

Burns in Pediatrics, a Challenge of Prevention. Report of a Case

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Abstract

Burns at pediatric ages are a public health problem: most traumatic accidents, which occur inside the home are irrelevant. Accidental events are one of the main agents that affect childhood, cause injuries and even death, resulting in the growing need to increase the attention for this sector of the population. We present the case of a pediatric patient with electric burn and further we suggest a theoretical model with elemental preventive measures.

Keywords: Electric Burn; Prevention; Pediatric Patient; Parents; Caregivers

Abbreviations

UQ: Burn Unit of the Health Services of the State of Puebla; ABCDE: Airway, Breathing, Circulation, Disability and Exposure; SINAVE: National Epidemiological Surveillance System; WHO: World Health Organization

Introduction

Burns cause approximately 180,000 deaths a year. They take place mainly in low- and middle-income countries like ours, they are also one of the main causes of morbidity [1] appearing in 60% of cases in vulnerable risk groups, especially in children population. Because children are not necessarily exposed voluntarily, it depends on the characteristics of the context in which they live and develop [2].

According to the literature, most electrical burns occur mainly in the home, and boys of school age are the most affected with varied clinical presentation; complications and death are more common in those with high-voltage burns [3,4]. Electrical burns in children are caused by tampering or biting on wires, placing fingers or other objects in plugs. In Mexico, the highest percentage of burns among the population aged 0 to 9 occurs in the home 70.4% of the times. A higher prevalence in males is reported in 91.9% of cases, with a 9: 1 ratio [5].

Clinical Case

We describe the clinical case of a 7-year 5-month old male patient, with no relevant history for the clinical presentation, with a low socioeconomic status. He begins his condition on July 11, 2019 on the roof of his home by contacting electric cables for an undetermined time and immediately after losing his state of consciousness. He was taken to the health center of his community where unspecified treatment was provided, he was later transferred to the General Hospital of Tehuacán where a subclavian catheter was placed, performed hydric resuscitation and analgesic management, finally he was transferred to the Burn Unit of the Health Services of the State of Puebla (UQ). He was received in the emergency department with an unsustainable airway, hypoventilated lung fields, in a state of mixed shock: cardiogenic and decompensated non-hemorrhagic, and a deteriorated state of consciousness. Diagnosis was: Electricity burn on 25% of affected third-degree body surface on both thighs, feet, genitals, and right upper limb; the presence of compartment syndrome and Volkmann's contracture was added. Due to the patient's clinical condition, an ABCDE for burn patient approach was performed by Pediatric Intensive Care and Anesthesiology. Orotracheal intubation and intravenous crystalloid administration were prioritized, the Pediatric Surgery service performed fasciotomy of the right upper limb. After stabilizing the patient, he was admitted in the hospitalization area.

During his stay at the hospital the corresponding laboratory tests were performed, electrocardiogram, and ultrasound protocols for the severely burned patient; he presented ventricular dysfunction secondary to myocardial contusion. The patient required nine plastic surgery interventions (debridement, grafting, and amputation of the hand and part of the right forearm), resulting in limb stump. The management of the patient was multidisciplinary in the UQ, the evolution was favorable, he was discharged for improvement and the treating services summoned him to external consultations for evaluation and follow-up.



Illustration 1: Injuries observed at patient admission. Burns caused by electricity in lower limbs.



Illustration 2: Injuries observed at patient admission. Burns caused by electricity in lower limbs and genitals.

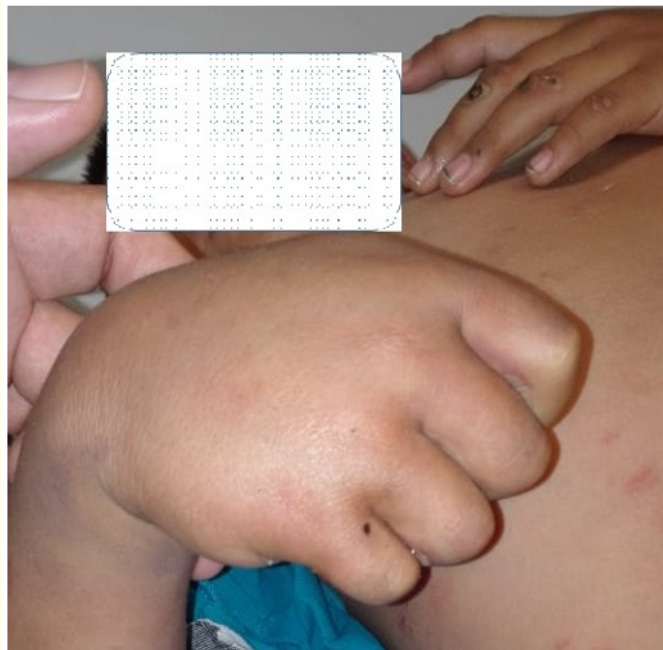


Illustration 3: Injuries observed at patient admission. Electric burns in left hand phalanges.

Results and Discussion

Burns are a type of preventable injury that should not be considered “accidents”, but sinisters [6]. Most of them occur from repeated exposure to risky activities. The patient’s burns were caused by low electrical voltage, which have different clinical presentations, so the initial impression is only the tip of the iceberg; high voltage electrical burns are associated with more serious injuries.

The management of these patients is a challenge for all the personnel involved in their care, having complications in the short-medium term (ventricular dysfunction, arrhythmias, cardiac contusion, pancreatitis, seizures, multiple injuries, rhabdomyolysis, and acute kidney damage, to mention a few) [8] and in the long term (possibility of developing cataracts even up to three years after the event) [9]. It also involves surgical procedures and multiple functional, aesthetic and psychological sequelae that the patient can develop.

