

A Retrospective Study of Electrocution Injury over Two Years Period in Dhaka Medical College Morgue

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Abstract:

Electricity is an integral part of modern society. At present, we cannot think of a life without electricity. But it has capacity to stand life and destroy the life up to death. The objective of this study was to find out the important feature related to electrical injury and their preventive measure. An observational retrospective study was done in the department of forensic medicine, Dhaka medical college over two-year period. A total 2018 autopsies were conducted and only 47(2.32%) cases were selected as fatal electrocution. During this study period, maximum electrocution occurred in males 34(72.34%) in the age group 21-30 years 14(29.78%). A great number of deaths were caused by low voltage electrocution 31(65.95%) and most of them in their workplace 18(38.29%). In majority cases only, entry wound found 25(53.19%) especially upper limb of the victim 22(46.8%). Death from electrocution usually uncommon and found to be lower among all other medicolegal death and majority of the electrical fatalities were occupational related which was preventable. Proper education about the use of electric device and safety measure can prevent most of the electrical fatalities.

Key Words: *Electrocution; Entry and Exit wound, Fatal, Voltage,*

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Introduction:

In modern society, electricity is the most important part for day to day life and we can not think our daily activities without it. But now a days it has become one of the significant causes of morbidity and mortality. The passage of substantial electrical current through the tissue can causes skin lesion, organ damage and death. This injury is commonly called electrocution ⁽¹⁾. Fatalities are usually accidental both in domestic

and industrial. Suicide from electricity have increased recently especially in Germany. Homicide is rare but is recorded in united states, electricity has become a means of judicial execution ^(1,2). Electrical injuries consist of 1. Fatal electrocution, 2. Electric shock and 3. Burn. For an electric shock to occur there must be contact by the body with both a positive and negative pole, and alternatively, the "earth". The earth may be any object not insulated from the ground. When earthling of the body is poor, as with dry and rubber shoes, carpets, wooden floors and upstairs premises, fatal electrocution is uncommon ⁽³⁾. In reality, the current drawn by a tiny 7.5w, 120-volt lamp, passed from hand to hand or hand to foot across the chest is sufficient to cause electrocution ⁽⁴⁾. Death in electrocution may result from instant shock due to vagal inhibition. With domestic supply, it usually results from ventricular fibrillation. With height voltage, death is usually due to electro thermal injury or from paralysis of respiratory Centre. In extensive burns, the fatal outcome may be due to hemoglobinuric nephrosis ⁽⁵⁾. Most of the electrical injuries are as a result of ignorance, misuse or carelessness ⁽⁶⁾. It signifies that people working at companies did not have an elementary

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knowledge of risks of electrocution. Most of the deaths were preventable.

Materials and methods: This retrospective study was done at the forensic medicine department, Dhaka Medical College during the period of July 2014 to June 2016. Electrocution death accounts for 47 cases (2.32%) of all autopsies (2018) done during this study period. Data was collected from the autopsy reports, case sheets from the hospital, the general prosecutor’s investigations report and the inquest reports from police. The data collected were thoroughly cleaned and entered into MS- excel spread sheets and analysis was carried out. Percentages were used in this study to analyze variables.

Results:

During the study period July 2014 to June 2016 electrical fatalities comprised 2.32% (n=47) of all autopsies (n=2018). The majority of the victims of electrocution were male 34(72.34%) and only 13 cases (27.65%) were female (Table-1). Maximum electrocution deaths occurred in the age group of 21 to 30 years 14(29.78%) followed by age group 31 to 40 years 12 (25.53%), age group 41 to 50 years 09(19.14%), age group 11 to 20 years 08(17.02) age group 51 to 60 years 02(4.25%). Age group 0-10 years and above 60 years were only 01(2.12%) (Table-2). Electrical fatalities were maximum at the working place 18(38.29%), followed by 16(34.04%) were domestic and 13(27.65%) were outdoor (Table-3). Among the total victims of fatal electrocution 47, entry mark was found 25(53.19%) cases, entry and exit mark 12(25.53%) cases and no electrical burn marks in 10 cases (21.27%) (Table-4). A great number of deaths were caused by low voltage electrocution 31(65.95%) and followed by high voltage electrocution 13(27.65%) and others 03(6.38%) (Figure-1). Entry lesions were localized on upper limb in the majority cases 22(46.8%) and no electrical lesions were found in 2(4.25%) cases (Figure-2).

