

OUTCOME OF ELECTRIC SHOCK INJURIES: AN EXPERIENCE AT THE LADY READING HOSPITAL PESHAWAR

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ABSTRACT

Objectives: To determine the clinical presentation and outcome of accidental electric shock injuries in patients brought to the Department of Accident and Emergency, Lady Reading Hospital, Peshawar.

Methodology: This descriptive study was conducted in the Department of Accident & Emergency, Lady Reading Hospital, Peshawar from 1st January 2011 to 31st December 2011. Patients with clear history of electric shock according to the patients or attendants were included in the study through consecutive sampling technique. Data was acquired through clinical history, physical examination and relevant investigations. Patients who were received dead and the attendants were not sure about the causes of death were excluded from the study. Data were analysed and presented in the form of tables.

Results: A total of 219 patients were studied in which male and female were 161 (73.52%) and 58(26.5%) respectively. Age wise distribution showed that 106(48.4%) were in age range of 20-40 years. The majority of cases were brought in the months of July 38(17.4%), August 44(20.1%) and September 43(19.6%). Patients having only minor injuries were 64(29.2%) while dead were 34(15.5%). Patient having neurosurgical injuries were 23(10.5%) while orthopaedic injuries, poly trauma, burn injuries and cardiac arrhythmias were 21(9.6%), 19(8.7%), 11(5.0%) and 7(3.2%) respectively. Majority of patients 153(70%) were buried in ground due to the local myth before bringing to the hospital.

Conclusion: Electric shock carries high morbidity and mortality. The majority of electric shock injuries occurred in the summer rainy season.

Key Words: Electric shock, Morbidity, Mortality, Pattern of injuries

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INTRODUCTION

Electrical injuries have been reported for almost 300 years. The first reported death caused by the electrical current was in Lyons, France in 1879. The apparent painlessness of electrocution was considered a "humane" way of execution. William Francis Kemmler was the first man electrocuted in 1890 in New York State's electric chair. The electrocution (electrical injury plus death) can be caused by DC (like Battery, Dynamos) and AC like electricity. The mortality from electrical shock is upto 5%¹.

The minimum current a human can feel depends on the current type (AC or DC) and its frequency. A person can feel at least 1mA of AC at 60Hz, while at least 5 mA for DC. About 10mA, AC current can cause powerful muscle contractions and the victim is unable to voluntarily control muscles and cannot release an electrified

object. This is known as the "let go threshold"².

Electrical burns account for 4- 6.5% of all admissions to burn units. The mortality is 1000 deaths per year in the United States. Most of the injury is thermal due to temperature of about 2500°C and coagulation necrosis³⁻⁴. The severity of injuries depends on the current strength, resistance and duration of current flow. The electrical injuries are burns, blunt trauma due to falls, cardiac arrest (ventricular fibrillation), fractures of the long bones, loss of consciousness, head injury, confusion, disturbances in memory and concentration, spinal injury and seizures. Neurologic symptoms may improve, but long-term disability is common^{3,5}. Initial resuscitation requires cardiac and trauma care. Intravenous fluids and vitals monitoring is important.

In the US 1000 deaths are reported in a year. Clear statistics are not available in our country about electric shock injuries and deaths. The purpose of this study was

to determine the outcome of accidental electric shock injuries in patients brought to the Department of Accident and Emergency, Lady Reading Hospital, Peshawar. This study may help in pointing out the importance of multi-disciplinary approach in the management of electric shock patients because of the presence of poly trauma and may help to create awareness among the public about the mechanism of injuries in these patients to stop the burials of victims of electric shock.

METHODOLOGY

This descriptive study was conducted in the Department of Accident & Emergency, Lady Reading Hospital, Peshawar from 1st January 2011 to 31st December 2011. 219 patients with the clear history of electric shock (according to the patients or their attendants) were included in the study through consecutive sampling technique. Patients who were received dead and the attendants were not sure about the history were excluded.

All patients were resuscitated in emergency room. Intravenous line were established and IV fluids were given. Patients with spinal injuries and long bone fractures were splinted. Those who were received dead, their deaths were confirmed by ECG. Resuscitation was not performed in dead cases who were >30minutes late.

Data was acquired through clinical history, physical examination and relevant investigations. ECG ; X-Rays of suspected fractures of long bones , spine, chest; abdominal ultrasound and CT brain were performed. All information was recorded on a pre-designed structured proforma. Descriptive statistical analysis (frequency, percentage, ratio, range and mean/SD) was employed for variables of interest. Data storage, processing and analysis was done utilizing SPSS version 21.0. Data was presented in the form of tables.

