

# FORENSIC CHARACTERISTICS OF SUICIDE BY HIGH VOLTAGE ELECTROCUTION IN TUNISIA AND ROLE OF MEDIA COVERAGE

## *SUICIDE PAR ÉLECTROCUTION EN TUNISIE : CARACTÉRISTIQUES MÉDICO-LÉGALES ET RÔLE DE LA COUVERTURE MÉDIATIQUE*

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### ABSTRACT

High voltage electrocution is a relatively scarce mode of suicide which is surprising in view of the availability of means. Indeed, only a few cases are reported in the forensic literature.

**Objective:** To identify the risk factors of suicide by high voltage, its features and to highlight the huge role of the media coverage in raising the prevalence of this way of suicide.

**Methods:** Retrospective study, based on the autopsy records of all suicidal high voltage electrocution cases conducted over a period of eight years: from January 2007 to December 2015 at the forensic unit of Habib Bourguiba Sfax.

**Results:** A total of 7 suicidal deaths from high voltage electrocution occurred between 2007 to 2015, representing 0,7% of all cases of suicide. The distribution was uneven depending on the year. In fact, in 2007, 3 cases were recorded in the same month. All the vic-

tims were single and young. The average age of victims was 22, 28 years. Males prevailed. More than half of them were unemployed, living in rural areas (4 victims). In two cases, a history of mental disorder was found. However, no case of previous attempted suicide was mentioned.

The autopsy allowed us to identify in all cases the association between extensive electric burns and important traumatic injuries contributing together to death.

**Conclusion:** Suicide by high voltage electrocution in Tunisia is becoming an increasing problem in the last years. It occurs in young age groups and the victims are typically men. The springing of the number of suicide is due to the role of media coverage. Proper preventive strategies to minimize such negative influence of media reporting must be implemented.

### KEYWORDS

Suicide, Electrocution, High voltage, Media coverage.

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## RÉSUMÉ

*L'électrocution à haut voltage est un mode de suicide relativement rare, ce qui est surprenant compte tenu de la disponibilité de ce moyen.*

**Objectifs :** Identifier les facteurs de risque du suicide à haut voltage, en insistant sur le rôle des médias dans l'augmentation de la prévalence de ce mode de suicide.

**Méthodes :** Il s'agit d'une étude rétrospective sur une période de huit ans : de janvier 2007 à décembre 2015 à l'unité médico-légale de l'Hôpital Habib Bourguiba Sfax, colligeant tous les cas de suicide par électrocution à haut voltage.

**Résultats :** Au total, sept cas ont été colligés, ce qui représente 0,7% de tous les cas de suicide survenus pendant la période d'étude. La répartition était inégale en fonction de l'année, avec un pic de 3 cas en 2007 faisant suite à une médiatisation excessive du premier cas survenu cette année là. Toutes les victimes étaient des jeunes hommes célibataires, avec un âge moyen de 22, 28 ans. Plus de la moitié d'entre eux étaient au chômage, vivant dans les zones rurales. Dans deux cas, des antécédents de troubles mentaux ont été retrouvés. Cependant, aucun cas de tentative de suicide n'a été mentionné. Un cas de suicide complexe a été également rapporté. L'autopsie a mis en évidence dans tous les cas l'association entre des brûlures électriques étendues et des lésions traumatiques importantes par projection, contribuant ensemble à la mort.

**Conclusion :** Le suicide par électrocution à haut voltage survient chez des sujets jeunes majoritairement de sexe masculin. L'augmentation du recours à ce mode suicidaire est due dans notre série à une médiatisation anarchique des cas. Une stratégie préventive appropriée pour minimiser cette influence négative de la couverture médiatique doit être instaurée.

## MOTS-CLÉS

*Suicide, Electrocution, Couverture médiatique, Haut voltage.*

## 1. INTRODUCTION

Suicides have reached an almost epidemic range in our country after the revolution of January 2011, thus turning into a significant public and health issue. In our country, the most commonly used methods to accomplish this act over the last decade were hanging and self poisoning. Cases of suicide by electrocution are relatively rare and not sufficiently studied.

This prompted us to undertake this study in order to present a more detailed picture of suicidal electrocution in our region, and to highlight the role of media coverage in raising its prevalence.

## 2. MATERIAL AND METHODS

It is a retrospective study conducted over a period of eight years (2007-2015), at the forensic unit of Habib Bourguiba Sfax, Tunisia, collecting all the cases of high voltage electrocution. The forensic medical files were studied for the purposes of this study.

Data was analyzed with regard to the age and sex of the victim, living area, marital and employment status, mental illness history, and previous suicide attempts.