In addition to the costs during the time of hospitalization in Intensive Care Units, treatment requires a large amount of financial resources for a long time. For every 2,500 children who suffer burns in the world, 1,000 have sequelae, permanent disability or both problems [10].

The National Epidemiological Surveillance System (SINAVE) reported a cumulative total of 94,753 cases of burns, the data is alarming since approximately 20% of the total electrical burns occur in children [11]. This situation is apparently irrelevant but with great repercussions in Pediatric clinical practice, that is why the measures must be implemented quickly, to make aware the entire community about this type of injury; to train parents, caregivers, and teachers; and to involve the authorities to implement security measures according to the age and stage of development of children.

Likewise, it is a priority to reinforce the importance of accident and sinister prevention in the health personnel to create effective strategies to decrease the incidence of these injuries. Taking into account that the vulnerability of the child population to burns is not homogeneous, special emphasis is needed on those living with some type of disability, the population displaced by social conflicts or in street situations or poverty, since they are the ones with the highest incidence of burns [12].

In this case, it is a previously healthy patient who faced a life-threatening situation, developing burn complications, a prolonged hospital stay and multiple surgical interventions. To achieve a state of physical, emotional, mental, and social well-being defined by the WHO, the goal is to achieve the least number of sequelae, so that he is able to return to his normal environment. The patient received multidisciplinary treatment and continues to be closely monitored by the Plastic Surgery, Nutrition, Rehabilitation, Psychology and Psychiatric services. This measures are of utmost importance due to the functional and aesthetic sequelae that will accompany the patient for the rest of his life: mainly scars, genital injury and amputation of a limb, as well as psychological disorders that could occur throughout their sexual maturity.

It is for this reason that prevention continues to be the fundamental stone to reduce the incidence of this type of injury. In other countries there are programs for this type of problem with satisfactory results, thus reducing morbidity and mortality. That is why we propose to implement workshops and burn prevention standards both at home and in schools.

If we do not want more children to suffer burns, we must teach them how to avoid them with activities based on educational exercises, videos, capsules and the dissemination through the main media: television, radio, cinema and advertisements for all audiences.

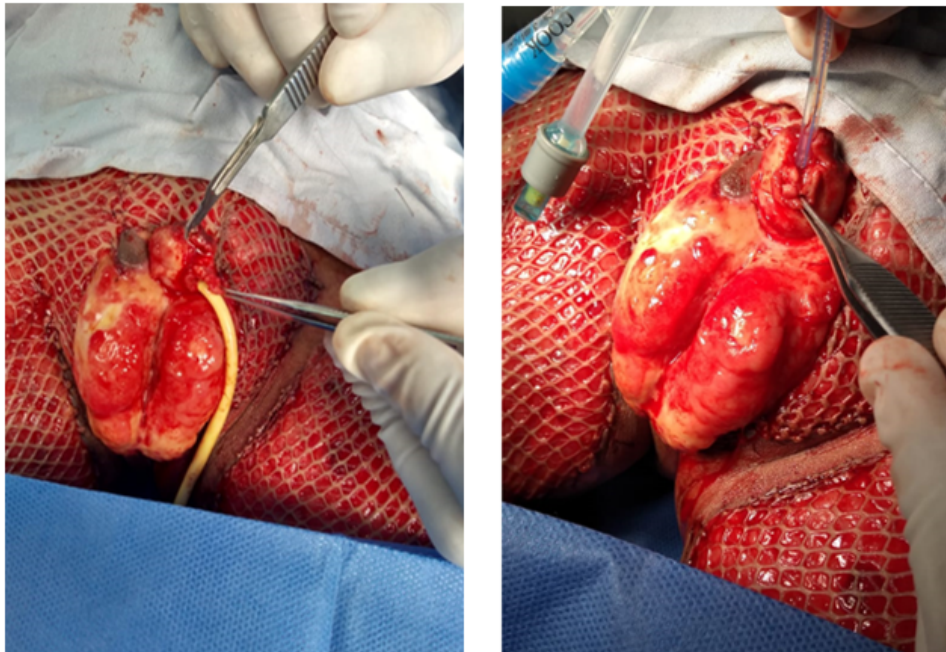


Illustration 4: Third degree electric burn on genitals.



Illustration 5: Graft taken from the patella area to cover the genital area.

We suggest a theoretical model with elementary measures for prevention in domestic safety:

1. Plugs protected with furniture or covered with safety lids.
2. Keep cords and appliances in good condition, dispose of appliances with old or worn cables.
3. Avoid using extensions and overloading plugs.
4. Hide cables in corners or under furniture, out of the reach of children and without being located on the floor.
5. Place televisions and music equipment against the wall, so children cannot access surfaces with cables.
6. Frequently check electronic toys for signs of wear; Immediately repair or dispose of objects that make sparks, are hot to the touch, or give off an unusual odor.
7. Unplug kitchen appliances when not in use and keep cords out of reach.
8. Do not raise kites in places where there are overhead electrical cables.
9. On balconies and areas accessible to people such as ceilings, cables should be 1.40 meters away. When the available space does not allow this value, the separation can be reduced to a minimum of 1.00 meters [14].

Conclusion

Pediatric patients are a vulnerable group, thus training of caregivers is essential, as epidemiological data remains discouraging.

In Mexico there is no preventive culture, and education is the best way to reverse the problem, otherwise we will continue to face cases of burns.

Burns can be prevented, insisting on measures for it is the central goal of this work.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this article.

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