

Suicidal electrocution using a homemade electrocution device

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Abstract

Electrocutions deaths are mostly accidental, suicidal electrocutions are rarely reported. The records of Forensic Medicine Council of Turkey Bursa Morgue Department reveal second case of suicidal electrocution during the past 20 years. The presented case was a 61 year old man, found by his wife at his home bedroom, using a homemade suicidal electrocution device with bare copper wires. The mechanism of death and autopsy findings in suicidal electrocution is discussed.

Key Words: Suicide, Electrocution, Forensic Autopsy

Electrocutions deaths are mostly accidental, suicidal electrocutions are rarely reported¹⁻⁴. Different mechanisms can cause death in electrocution: ventricular fibrillation, tetanic respiratory spasm, and paralysis of the central nervous system respiratory centres^{4,5}. Pathologic findings in electrocution include streaming of the epidermal nuclei, microscopic blisters of the epidermis, and heat artefacts^{4,6,7}. The records of Forensic Medicine Council of Turkey Bursa Morgue Department reveal second case of suicidal electrocution during the past 20 years. The presented case was a 61 year old man, found by his wife at his home bedroom, using a homemade suicidal electrocution device with bare copper wires.

Case report

The records of Forensic Medicine Council of Turkey Bursa Morgue Department reveal second case of suicidal electrocution during the past 20 years. Victim was a 61-year-old man. He was found by his wife unresponsive on the floor at his home bedroom, with bare copper wires encircling left wrist (Fig 1), and neck. The suicidal electrocution device consisted of bare copper wires. One of these wires encircling left wrist, and other neck, the other ends of the wires were connected to the copper wire led from the switch to a plug. An extension cord running along the floor was plugged into a wall outlet supplying 220-V

current. Interviews by police revealed that the victim was retired electric technician, who was despondent over the labour accident eight years ago; although he underwent several spinal operations he had depressive personality changes. The victim was taken to the Forensic Council Bursa Morgue Department for further examination. On gross physical examination, there were circumferential electrical burn areas with green copper deposition of up to 0.3 cm wide on the skin of the left wrist and neck (Fig 2). Autopsy macroscopic examination revealed petechial haemorrhages on lung surfaces and internal organs. Microscopic findings consistent with electrical burns were found on the skin of the wrist and neck. There was streaming of the epidermal nuclei and microscopic blisters in the epidermis. Other findings at autopsy included coronary artery atherosclerosis. Histology of internal organs confirmed the gross findings. Toxicological studies revealed no special finding.

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Fig 1: Copper wire encircling left wrist



Fig 2: Electrical burns on the neck



Discussion

Electrocution deaths are mostly accidental, suicidal electrocutions are rarely reported¹⁻⁴. Suicidal electrocution cases with bare copper wires encircling wrist and ankles creating circuit including heart^{6,7}, suicide in bathtub², besides cases using time regulated electrocution machines asserting chest metal objects like electrodes have been reported^{8,9}. Wick et al¹ found that electrocution suicides were evenly distributed throughout the year, with higher rates among males. On the other hand Fernando³ et al and Leygraf⁷ stated that suicidal electrocution of mentally ill individuals with depressive personality changes is common pattern.

Suicides by electrocution were examples of low-voltage electrocution^{3,6,10}, suicidal electrocutions of high voltage were rarely reported¹¹. In our country, the most accessible source of electrical power is household current: which is 220-V. Low voltage electrocution can induce ventricular fibrillation, cause tetanic contraction and spasm of the diaphragm and intercostal muscles, leading to respiratory arrest, or cause paralysis of the respiratory centres of the brain^{2,5,6}. In all mechanisms, the exogenous current disrupts the endogenous electrical polarity of the victim's cells and these changes ultimately lead to hypoxia and death⁴. Current flows best through the blood vessels, as blood is a salt solution, but current can also be conducted through the rest of the body because cells are bathed in tissue fluid, also a salt solution^{4,5}.

Current passing across the chest is most dangerous to life^{6,7}, this path like in our case puts the heart in line with the current. Cardiac myocytes are particularly

sensitive to current^{5,12}. Current fluctuations tend to induce ventricular fibrillation and produce little or no cardiac output and therefore lead to systemic hypoxia and death within minutes⁴.

Petechial bleedings of internal organs "electrical petechiae" have been stated that represent a non-specific but typical finding in electrocution irrespective of the mechanism leading to death, and also indicate the vital origin of the events¹⁰. In addition Andreas et al⁹ described a blackish linear mark on the pleura parietalis of the inner side of the thoracic cavity, connecting the cutaneous current marks. Electrical burns have a characteristic appearance and pathologic findings, electrocution include streaming of the epidermal nuclei at the point of contact with the current, microscopic blisters of the epidermis, and heat artefacts^{4,6,7}.

Conclusion

Electrocution deaths are important problem in all industrial countries. Especially suicidal electrocution deaths are valuable from medico legal aspect. The rareness of suicide by electrocution and its forensic characteristics are discussed in order to help the clinical forensic examiners, and police officers concerned by such death examinations for excluding the other possible manners of death.

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