported in literature^{2,3}. Majority of the deaths are due to lack of awareness and safety precautions while handling the appliances. Faulty devices, improper installation and wiring may be other factors contributing to electrocution.

Materials & methods

In this retrospective study done in Government Stanley Medical College, Chennai, all electrocution deaths that underwent autopsy in the Department of Forensic Medicine & Toxicology, were studied during a two year time period from January 2014 to December 2015. Socio-demographic and clinical data were studied from the inquest, clinical records and autopsy reports. Results were tabulated and analyzed.

Result and Discussion

Out of the total number of cases 9 cases (32.14%) were in the age group 21-30 years, another 32.14% were in the age group 41-50 years (Table 1). This trend of maximum cases being seen in the third decade of life has been reported by other researchers as well^{1,2,4-6}.

This was followed by 6 cases (21.42%) in the age group 21-40 years and 2 cases in 11-20 years and 51-60 years age group. No cases were seen in less than 10 years and more than 60 years.

During the two year period, a total of 28 cases of electrocution were observed. This constitutes 0.9% of the total 3226 cases of autopsy done during this time period.

Age group	No. of cases
11-20years	2
21-30years	9
31-40years	6
41-50years	9
51-60years	2
Total	28

Table 1 - Age wise distribution of cases

Gender	No. of cases
Male	28
Female	0
Total	28

Table 2 - Gender wise distribution of cases

In the present study all cases were male (Table 2). Male preponderance has been reported by previous researchers in their studies but total absence of female cases has not been reported.

Month	No. of cases
January	0
February	1
March	0
April	4
May	1
June	3
July	7
August	2
September	5
October	3
November	0
December	2
Total	28

Table 3 - Month wise distribution of cases

Increased number of cases were observed in the months of April, June, July and September (Table 3). This is in concurrence with other studies^{1,5,4}. This could be attributed to increased demand for electricity in the summer season. Also sweating is common in summer which facilitates conduction of electricity. Furthermore, people prefer to sleep at night in rooftops of building and open terraces where there is danger of field of electric arc of high tension wires of electric poles lying close to the buildings.

Manner	No. of cases
Domestic accident	21
Industrial accident	7
Total	28

Table 4 - Manner wise distribution of cases

In the present study all cases were accidental in nature. Of the total, 21 cases (75%) were domestic accidents and the remainder were industrial accidents which occurred at workplaces (Table 4). This pattern of majority domestic accidents have been reported by other researchers as well^{1,5,2,4}. Suicidal² and homicidal³ electrocution cases have been reported by other researchers but no such cases were seen in this study.

Occupation	No. of cases
Skilled workers	7
Unskilled people	21
Total	28

Table 5 - Occupation wise distribution of cases

In the present study, only 25 % of cases were skilled to handle electrical devices whereas 75% of cases were unskilled people who were electrocuted while handling or fixing electrical appliances at home (Table 5).

Injuries	No. of cases
Present	17
Absent	11
Total	28

Table 6 - Presence of electrical injuries

Electrical injuries in the form of entry, exit marks or burns were seen in 60% (17 cases) of cases (Table 6). This pattern has been observed in other studies too^{1,2,4}. In the 11 cases (39%) in whom no electrical injuries were seen, diagnosis was made by circumstantial evidences, treatment papers and after ruling out other causes of death. The absence of electrical injuries could be attributed to dampness of skin during electrocution which is a well documented in literature. In our study mechanical injuries were present in 9 cases (32%), apart from electrical injuries which were predominantly due to fall from height following electrocution.

Site of injuries	No. of cases
Upper limb	15
Lower limb	5
Chest and abdomen	2
Head and neck	Nil
Total	17

Table 7 - Site of electrical injuries

Of the 17 cases in which electrical injuries were seen, entry lesions were seen in all 17 cases whereas both entry and exit were seen in only 5 cases (29.4%). 88.23 % of cases had entry lesions in the upper limbs (15cases) whereas the rest (11.8%) had entry lesions in chest and abdomen (Table 7). None of the cases had electrical injuries in the head and neck region. All lesions seen in the lower limbs (5 cases) were exit marks. Previous studies also concur that maximum number of electrical lesions have been observed in the upper limbs^{1,2,4}.

Survival time	No. of cases
Found dead	5
Within 24 hours	7
Within 7 days	7
1-2 weeks	6
2 weeks - 1 month	3
Total	28

Table 8 - Survival time after electrocution

In the present study, survival time could not be determined in 5 cases (17%) that were found dead. 25% of cases expired within 24 hours of the incidence and 25% expired within 1 week. In a study by Gupta et al¹ 96.07% cases died on the spot and Pathak et al⁴ reported that 40% of cases were brought dead to the hospital.

Conclusion and recommendations

In the present study on deaths due to electrocution, males in the productive age group (21-30 years) were found to be predominantly affected followed by 41-50 years. All cases were accidental, 75 % of which occurred at home and were observed in unskilled people. Maximum number of cases were observed in the summer season. Electrical injuries were absent in 39% of cases. Upper limbs were the predominant site involved (88.23%). 25% of the cases expired within 24 hours of the incident.

Electrocution deaths though less in number are becoming increasingly common in modern days due to urbanization and booming real estate business. It is a preventable tragedy which predominantly affects adults in the productive years of life. Knowledge of the incidence and electrical injuries and underlying causes is of primary importance, the ultimate goal being their prevention. Generally, electrical injuries that gain attention are those that are fatal or which cause disability. Accidents occurring within home are poorly documented or not reported at all. There are no national statistics available unlike road accidents.

Increasing awareness of the importance of following safety precautions in handling electrical equipments at home or workplace will greatly reduce the morbidity and mortality due to electrical injuries.

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Nap your way out of mental descent

The next time you see your senior professor taking an afternoon nap, don't be so cruel as to disturb him. Nor are you supposed to smirk and squeal. You see, he is trying to revive his failing memory through nature's therapy! As we grow older, we experience gradual diminution of memory and other cognitive functions. Some may slide into dementia. One way of halting this descent is to lead a physically and mentally active life. But there is apparently another way as was discovered by Chinese investigators. In a study carried out on 2974 adults aged 65 or older, the investigators categorized the subjects into non-nappers, short nappers (less than 30 minutes), moderate nappers (30-90 minutes) and extended nappers (longer than 90 minutes) depending on the length of afternoon naps they took. All the subjects were tested for attention, episodic memory and visuospatial abilities. The moderate nappers were found to perform 4 to 6 times better than the non-nappers, short nappers and extended nappers. As this was an observational study, we are not given any insight into why afternoon nap has such a salutary effect on geriatric mind. So, in the name of work, it is unfair to deny old professor of his much needed therapy. However, his working hours may be extended so that he can put his revived mind to good use!!

(Junxin Li et al., Journal of the American Geriatrics Society, doi: 10.1111/jgs.14368, published online 20 December 2016)

- Dr. K. Ramesh Rao