

Management of a COVID Positive Electrical Burn Patient: Challenges and Our Experience

Nishad K.¹, Neljo Thomas², Ravi Kumar Chittoria³, Barath Kumar Singh P⁴, Jacob Antony Chakiath⁵

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Author's Affiliation: ^{1,2,4,5}Senior Resident, Department of General Surgery, ³Professor, Department of Plastic Surgery Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor, Department of Plastic Surgery & Telemedicine, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

E-mail: kamalakrou@gmail.com

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Abstract

The COVID-19 Pandemic has brought about unprecedented challenges in the management of patients. The increased number of COVID cases compelled the diversion of manpower and infrastructure into the management of COVID patients. The burns patients were a subset of patients who were still given priority even during the pandemic. Like any other specialty Burns units also needed to adapt themselves during this pandemic time in the management of burns, with special care of resources and to prevent transmission of the virus to the healthcare providers as well as to the patients. Among burn patients, electrical burns, in particular, needs to be managed aggressively due to the nature of their pathophysiology. In this article, we share our experience in managing a patient who was detected to be COVID-19 Positive.

Keywords: Electrical burn; Burn; COVID-19; COVID positive.

Introduction

The 2019 novel coronavirus is responsible for the global pandemic that started first in the Wuhan province of China in December 2019.¹ The International Committee on Taxonomy of Viruses named this new strain of coronavirus as "Severe Acute Respiratory Syndrome Coronavirus 2 (SARS Corona Virus 2).² The World Health Organization named the infection "Coronavirus disease 2019" (COVID-19).³ The electrical burn injury is among the accidents with the highest morbidity and the electrical burn injury needs very cautious monitoring because they are serious conditions,

and correct time critical management is vital for survival. Meantime steps should be taken to reduce the risk of transmission of COVID-19 and also to reserve the available resources, like admitting only those patients who cannot be treated on OPD basis or cannot be followed up using Telemedicine, testing of patients for COVID infection before admission, reducing the length of inpatient stay⁴, avoiding procedure that can generate aerosol, like although not proven, the powered dermatome used to harvest a split thickness skin graft can be an aerosol generating procedure and so, it may increase the risk of transmission of the virus in the theater⁵ adequate spacing between patients in the

ward, avoiding fomite sharing to the minimum, proper mask hand sanitization protocols, isolating patients with symptoms or who are tested positive, etc. The wound care also needed to be selected based on these factors, like surgical interventions to be reserved for patients only if it is necessary. In short burns, units were also followed recommendations issued by governments on how the various departments and surgical specialties should adapt to maximize resources and minimize the risk of viral transmission to both staff and patients.

In this article, we share our experience in treating a patient who was admitted with burns sustained from a domestic electrical source. The patient was tested positive for RTPCR for COVID 19 on day 5 of admission.

Materials and methods

This study was conducted in a tertiary care institute in south Indian. Department ethical clearance was obtained as well as consent from the patient was obtained. No clinical data about the COVID management were taken into the study.

An adolescent girl without any known comorbidities was admitted with a history of electrical injury at home from a low voltage electrical source, the entry wound was over the temporal scalp within the hairline, and the exit wound was over the toes of the right foot. The entry wound, as well as the exit wound, were third-degree burns and the patient also sustained second-degree superficial burns over the face due to flash.

The patient was managed with IV fluid resuscitation, analgesia, continuous monitoring of ECG, urine was monitored for volume and color. Since the entry wound was over the scalp the GCS score of the patient was also monitored and was observed any neurological deficit. The patient was detected to be COVID-19 positive through the RTPCR test, following which the patient was shifted to the COVID-19 isolation. The management of the patient was done with all COVID-19 protocols after that and special care was taken to prevent the transmission of infection as well as to minimize procedures that may generate aerosols to the extent possible. The burn areas were managed with Hydrotherapy, APRP Therapy, Prolotherapy with 25% Dextrose solution, Heterografting with Dry collagen sheet, Low level Laser Therapy, and Negative pressure wound therapy.

The management of the COVID-19 was based on the institutional/national protocols as decided by

the COVID-19 team.

Result

The patient recovered successfully from Electrical burn injury as well as COVID-19 without any complications, the burns areas completely without any complications. The period of hospital stay is almost same.



Fig. 1: Entry wound over the scalp



Fig. 2: Exit wound Over the toes



Fig. 3: APRP Therapy



Fig. 4: Negative Pressure wound Therapy



Fig. 5: Wounds Healed

Discussion

Electrical injuries, even though they are uncommon, constitute approximately 0.04 to 5% of admissions to burn units in developed countries, and up to 27% in developing countries.^{6,7} Both morbidity and mortality in electrical injuries are relatively high and have physical and psychological short term and long term sequelae.^{8,9} The most common cause of electrical burn injury was electrical contact. There is a difference between an electrical burn (electro-combustion) from the electric power and a thermal burn from the electric arch, which is often considered as one. This differentiation does have not only theoretical differences but is also practical in further management. The thermal burn from the electrical arch is characterized by a low voltage and causes a relatively superficial wound because of the short time acting on the tissue. On the other side, the thermal electric burns caused extensive damages, the electric burns require careful management of

the pathology from the first moment due to the serious acute complications that might follow. The well known complications are myoglobinuria, cardiac rhythm changes, respiratory acidosis, hypoventilation, etc. The electrical burns do not manifest complications in the acute phase, and they do not affect the metabolic balance of the patient^{10,11} like thermal burns but it can manifest over a while, hence these patients need to be monitored for any complications. Electrical injuries are typically divided into low voltage (LV <1000 volts) and high voltage (HV >1000 volts), as well as by whether electrical current flows directly through the body vs a thermal injury caused by electrical flash. The electrical burn includes the tissue damages caused by the conduction of the electricity through the morphological structures of the organism. The electric burn is one of the most severe and expensive pathologies, with a long hospital stay and several surgical procedures.

The challenges we faced in the management of this patient were, first was in the identification of systemic complications from an electrical burn, flash burn, or from COVID-19 and symptoms may overlap. The second challenge was the selection of wound care. The decision of doing surgical management was also difficult. In our patient, the treatment was weighed for risk vs benefit ratio, and the treatment plan was made with many factors in mind like the electrical burn, its complications, COVID-19 its complications, available resources, and the merits and demerits of each.

Conclusion

The management of electrical burns in our COVID-19 positive patient was challenging, with risk of transmission of infection. Careful and tailored treatment plan can help manage the patient without any complications. All surgical specialties have had to adapt to the COVID-19 healthcare crisis. This difficult period has not only taught us how important a functioning healthcare system is but also how we can learn from this pandemic and be prepared in the future.

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