

AN EVALUATION PROTOCOL FOR ELECTRIC SHOCK INJURY SUPPORTED BY MINIMAL DIAGNOSTIC EVIDENCE

M. Steven Morse, Diana Weiss
University of San Diego, Alcalá Park, San Diego, CA 92110

ABSTRACT

While the immediate effects from electric shock injuries are obvious in terms of entry wounds, exit wounds and cellular damage to the pathway traversed by the current, the long term effects are often unpredictable. Furthermore, in electric shock injuries of either extremely short duration or of less than 500 Volts, there may be minimal or no observable diagnostic evidence that an electric shock actually occurred. Still, it is not uncommon to find individuals who suffer from a diverse set of neurological, physical, and psychological problems that seem to post-date the injury. When taken in conjunction with the litigious nature of our society, it becomes essential to develop a protocol to relate cause with effect in the absence of solidly quantifiable evidence. The protocol must provide a basis upon which a treatment plan can be established, blame can be assessed, and fraud can be detected. (Keywords: Electric Shock, Electrical Injury)^{1,2}

INTRODUCTION

After reviewing numerous electric shock injuries as an expert witness, the author has observed a particular class of injuries that seem to defy easy evaluation. The scenario of these injuries are often similar. An individual suffers a very brief duration shock, usually of less than 500V. The current pathway is typically hand to hand but may vary. Eleven such cases are reviewed here. Cases were chosen on the basis of the lack of clear diagnostic medical evidence and similarities in symptomology. (See TABLE 1)

TABLE 1
Summary of Electrical Injuries Reviewed

Shock Duration	
Momentary contact - 8 cases	
1-10 seconds - 2 cases	
unknown - 1 case	
Shock Magnitude	
120 Volts - 5 cases	
480 Volts - 2 cases	
10,000 volts (electric arc) - 1 case	
unknown - 3 cases	

Immediate effects from an electrical shock such as ventricular fibrillation and excessive cellular damage are not

observed in any of the cases examined. Observable manifestations were generally limited to reddening of the tissue at the entry or exit site or some minimal burning. Subjects rarely reported being rendered unconscious. Little more was noted on initial medical evaluation. In most instances, the injured party began to suffer from a wide array of symptoms within the first few hours. The initial symptoms tended to subside with time. Within weeks to months, the injured party began to suffer from a much greater array of symptoms (See TABLE 2). Relief from symptoms existing beyond 18 months was typically minimal.

Medical diagnostic procedures such as nerve conduction studies yielded marginal indication as to what the source of the problems may be. In almost all cases, the patient was referred to a psychologist for further evaluation. The results of such evaluation when not conducted per a thorough protocol revealed little and offered minimal quantification. (See TABLE 3)

Based on the review of these similar cases, the author determined that a protocol was necessary to evaluate the extent and cause of the injuries, validity of claims made, and also to determine long term prospects for rehabilitation.

TABLE 2
Common Symptomology Observed in a Survey of Eleven
Electric Shock Injuries Characterized by Minimal Medical
Diagnostic Evidence

Immediate:
Exhaustion
Dizziness
Loss of Function along current path
Long Term:
Weakness/Dysfunction distal to injury path
Chronic pain
Headaches
Irritability
Depression
Chronic Exhaustion
Inability to function at a normal level
Inability to hold/maintain normal employment

TABLE 3

Commonly Observed Diagnoses For Cases Described

Post-traumatic Stress Disorder (secondary to electric shock)
Depression
Carpal Tunnel Syndrome
Joint Disease
Tissue Strain

METHODS

The protocol defined is multi-directional and interdisciplinary in nature. It is best defined as a step-wise method of intuitive proof. The evaluation procedures is as follows:

1. Engineering evaluation of the electrical source, pathway, duration and magnitude of the electric shock is the first step. It is essential to first establish the nature of the electric shock and the environment in which it occurred.
2. Review of medical records of the injured party, both predating and postdating the injury is used to establish a baseline. (Symptomology that predates the injury is eliminated from further consideration in the evaluation.)
3. A complete psychological work-up must be conducted on the patient using valid and impartial diagnostic instruments. It must be determined if the patient is given to lying, gross exaggeration, or malingering prior to making any judgments.

Due to the often diffuse nature of electrical injury symptomology, it is helpful to have the injured party evaluated by a psychologist. If the injured party is malingering or has a historical pattern of somatic concerns, hypochondias and/or lying this can be revealed through a psychological assessment.

A clinical review and the Minnesota Multiphasic Personality Inventory (MMPI) are usually adequate for determining the likely accuracy of an individual's self-report. The amount of current psychological stressors experienced by the person as well as their medical history may be obtained in the clinical interview and give direction as to what to look for in the MMPI. For example, if the clinical interview reveals an ongoing pattern of physical problems and social dysfunction, the MMPI can confirm a "character disorder" personality. This might indicate tendencies toward manipulative behaviors, somatic symptoms and a lack of moral conscience.³

4. Available case studies from the literature should be used as templates for determining if the symptomology described is within the confines of what might be viewed as reasonable probability for an electric shock injury.

5. When it has been established that an electric shock did in fact occur, that the individual involved is not given to dishonesty or malingering, and that the symptomology is not tied to conditions that predated the date of the incident and that similar types of injuries have yielded similar (although sometimes unexplainable) results, it is a logical conclusion that the electric shock was indeed the cause of the current symptomology even in the absence of firm diagnostic medical evidence.

RESULTS

In a review of the 11 cases using the described protocol, 6 cases indicated a strong relationship between observed symptoms and the electrical accident. Five cases were questionable based upon a failure in one or more of the evaluation steps described.

DISCUSSIONS/CONCLUSIONS

Evaluation of minimally quantifiable electrical injuries is possible using the described protocol. Using a step-wise method of intuitive proof, it is possible to relate symptomology to source of injury even in the absence of firm medical diagnostic evidence. As a result, it is then possible to define a protocol for treatment and when necessary assign responsibility for cause.

REFERENCES

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