

Accidental High Voltage Electrocution: a Case Report

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ABSTRACT

Background: Without electricity, mankind wouldn't have progressed to the heights we are at now. As much as electricity is helpful, being careless with it can be fatal. The passage of electric current through the body produces wide range of effects, varying from insignificant localised spasm, little or no contact burns, fatality with little or no burns or extreme severe burning.

Case Report: This case report discusses the injuries sustained by a young adult, due to accidental contact with high tension wire.

Conclusion: This paper also highlights safety rules pertaining to high voltage cables.

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► *Implication for health policy/practice/research/medical education:* Accidental High Voltage Electrocution

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1. Introduction:

Even before electricity was discovered, ancient people were aware of shocks from electric fishes. They were mentioned in ancient Greek, Roman and Arabic literature (1).

Electric current is the movement or flow of electrically charged particles. The passage of a substantial electrical current through the tissue can cause skin lesions, organ damage and death. This injury is commonly called

electrocution. Electric fatalities are usually accidental in nature (2).

In developing countries like India, where population density is high and people tend to flout the building rules with regards to electricity, high tension wires pass by very near to the sides of homes and high rise buildings. These lead to many cases of accidental electrocution. Severity of electrocution injuries mainly depends on the path traversed by the current along with type and duration of its contact with the body.

In high voltage over-head line electric injuries, the victim acts as a conduction rod to earth causing damage to subcutaneous tissue and muscles with damage at entry and exit points. Burns may be severe with confluent areas of third degree burns or charring of the body. Sparking can also

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occur over many centimetres resulting in 'crocodile skin' lesions (3).

2. Case Report:

Body of a 21-year old male was brought to the mortuary of JSS Medical College, Mysuru. The victim accidentally came into contact with a high tension wire which was passing by the side of his house terrace (Figure 1).

Autopsy Findings

On external examination, lesions of entry in the form of deep burns exposing tendons with charring of edges were seen over right and left palm (Figure 2).

Exit lesions in the form of deep burns exposing tendons with charring of edges were noted over the sole of right and left foot (Figure 3 and 4).

Multiple punched out lesions (Crocodile flash burns) were present over front of chest and both upper limbs (Figure 5).

Superficial burns with singeing of hair were present over head, neck, both upper limbs, front of chest, abdomen, upper back and genitals. Total body surface area involved in burns was 55%.

On internal examination, petechial haemorrhages were seen in the white matter of the brain, over the epicardium and endocardium of the heart

3. Discussion:

A detailed history of the incident revealed that the victim who was talking over mobile near the sides of terrace lost his balance and came into contact with the high tension wire.



Fig. 1. The scene of occurrence and position of body.



Fig. 2. Entry lesions.



Fig. 3. Exit lesion over the sole of right foot.



Fig. 4. Exit lesion over sole of left foot.



Fig. 5. Crocodile flash burns over the right upper limb.

Histopathology of entry and exit marks showed partially separated dermis and altered dermal papilla with streaming of nuclei. The skin over crocodile flash burns showed thinning with focal separation of epidermis with nuclear streaming.

Cause of death in this case was opined as death due to electrocution. The crocodile flash burns seen in the victim's body is as a result of high voltage current which can result in sparking over many centimetres.

As per Indian Electricity Rules 1966, clearance for construction of buildings adjacent or beneath the high voltage line is issued based on the maximum sagging of the electric lines and vertical clearance between the highest point of the building and the electric lines. While the clearance distance between the building and electric line should be 3.7 meters for lines carrying power up to 33 kV and for lines carrying power above 33 kV, a distance of 0.3 m will be added for every additional kV (4, 5).

The distance between high tension power line and the house as seen in figure 1 in the present case, was less than 1 meter which is in clear violation of rules.

The High tension wire in this case had a protective plastic pipe casing. Even with protection the victim was electrocuted. The plastic casing may have been weakened because of elements of nature.

A study done by a group of workers in Hyderabad, India showed high voltage electrocution accounts to 18-26% of deaths due to electric current. The study also showed 40% of the victims were from age group 21-40 years (6) to which the victim of present case also belongs to.

Accidental electrocution may be encountered when an individual disregards warning signs

or ignores the presence of high voltage cables when he is engaged in some activity near the cable (7). Most of the electrocution deaths are preventable (8).

4. Conclusion:

Present case occurred as a result of flouting of building rules with respect to overhead electric wires which reflects poor town/city planning. This case warrants the need of underground electric cables or proper insulation of overhead electric wires.

Proper education and awareness programmes of general public regarding electric safety will reduce the number of such cases.

Insulating/isolating high tension electric wires would insulate life.

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