

# Electrical injuries: Case series presentation

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## Abstract

Electrical injuries are relatively uncommon. The mechanism may be by a direct electrocution, arcing or flash burn. The arcing or flash injuries may result in superficial burns, whereas the cases of electrocution are often deep and can result in loss of limbs following amputation of charred or gangrenous limbs or death following bleeding jugular vessels. Three cases are presented to highlight some patterns of electrical burns ranging from flash injuries with minimal sequelae to electrocution with resultant limb amputation and death following bleeding jugular vessels. Electrical injuries, though uncommon, are still adding to limb amputations and death in this environment. This can be minimized by proper education in handling electrical gadgets and reduced interference with high tension cables.

**Key words:** Bleeding jugular veins, Electrical injuries, Limb amputations

## INTRODUCTION

Electrical injury is a relatively infrequent but potentially devastating form of multisystem injury with high morbidity and mortality.<sup>[1]</sup> Electric burns can take various forms including injury from the electric current itself, flash burns, flame burns, contact burns, or a combination thereof.<sup>[2]</sup> (Lightning strikes are also result in electrical injuries). Motor vehicle accidents are the most common causes of injuries leading to limb amputations in Nigeria.<sup>[3,4]</sup> From this presentation, electrical injuries are now contributing to limb losses and death from bleeding vessels. In several studies in this region and elsewhere, electrical injuries constitute only a small percentage of burns.<sup>[5,6]</sup> Electrical injuries usually result from contact in the home or workplace. It can also result from inadvertent contact with high-tension cables or illegal interference (vandalization). The spectrum of injury is very broad ranging from minimal injury to severe multiorgan involvement with both occult and delayed complications to death.<sup>[4]</sup>

Three cases of electrical injuries are presented with a view to highlighting different patterns and degrees of injuries.

## CASE REPORTS

### Case number 1

Admitted on June 27, 2012. An apprentice mason, 24 years old, who worked on the top floor of a storey building close to high tension cable. The metal tape he was using accidentally got in contact with the high tension cable. There was a resultant flash, and he was held at the spot, while experiencing repeated muscle contractions. A wooden pole was used to dislodge the tape before he could be dragged from the site. There was no loss of consciousness. His blood pressure was 150/90 mmHg, pulse rate of 80/m, and respiratory rate of 26/m. He sustained superficial burns on the left upper limb, anterior trunk, posterior trunk, perineum, and left thigh posteriorly [Figure 1a and b]. About 25% of his body surface area was involved. He was admitted and resuscitated with intravenous fluids. A urinary catheter was passed. Antibiotics, analgesics and burn wound care instituted. He was transfused with two units of blood after about a week when his packed cell volume was noted to be 0.29 L/L. The burn wounds were almost completely healed by 4<sup>th</sup> week of admission. He was discharged home on July 23, 2012.

### Case number 2

A 31-year-old electrician admitted on May 8, 2013 from an electrical power company. He was electrocuted 7 days prior to presentation, while working on high tension electric cables. He sustained very deep burn wounds on the left forearm which was gangrenous on presentation. The skin and underlying tissues were charred with exposure of the forearm bones. He also sustained multiple burn wounds on the left axilla and

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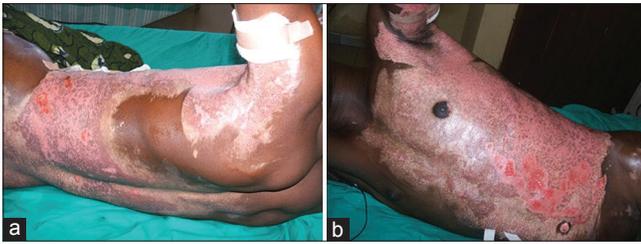
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**Figure 1:** (a) Posterior trunk and left upper limb, (b) Anterior trunk and left upper limb

right wrist joint [Figure 2a-d]. The exit points were obvious on the soles of both feet. He had a left above-elbow amputation on the same day of the presentation). He received two units of blood (sedimented cells only), intravenous antibiotics, hematinics, analgesics and the wounds were dressed in silver sulfadiazine cream. He was discharged on June 10, 2013.

### Case number 3

Admitted on November 4, 2011. A 43-year-old fork-lift operator who was loading some materials into a vehicle when the lift accidentally came in contact with high tension electric cable. He sustained an electric shock and there was a transient loss of consciousness. There were multiple areas of mixed thickness burn wounds involving the head and neck, trunk, both upper and lower limbs. There were gangrenous areas in the right hand and right foot. As levels of amputation were being considered, the patient started bleeding gradually from the wounds on the right side of the neck. Packing was done and blood transfusion with two units of blood, ordered for. The bleeding was progressive and patient was taken to the theatre. Exploration of the site revealed that the jugular veins, external and internal, were burnt and necrotic along with other soft tissues in the right side of the neck. Attempt at arresting bleeding was unsuccessful. The area was packed and patient sent back to the ward. He died on November 13, 2011.

## DISCUSSION

Electrical injuries can take various patterns and present with various degrees of morbidity and mortality as illustrated in the three case presentations [Figures 1a, b and 2a-c]. Basically, the injuries could be classified as of low or high voltage.<sup>[1,5,7,8]</sup> Most injuries in the home usually are of low voltage origin, whereas those outside homes and contacts with high-tension cables as in the three cases presented are of high voltage though with various manifestations-the flash injury, the electrocution/direct contact with gangrenous limb and that with damage/rupture of vessels. The patient who sustained the flash injury survived not because this injury could not be lethal, but probably because of the extent of the superficial burn wound and prompt management. The second patient suffered a loss of one of his upper limbs following an above-elbow amputation for a severely charred limb. The third patient lost his life following damage to vessels and resultant uncontrollable bleeding. A similar condition to the third case was a case of delayed rupture of obturator artery who survived following computed tomography-aided embolization.<sup>[8]</sup> These injuries and the



**Figure 2:** (a) Gangrenous left hand with exposed forearm bones, (b) Gangrenous left hand with exposed forearm bones, (c) Above elbow amputation following electrical burns, (d) Exit points, soles of both feet

morbidity and mortality could be prevented or minimized if workers are more wary of electrical cables close to their work places and minimize undue interference with high-tension cables.<sup>[6]</sup> Hopefully with the privatization of our national power company and better availability of power supply in the country, some of these problems will drastically reduce.

## CONCLUSION

Electrical injuries, though uncommon, are still occurring with different degrees of morbidity and mortality as illustrated in the cases presented. Flash burns, limb amputations and death from ruptured jugular vessels are preventable sequelae if a little more care is exercised at the work place.

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