

Team Approach Helps Patient Survive High-voltage Electric Burn

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Summary: A 20-year-old man was subjected to high-voltage electric burn, which was occupational. The patient was admitted to AlGalaa Military Medical Complex almost 2 weeks after the accident had happened. According to Lund and Browder's chart, the patient had a 40% total body surface area burn involving the upper limbs, anterior and posterior trunks, and the left thigh (third- and fourth-degree burns). The aim of this study was to stabilize the patient by conducting lifesaving operations in multiple scheduled sessions, bilateral below-elbow amputations, escharotomies, and excision of affected ribs and cartilages. A left latissimus dorsi flap used to cover the left side of the anterior chest wall. Skin grafting (split thickness, meshed 1:3) was done to cover the raw areas. Multiple aggressive operations by a multidisciplinary team saved the patient's life. The victim suffered a major injury and was handicapped, but he survived. It was not necessary to replace the excised ribs with prosthesis because of the preserved sternum. An electric burn poses a burden on many people in addition to the patients themselves. (*Plast Reconstr Surg Glob Open* 2017;5:e1243; doi: 10.1097/GOX.0000000000001243; Published online 24 March 2017.)

METHODS

The patient was received in the Accident and Emergency Department, Burn and Plastic Surgery Centre, AlGalaa Military Medical Complex, Cairo, Egypt. The patient's history revealed that the patient had been subjected to a high-voltage electric burn 12 days before. The patient was transferred from another country 12 days after the burn injury. He was then admitted to the intensive care unit at our center. He was assessed and managed by a multidisciplinary team that included plastic surgeons, intensivists, psychologists, a cardiothoracic surgeon, a vascular surgeon, an orthopedic surgeon, and a nutritionist. The intensivists started the management protocol by replacement therapy, resuscitation, and full investigations. It was obvious that his right hand and distal half of the forearm were mummified as shown in Figure 1. His left hand and two-thirds of the distal forearm showed impaired circulation.

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Decision Making and Operations

We scheduled the patient for multiple successive operative sessions. He underwent a total of 5 operations. The first one was conducted on the second day after he was admitted; 2 teams (vascular surgery and plastic surgery) operated upon him. The vascular team amputated the right upper limb of the lower elbow. This was then followed by an escharectomy of the left hand, forearm, and anterior trunk that showed fourth-degree burn as shown in Figure 2, with partial debridement of the posterior trunk—severed tissues as shown in Figure 3.

After a few days of continuous medical treatment and local burn management, the left hand and forearm showed demarcation and infective gangrene. The vascular and the plastic surgery teams performed a left forearm amputation. Additionally, we performed an escharectomy of the anterior trunk again.

Two weeks later, the cardiothoracic and plastic surgery teams operated on the patient, and necrotic ribs and costal cartilages, especially of the left side of the thoracic cage, were excised together with tangential excision of the sternum while preserving the main body of the sternum. The operating team decided against replacing the diseased ribs and cartilages with any prosthesis so far as the main body of sternum and the posterior walls of the ribs were preserved. The left latissimus dorsi flap was dissected with a skin paddle (10×6 cm) to cover the left side of the chest.

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Fig. 1. Patient on table just before the first operation (mummified right hand and distal forearm, anterior trunk, and lower posterior trunk show third- and fourth-degree burns with severed tissues).



Fig. 2. Anterior trunk shows fourth-degree burn involving the thoracic cage (sternum, ribs, and costal cartilages).

Within 2 weeks, the fourth operation was carried out by the plastic surgery team; the anterior trunk and the posterior aspect of the left arm were covered by split-thickness skin grafts (meshed 1:3).

Maturation of the grafted areas and healing of the donor site (right thigh and leg) lasted 4 weeks. Meanwhile, the posterior trunk showed creeping of the granulation tissue of the right iliac bone except for the posterior lip. Thereafter, the patient was prepared for the last operation. The orthopaedic surgery department collaborated with plastic surgeons, and we excised the posterior lip of the iliac crest. The posterior trunk and left thigh were then reconstructed by split-thickness meshed (1:3) skin grafts. The patient was discharged 2 weeks later as shown in Figure 4 to be observed in the outpatient clinic.

Follow-up

The patient was referred to psychiatrists and physiotherapists for further management. He was directed to get a bilateral upper-limb prosthesis and was scheduled for clinic visits every 2 weeks in the first month and then on a monthly basis thereafter for 1 year.

Functional Status and Goals

The patient continues physiotherapy sessions to regain his strength so that a light job can be adopted by him.



Fig. 3. Lower third of the posterior trunk shows severed tissues with fourth-degree burn (exit of electric current).

CONCLUSIONS

An electric burn is a burden not only on the patient, relatives, and managing team but also on the entire community. Collaboration of different specialties is the key to successful management. Multiple operations were done serially to overcome this major trauma.



Fig. 4. Patient just before being discharged and with wounds totally healed.

Although the patient is handicapped, he survived and recovered from a major injury. The parents of the young man were satisfied and grateful for the final results.

We receive annually around 120–140 major burn cases with different etiological factors. Cases vary in the percentage of burns and the depth as well. The reported case is unique in the aggressive presentation and the extensive severed tissues.

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