

Breach of Abdominal Cavity Causing Omental Evisceration due to High Voltage Electric Shock: A Rare Presentation

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Abstract:

Electric burn injuries are frequent among low socioeconomic populations and in less developed regions. The most common part of body involved was upper limbs. Incidence of high voltage electrocution causing full thickness injury to anterior abdominal wall is rare. The colon and small intestine are most frequently affected in electric shock. Less commonly involved organs like esophagus, pancreas, gall bladder and heart have also been reported as directly injured by current. However, in such a situation quick intervention is the need of the hour. In cases without obvious wounds, surgical

exploration is necessitated owing to the segmental and bouncing nature of electrical burns.

Following severe electrical exposures, some injuries may not be apparent initially and frequent reassessment is inevitable.

Thus, meticulous examination of the abdominal organs at laparotomy is stressed. We report one such case where the patient suffered abdominal wall blowout due to electric current.

Keywords: *Electric current, Accidental contact, Burns, abdominal blowout, Electrical injuries.*

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Introduction:

Electric current is defined as the passage of electrically charged particles. Bodily contact with high tension wires may lead to skin lesions, organ damage and death. Hence, injury due to contact with electric current is known as electrocution¹.

During electrical burn, electric current surpasses underlying structures leading to coagulative necrosis and rupture of cell membrane. As current passes through tissues, heat is produced according to Joule's law: heat (Joule, J) = I^2 (current) $\times$ R (resistance). The inclination of temperature in the tissues results in the denaturation of macromolecules which is usually irreversible².

Electrical hazards are mostly accidental but preventable at the same time. Thus, recruiting various safety

measures is pivotal at risky work places¹. Rarely, electricity has also been misused for suicidal and homicidal purposes³. Wet cases of electrocution using bathtubs, heaters and hair dryers are also reported⁴. Mishapening can occur directly via direct contact or indirectly through the conductive materials or equipments while handling high-voltage currents ($>1,000$ V, 50 Hz)⁵.

Among the circumstances leading to electrocution, household accidents (78.06%) prevailed over occupational accidents (13.39%). Suicides were significantly rarer (7.41%)(6). We hereby report a successful management of young male who suffered electric burn causing abdominal defect while performing his occupational duties.

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Case Report:

A 24 year old male presented to the surgical casualty with alleged history of electrical burn. Incident occurred when he was working as lineman and fell from the electric pole.

At the time of presentation, he was haemodynamically stable and there was a full abdominal wall defect of approximately 2*2 cm in size, lying obliquely in the left hypochondriac region. Omental prolapsed through this wound was well appreciable. Besides, there were blackening and crusting of skin around the defect on his abdominal wall.(FIGURE 1)



Figure 1: Wound at the presentation of patient to emergency department

All routine investigations were within normal limits. After successful resuscitation, patient was shifted to the radiology department. In X-RAY chest, there was no air under the diaphragm. CECT abdomen discussed with radiologist was suggestive of peritoneal breach with no solid organ injury or any free fluid in the abdomen. Exploratory laparotomy was not required as Computed Tomography was normal. Moreover, patient was passing stool and flatus.

Keeping above facts in mind, patient was managed conservatively and planned for delayed closure. In the observation period, there was no leak from the peritoneal cavity. Finally, prolapsed omentum was repositioned back and peritoneal defect was sutured with vicryl2-0 after refreshing the margins. (FIGURE 2) on day 2. Subsequently, the abdomen was closed in layers. His postoperative period was uneventful and patient was discharged in satisfactory condition on 10th



Figure 2: Radical debridement followed by closure of abdomen in layers after electrical blowout

POSTOPERATIVE DAY. The patient was given follow up in the outpatient department FOR SIX WEEKS and there were no complications till the writing of this report. (what was the observational period , when was the surgery done on which post burn day DAY 2 , how long was the follow up period)

Discussion:

Electrical burns account for approximately 5% of the hospital admissions in major burn units⁷. A major number of fatalities occur in males(73.53%)⁸. Marked male predominance is likely to be higher as compared to females due to the fact that males are more likely to use a variety of electrical equipments in both work and the domestic environment.

Most of the cases fell in the age group of 21-40 years (84.29%). Surprisingly, the age group of 0-10 years was also not spared⁹.

Children usually suffer accidental electrical injuries because of immaturity whereas in adults such injuries are common cause of occupation related death.

Even, there are evidences of massive full thickness burn injury to anterior abdominal wall eventually leading to full thickness burn of small bowel and intraperitoneal bladder rupture secondary to full thickness burn¹⁰. In addition, a case of immediate post-electrocution

abdominal wall and stomach perforation following high tension electric injury has also been reported¹¹.

Abdominal cavity blowout is a rare instance due to electric shock. On the contrary it is very challenging to deal with such situations¹². Abdomen is usually spared as it has greater cross sectional area and low electrical resistance. These two factors aid in dissipation of energy¹³. Immediate surgical exploration is crucial to remove the dead and necrotic tissue which may act as foci of infection¹⁴.

The present case report refers to an electrician who accidentally got electrocuted with a high-tension wire and discusses the injury pattern and gross consequences of tissues following high voltage electrocution. Poor maintenance of the electric cables along with usage of bad quality wire, breakage, which may remain unattended on the roadside may be the cause of accidental electrocution outdoors. According to the history narrated by the patient, he had contacted the high voltage power lines while he was reversing it, resulting in the prolonged contact and he fell from the pole.

Conclusion:

Above case highlights the fact that electrical burn injury following abdominal wall evisceration is rare. Emergency intervention is required to save the life of the patient. A prompt diagnosis and timely intervention usually result in favourable outcome.

Conflict of interest: None

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