Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol 13: Issue 3
Open Access

Post Electrical Burn Injury Of Hand With Functional Reconstruction In A 6 Year Old – A Case Report

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Cite this paper: Kedara Harshitha S, Manimaran R, Kanchana K(2024) Post Electrical Burn Injury Of Hand With Functional Reconstruction In A 6 Year Old – A Case Report. *Frontiers in Health Informatics, 13* (3), 5282-5287

Abstract
A minor percentage of burn cases in the paediatric age are electrical burn injuries, which have a major long-term psychological and functional impairment and considerable morbidity. Older age groups were more commonly impacted, and high voltage burns were the most common kind. Electrical burn injuries are seen 4 times more in males than females. Management ranges from requiring local wound care to skin grafting and flap cover.Adherence to safety standards, education of parents, and improved health infrastructure can all serve as basic preventative measures that can lessen the significant effect of electrical burn injuries. This is a case report where we discuss regarding the presentation, management of a 6 year old girl who presented with electrical burn injury to the left hand.
Keywords: *Abdominal flap, burns, electrical, paediatric, prevention, reconstruction.*

Introduction

Electrical burn injuries (EBIs), which have a documented incidence of around 5-7% of all burns, make up a minor portion of all admissions to any burns unit [1,2]. The majority of these injuries are unintentional and related to work.[3]When compared to other types of burns involving the same surface area, EBIs are the most catastrophic. The genesis of electrical burns in children differs from that of adult burns, and managing them poses a special set of difficulties.

Due to their natural curiosity, impulsivity, and lack of caution, children are susceptible to rare and more serious forms of electrical burn injuries. In our developing nation, the problem has been made worse by the public's lack of awareness of safety procedures, which has led to a rise in low-voltage electrical burn injuries – seen in younger population (almost always resulting from household accidents) while high-voltage burn injuries (happen outside) which are more common in older age groups[4].

It is commonly known that childhood burn survivors experience terrible aftereffects that last into

adulthood[5]. Comprehensive prevention strategies are lacking, and there is few data that concentrate only on electrical burn injuries in children.

Case Report

A 6 year old girl was brought to the casualty by her mother, with alleged history of electrical burn over her left index finger when the kid accidentally placed her finger in an electrical socket. Patient had complaints of pain over the burns site. On local examination, discolouration of skin over the left index finger is seen, along with contracture of the finger. Left index finger was congested. Eschar present over left index finger (Fig 1). ECG and cardiac evaluation was done. After obtaining fitness, patient has been taken up for emergency escharotomy to relieve compression of the neurovascular bundle (Fig 2). After a week, escharectomy with superiorly based abdominal flapcover was done as shown in Fig 3. Further, after 3 weeks, patient was taken up for the flap division and inset(Fig 4 , 5a ,b,c). Postoperatively the flap was healthy and the patient was followed up further. The patient has been adviced wound hygiene , flap massage and to continue left hand physiotherapy.


Fig 1

Fig 1 - Preoperative pictures depicting the eschar over left index finger post electrical burn injury


Fig 2

Fig 2 - Emergency Escharotomy

Fig 3

Fig 3 - Superiorly based abdominal flapcover

Fig 4

Fig 4 – depicting the left groin as the donor site for full thickness skin graft – after the primary closur

Fig 5

Fig 5 – Post full thickness graft over the raw area over left index finger – lateral view

Fig 6

Fig 6 – Post full thickness graft over the raw area over left index finger – palmar view

Methods:

This is a single case report on paediatric electrical burns and its management in a staged procedures considering the age and cosmetic and functional outcome.

Type of study – A single case report

Place of study – Sree Balaji Medical College and Hospital , Chennai

Discussion

Upper extremity burn injuries can result in severe morbidity and impairment for the victims. Various studies indicate that in the paediatric age range, electrical burns account for 2% to 10% of all burn admissions in India and worldwide(6,7,8), Moreover, more than 80% of the Electrical Burn Injuries were high voltage. Population growth, early referrals, easy availability to energy, and steady industrialization throughout time might all contribute to this rising occurrence.

The majority of afflicted individuals were found to be boys and older age groups, which is consistent with earlier research findings(9,10) This may be because they are spending more time outside and coming into contact with high-tension electricity wires. In our case, the injury is due to a low voltage electric burn injury at a household.

In patients with electric burn injuries – following changes like sinus tachycardia and ectopic beats in Electrocardiogram (ECG); elevated levels of Creatine phosphokinase (CPK) levels and myoglobinuria are seen. Neurolysis, rhabdomyolysis, and tissue injury caused by thermal mechanisms (joule heating), non-thermal mechanisms (cell lysis by electroporation), and associated flame burns add another level of complexity to electrical burns of the upper extremities.[11,12,13]

Due to the functional repercussions of tendon dysfunction, nerve injury, and contractures, even a small surface area burn on the hand or wrist can result in severe morbidity.

Even while breakthroughs in reconstructive methods like as microsurgery and free tissue transfer have greatly improved soft tissue coverage and mobility, there is still limited recovery following burn damage to major peripheral nerves. Therefore, major limb reconstructive surgery or amputation are commonly required as a result of electrical burns to the upper extremities.

Depending on the extent of the injury, many reconstructive techniques were used, including flap covering, local tissue reorganisation, release and grafting, and primary excision and grafting. Most commonly used flap types, when flap cover is indicated are: anterolateral thigh flap, fillet flap, abdominal or groin flap.

Upper limb reconstruction is still a complicated subject, especially when taking the paediatric age range into account. Although it is commonly recognised that early excision and skin cover followed by splinting and physiotherapy reduces deformity, reduces the need for later reconstruction, and improves functional results, which is demonstrated substantially by our patient.[14,15]

Results

This is a single case report on paediatric electrical burns which emphasises the importance of early intervention and skin cover for good functional outcome with potential for normal growth.

Conclusion

Only a small percentage of injuries are electrical burns to the upper extremities. But they cause serious morbidity and impairment for individuals who are impacted. Paediatric population are becoming more susceptible to the avoidable low voltage electrical burn injuries from household wiring. There is a great deal of long-term physical and mental strain on the patients considering the age and the society. Through this case report, we would like to emphasise proper education regarding safety precautions of electrical burns, predominantly arising from households, to follow safety power line placement and maintenance and that health facilities be upgraded for the best care and rehabilitation.

Acknowledgement

The completion of this undertaking could not have been possible without the participation and assistance of so many people whose names may not be all enumerated .Their contributions are sincerely appreciated and gratefully acknowledged.

Conflict of interest

The authors declare that they have no conflict of interest.

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