RESULTS

The total number of patients was 219. Males were 161(73.5%) and females were 58(22.5%). The ages ranged from 3years to 93years. Age-wise distribution of patients is shown in table 1.

19(8.7%) had poly trauma and 10(4.6%) other were very serious needed multi-disciplinary approach and special care. The frequency of patients who were referred to different specialities for admission and further treatment is shown in table 2. Out of 23 patients, 10 had minor injuries like scalp bruises and mild headache and with normal Glasgow Coma Score (GCS) were discharged home. The GCS was less than 8 in 10 (43.5%) cases and these were admitted in the ICU. CT scan find-

Table 1: Age distribution of electric shock patients

Age (Years)	Male	Female	Total	Percentage%
0—5	14	8	22	10.1
6—9	9	7	16	7.3
10—19	33	17	50	22.8
20—40	88	18	106	48.4
41—60	16	7	23	10.5
>60	1	1	2	0.9
Total	161	58	219	100

Table 2: Treatment in various departments and outcome of electric shock patients

Departmental Referral	Number of Patients (n)	Percentage (%)
Medical	25	11.4
Neurosurgery	23	10.5
Orthopaedics	21	9.6
Poly trauma	19	8.7
Burn unit	11	5.0
Paediatrics	5	2.3
Cardiac care unit	7	3.2
Discharged home after first aid	64	29.2
Received dead	34	15.5
Condition Serious	10	4.6
Total	219	100

Table 3: Month wise distribution of electric shock patients

Months	Male	Female	Total	Percentage %
January	11	0	11	5.0
February	3	2	5	2.3
March	4	1	5	2.3
April	11	2	13	5.9
May	7	2	9	4.1
June	18	7	25	11.4
July	25	13	38	17.4
August	30	14	44	20.1
September	31	12	43	19.6
October	7	2	9	4.1
November	7	3	10	4.6
December	7	0	7	3.2
Total	161	58	219	100

ings were brain contusions and intra cerebral haematomas. Out of 23 patients 3 had extradural haematomas and were operated.

The majority of cases were brought in summer season in the months of July 38(17.4%) cases, August 44(20.1%) and September 43(19.6%). Month-wise distribution of patients is shown in table 3.

DISCUSSION

Accidental electrical injuries have devastating complications in term of mortality and morbidity. No tissue and organ is immune to it. It affects any part of the body from vertex to toes depending upon the site of contact, voltage and duration. Severe burns, confusion, difficulty breathing, arrhythmias, cardiac arrest, muscle contractions, seizures, loss of consciousness, eyes injuries, other visceral injuries, fractures and dislocations can occur. The incidence of spinal cord injury following electrical trauma ranges between 2-5%⁴⁻⁶. Electrical injury may produce an immediate or delayed myelopathy. Immediate injury typically produces decreased levels of consciousness, paresthesias and weakness. Significant or complete recovery is frequently observed. Delayed spinal cord injury is usually incomplete and progressive and improvement is less common. Skin burn is a common electrocution complication ranging from 57-96% of a postmortem study of 220 fatal cases⁷.

In our study the mortality was 15.5%. This is much higher than international data because this is single hospital data. The reason is delayed presentation because the patients are first buried in mud for the extraction of currents according to the local taboos and customs. Despite the fact that current passes through

the body in a fraction of a second and nothing to extract through burying in the earth. In the mean while the patient dies or become serious then the attendants bring them to the hospital^{8,9}.

Electrocution can affect any age but adolescents and young adults are affected more because of job works and enthusiasm to amend the defective wires. In our study they are 48.4% and the incidence of electrocution is much higher in our study from the developed countries due to lack of safety measures. While in international studies mainly factories workers are involved⁹⁻¹¹.

The highest number of electrocution occurs in summer season of the year due to rains and over loading of power lines. In our study in the 4 months of summer (June, July, August and September) 68.5% cases were reported. This happens mainly in third world countries while in developed countries it is irrespective of the seasons¹²⁻¹⁵.

About one third patients 29.2% had mild injuries and discharged home after first aid. The main problems we faced were severe burns and poly trauma which need multidisciplinary approach and ICU care. The neurosurgical injuries were 10.5% cases and only 3 cases needed haematoma evacuation, 10 needed ICU care and 10 cases were mild and discharged after the first aid and stabilisation of neurological status¹⁷⁻²⁰.

CONCLUSION

Electric shock carries high morbidity and mortality. The majority of electric shock injuries occurred in the summer rainy season. Majority of patients underwent ground burial due to myth.

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CONTRIBUTORS

AH conceived the idea, planned the study, and drafted the manuscript. MZ, ZA, S, I, AM, MNK and M helped acquisition of data and did statistical analysis. AK supervised the study and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.