Table-I

Case distribution according to sex (n=47)

Sex	Number	Percentage
Male	34	72.34%
Female	13	27.65%

Table-II

Age distribution of the victims in fatal electrocution (n=47)

Age	Number	Percentage
0 to 10	01	2.12%
11 to 20	08	17.02%
21 to 30	14	29.78%
31 to 40	12	25.53%
41 to 50	09	19.14%
51 to 60	02	4.25%
Above 60	01	2.12%

Table-III

Place of occurrence (n=47)

Place	Number	Percentage
Work place	18	38.29%
Domestic	16	34.04%
Outdoor	13	27.65%

Table-IV

Type of burn mark presents in electrocution (n=47)

Burn mark	Number	Percentage
Entry wound	25	53.19%
Entry and Exit	12	25.53%
Not observed	10	21.27%

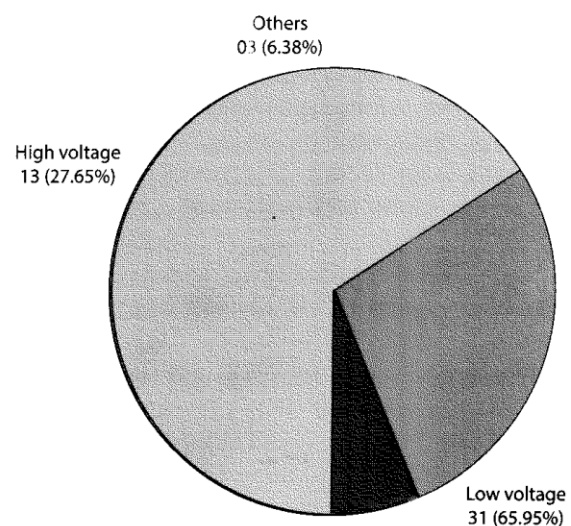


Fig.-1: Distribution of cases according to voltage.

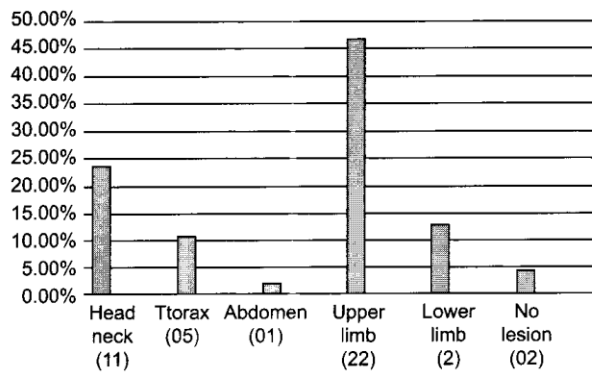


Fig.-2: Distribution of entry lesions according to body part.

Discussion:

Electrocution is an uncommon cause of death. Exposure to electricity as the precipitating cause of death in the workplace. Among the total electrocution death, 34 (72.34%) cases were male. It may be due to more exposure of men to electric hazards. This result of this study is similar to previous studies done in other country (7,8). The majority of the victims were age group 21 to 30 years 14 (29.78%), which was similar to many other previous studies (7,9,10). Work related electrocution deaths were the most common form of accidents 18 (38.29%) in this study. Most of the workers are unaware to the potential electrical hazards present in their work environment, which makes them more vulnerable to the danger of electrocution. United states have known that electrocution continues to be a major cause of death of workers, because workers and employers were do not recognize the important of safety training and implementing safe practices⁽¹¹⁾. Entry wounds were present in majority cases 25 (53.19%) and both entry and exit wound were 12 cases (25.53%). Where as there were no burn mark present in 10 cases (21.27%). Other studies reported this type of results^(12,13). Low voltage victims were 31 (65.95%) more than high voltage 13 (27.65%). In India, death occur mostly at voltage between 220-240 volts alternative current however death due to lower voltage had been also reported⁽¹⁴⁾. In this study, entry lesion was mostly localized on the upper limbs 22 (46.8%), which was parallels to a study in Gauteng, south Africa⁽¹⁵⁾. Fatalities caused by electricity are preventable, still death due to electrocution are on the rise.

Conclusion:

Among the total autopsy cases 2018 conducted during this study period only 47 (2.32%) cases

were found where death was due to electrocution. Males were the predominant victims and all of the death in this study was accidental. Most of the electrocution occurring during working when was preventable. To ensure that all electric devices are properly designed and maintenance which helps to prevent the fatal electrocution injuries in the workplace and also at home. Proper education for worker and employers and provided safety measures by the authorities can prevent most of the electrocution fatalities.

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