## 3. RESULTS

During the 8-year-long period of study, 78 cases of death related to electricity were identified, out of which 7 were cases of suicidal electrocution, representing thus 0,7% of all cases of suicide (Table I).

Three cases happened all together in 2007 during the same month. All victims were single young people. The average age of victims was 22, 28 years. Males prevailed (6 men/1 women). 4 victims were unemployed, and 4 among them were living in rural areas (4 victims). In two cases, a history of mental disorder was found. However, no cases of previous attempted suicide was mentioned. All cases concerned high voltage electrocution. The most employed manner of

*Table I: Distribution of suicidal methods (2007-2015).*

Suicidal method	Percentage
Hanging	40.65%
Intoxication	17.99%
Drowning	13.31%
Defenestration	10.79%
Immolation	7.91%
Rail way	6.12%
Firearm	6.12%
<b>Electrocution</b>	<b>6.12%</b>
Cold steel	6.12%
Traffic accident	6.12%

suicide by electrocution was direct contact victim/ electrical cable, by wrapping the electrical cord around the hand (figures 1, 2, 3), or climbing to the top of a high voltage power pole and throwing on the cable.

The external examination revealed burn marks on victim's clothes (figure 4), high voltage electrical burns with epidermal detachment (figure 5), associated with bruises, and accelerated rigor. External traumatic injuries by secondary projection were noticed in most of the cases (figure 6). One case of complex suicide was also recorded, with bruises caused by phlebotomy in the left forearm (figure 7). The autopsy found acute pulmonary and cerebral edema, intense visceral congestion and petechiae in the gastrointestinal tract in all the cases. Traumatic injuries caused by projection were observed in 6 cases (figures 8-11).

#### 4. DISCUSSION

Given the widespread use of electricity, it is perhaps surprising that fatalities related to its use are not more common. Nevertheless, epidemiological characteristics of electricity related deaths remain insufficiently studied [1].

Lethal injuries caused by low-voltage electrical current (electrocution) are considered to be the most frequent injuries caused by electrical current [2, 3], due to the immensely larger access to electrical installations and low-voltage operated electrical devices. Whereas, electrical burns due to high voltage current (1000V, 50Hz) are usually work-related accidents in electricians, construction workers, truck drivers, farmers... In the published reports, suicide by electrocution is relatively uncommon [4].

Our results show that like other forms of 'violent' suicide, this method showed a strong male bias especially when the victim is unemployed, a fact observed not only in our study but also by other authors [5, 6]. In a study carried out in BULGARIA, collecting 59 cases of suicidal electrocution during 27 years (1980-2006), the average age of victims was 45.19 years. Males prevailed: 91.53%. 42.37% of the victims applied low voltage (<220 V), and 33.99% applied high voltage (>220 V).

Moreover, other authors have ascertained seasonality in fatal accidents caused by electric current whose number increases abruptly during the summer months, between June and September [6, 7]. They attributed this seasonal trend to the following major factors:

- The electrical threshold of the myocardium for excitability is decreased with increased environmental temperature and hence the increased number of cases of ventricular fibrillations.

- When environmental temperature is high, skin moisture is increased and skin resistance is decreased.
- The summer season presupposes less clothing, and a greater likelihood of direct electrical contact with moist bare skin.

Most deaths from electricity are caused by cardiac arrhythmias, usually ventricular fibrillation ending in arrest [1]. This is caused by the passage of current through the myocardium, especially in the superficial epicardial layers and possibly across the endocardium. The current has a profound effect directly up on the myocardial syncytium, the possible dislocation of the pace making nodes and conducting systems being ill-understood. When death occurs from cardiac arrest, the body remains either pale or only slightly congested, the autopsy appearances being unhelpful apart from the presence of any external electrical marks.

The second (and far less common) mode of death is respiratory arrest, in which the passage of current through the thorax causes the intercostal muscles and diaphragm to go into spasm, or become paralysed. In either case, respiratory movements are inhibited and a congestive hypoxic death occurs. The brainstem is affected rarely, when the current enters through the head. Either cardiac arrest or respiratory paralysis can then supervene.

Histologically, the skin mark consists of vacuolation in the epidermis and sometimes dermis, caused by the gas spaces from the heated tissue fluids splitting the cells apart. The affected tissues become more eosinophilic. The cap of epidermis may be detached and raised into a blister, with a large space beneath. The cells of the epidermis are often elongated, with the nuclei of the lower layers orientated and horizontally stretched [1].

