ANALYSIS OF FATAL ELECTRICAL TRAUMAS IN THE REGION OF VARNA FOR A 41-YEAR-LONG PERIOD

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ABSTRACT

Introduction. Electrocotraumatism (ET) is rare to observe, but it presents a significant problem both for public health and forensic medicine. The purpose of this study is to identify some features and circumstances typical of ET on the territory of Varna District. Material and methods. Forensic medicine documentation has been examined from 16,780 autopsies for the period 1965-2005 performed at the Chair of Forensic Medicine and Deontology, the Medical University of Varna. The results have been processed by the statistical methods of alternative, variational and graphical analysis. Results. Over the 41-year-long period, a total of 280 ET autopsies have been performed, which accounts for 1.67% (p=Δ1.5) of all autopsies. Lethal injuries by electric current typically occur in young age. Young males prevail. More than half of the events have been domestic ET. In the studied group, the number of accidents caused by high voltage is about the same as the number of accidents caused by low voltage. Suicide by electric current is relatively rare. A forensic medicine expert participated in 99 (62.26% p=Δ6.95) of the inspections on the scene of accident. Conclusions. ET affects mainly young males in domestic ET.

Keywords: Electro-traumatism, Varna District

INTRODUCTION

Electrocotraumatism (ET) is rare to observe, but it presents a significant problem both for public health and forensic medicine. Its relatively low incidence is not conducive to major studies due to which there are scarce data on this problem in literature. This prompted us to undertake the present study.

PURPOSE

The purpose of this study is to identify some features and circumstances typical of ET on the territory of Varna District.

MATERIAL AND METHODS

Forensic medicine documentation has been examined from 16,780 autopsies for the period 1965-2005 performed at the Chair of Forensic Medicine and Deontology, the Medical University of Varna. The results have been processed by the statistical methods of alternative, variational and graphical analysis.

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RESULTS AND DISCUSSION

Over the 41-year-long period, a total of 280 ET autopsies have been performed, which accounts for 1.67% (p=Δ1.5) of all autopsies. The average age of the deceased from ET is 35.47±2.91 years, within the scope of 1 to 83 years. Male gender prevails over the female with 242 (86.43% p=Δ4.22) to 38 (13.57% p=Δ9.39). The difference in the relative share between males (M) and females (F) is statistically reliable (p<0.001).

![Graph showing gender distribution of deceased from electrotrauma.](image)

more than half of the cases are domestic ET (DET): 160
(57.14% p=Δ7.67), and about 1/3 are labour-related
electrotraumas (LET): 86 (30.71% p=Δ9.75). Suicides
(SC) by electric current are relatively rare to observe: 17
(6.07% p=Δ11.35)
In 18 cases (6.43% p=Δ11.33), there are no data about the
type of the accident on inspection or the autopsy (N/A).

![Diagram of ET types]

**Fig. 2 Structure of ET depending on the type of
electrotrauma.**

Injuries caused by low voltage (<220V), 93 (33.21%
p=Δ9.57), and by high voltage (>220V), 91 (32.5
p=Δ9.62), are approximately the same number without a
significant difference (p>0.5). In 96 cases (34.28 p=Δ9.49)
there are no data about the voltage of the electric current at
the beginning of the expertise, which impedes the diagnos-
tic process.

A large part of information significant for the foren-
sic-medical diagnosis and expertise can be ascertained as
soon as the scene of accident is inspected. Forensic-medical
expert participated in 99 inspections (62.26% p=Δ5.55) out
of a total 159 cases studied by us, but quite a few, 60
(37.74% p=Δ12.27), were performed in his absence.
Electrotraumas account for 3.1% (1) respectively 5% (3),
5.1% (5) up to 21% (4) of all cases of burns. Our data have
revealed that ET is observed in 1.67% of all autopsies after
violent or non-violent death.

Our study has discovered a characteristic age-related pecu-
liarity. ET affect mainly young people (x=35.47±2.91
years) of working age. There is a peculiar distribution of the
cases by gender. We have ascertained that males are mainly
affected (86.43% p=Δ4.22). Similar results are reported by
to whom males are affected in 67% or 95% of the cases, re-
spectively.

The results of our study show that the prevailing part of ET
are domestic or labour-related accident. With results like
these, we could not agree more with the recommendations
given by Nursal TZ, et al (2003 ) according to whom pre-
vention, public discussion of the problem and strict observ-
ance of the rules when distributing electric power would
notably reduce this type of traumatism.

While the data given by Celik A, et al (2004) point to a
prevalence of injuries due to electric current of high volt-
age: 63%, our results show a relatively even distribution of
the cases either of high or low voltage. At the other end of
the scale are the data given by Byard RW(2003): a very rare
occurrence of accidents caused by high voltage.

Our study brings forth a question of pressing interest about
the effectiveness of the process of diagnostics and expertise
in relation to the data from the inspection of the accident
scene. The relatively high percentage of cases (37.74%)
where a forensic medicine expert was not present on the
inspection point to feasible opportunities to increase the
speed and quality of expert activities in this direction.

**CONCLUSIONS**

Fatal injuries due to electric current are typical of young
age.

There is a prevalence of persons of male gender.

More than half of the cases result from domestic
electrotraumatism.

The injuries due to high or low voltage current are distrib-
uted approximately evenly by number in the group under
study.

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