Focal petechial hemorrhages, spaces around small blood vessels and tears in white matter have been described. Electron microscopy reveals a variety of changes, especially in the nuclei of skin cells, which are deformed with clumped chromatin. Janssen (1984) has compiled a review of electrical histological lesions in his book on forensic histology, but it seems evident that there is little that is absolutely pathognomonic of electrical as opposed to purely thermal burns [8].

#### 5. SUICIDE AND MEDIA COVERAGE

Our study found that there is an unaccustomed recurrence of suicide by high voltage electrocution during the 8 years of our research. Indeed, the last case of suicide recorded in our department was in 1997. 3 cases of suicide occurred in 2007 during the same month and in the same town, after the tremendous media



*Figures 1-2-3: Electrical burns in the hand due to grasp of the wire.*



*Figure 4: Marks of burns on victim's clothes.*



*Figure 5: Extensive electrical burns.*



*Figure 6: Head injuries by projection.*



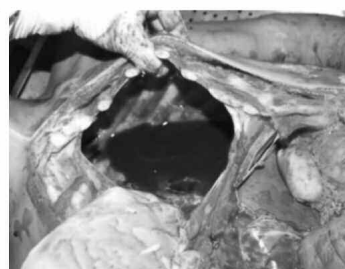
*Figure 7: Phlebotomy done before the electrocution.*



*Figure 8: Smash the skull.*



*Figure 9: Lung injury.*



*Figure 10: Chest trauma.*





*Figure 11: Hepatic wound.*

coverage of the first case. Notions about suicidal contagion after reporting cases of suicide in newspapers go back to 19<sup>th</sup> century medical literature [9]. In the literature, suicide contagion is also referred to as imitative, copycat or mass cluster suicide. Associations between media portrayal and suicidal behaviours have been a subject of research for decades. Although the media is only one feature of the social environment in which suicidal behaviors can be learned [10] and the effect is probably smaller than that of other psychosocial risk factors for suicide [11], it is a significant agent in social construction of reality, especially for vulnerable persons (young person, mentally disturbed, or identifies with the person who committed suicide). Moreover, suicide risk increases with the number of shared characteristics between the victims (age, gender, peers and family members) and the popularity of the suicide victim [12].

The risk of imitative suicide is the highest during the first 3 days of reporting and levels off after about 2 weeks [13]. Celebrity suicide, repeated news coverage, and sensational stories, enhance the risk [13]. A dose-response effect is also evident from increased suicide-rates after front page suicide coverage, use of large-headlines, and publication of pictures [13]. Description of the method of suicide increases suicidal behavior by the same method [13]. Copycat suicides are less likely to follow television reports than newspaper reports, perhaps because newspapers can be preserved for reading and re-reading [13].

In fact, many studies have looked at the effect of media coverage on suicide rate in the general population [14]. Two phenomena are used to describe the association between suicidal behaviour and media exposure: the Werther effect [12] and the Papageno effect. The Werther effect (WE) refers to the robust increase of suicide rates following the publication of a suicide story. This specific kind of mass cluster implies a suggestion process, i.e. imitation of the depicted death by vulnerable persons. In contrast, the preventive potential of medias has been labeled the "Papageno effect" (PE). Although more recently discovered and far less known, PE predicts that journalists can help prevent suicidal behaviors beyond a simple WE reduction [12].

Based on this strong evidence, many countries such as the USA provide guidelines for safer reporting [15]. Guidelines have also been issued by the World Health Organization (WHO) [14] for professional journalists and have been recommended to all the member states of WHO. Besides, The Indian Psychiatric Society offers simple and easy-to-implement suggestions that the media can adopt in the form of guidelines [13]. While these recommendations have been prepared with the media printed in mind, parallels can easily be drawn for visual media. For example, it has been suggested that media coverage should be discreet, avoiding first page reports, presentation in boxes, use of headlines, and lengthy reporting. For television media, this could result in avoidance of prime time coverage, prolonged coverage, repeat coverage, comments excited by on-site journalists, and graphic visual imagery. And it recommends that these guidelines be circulated among mental health professionals and the media in order that the guidelines may be implemented for the benefit of society as a whole [13].

Conclusively, such guideline and continuous education can be highly successful in responsible manner of reporting concentrating on encouragement of help-seeking and minimization of harmful messages without discouraging intention of media report [17, 18].

## 6. CONCLUSION

Suicide by high voltage electrocution in Tunisia is becoming an increasing problem. It occurs in young age groups and the victims are typically men. The springing of the number of suicide is due to the role of media coverage.

Regarding proper preventive strategy to minimize such negative influence of media reporting must be requested. ■

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