



## **Electrical hand burns in children: accidental circumstances**

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### summary

Burns are certainly the most common of the consequences of electrical accidents in children. It is difficult to know their frequency for all electrical accidents

Our goal is to describe the circumstances of this electrical accident. through three clinical observations in children admitted to intensive care at the university hospital in Oran November 1, with neurological and cardiac manifestations but the evolution was favorable in the 03 children  
High voltage electrification accidents in children are rare and serious medico-surgical emergencies involving both the child's vital, functional and psychological prognosis

To limit the risk of electric burns in children Prevention remains, however, the capital point

keys words: electrification, children, convulsions, surgical excision, prognosis

### **Introduction:**

Burns are certainly the most common of the consequences of electrical accidents in children. It is difficult to know their frequency for all electrical accidents. In children, hand burns remain a rare reason for admission to pediatric intensive care unit. Our goal is to describe the circumstances of this electrical accident.

#### Materials-methods:

We describe 03 clinical observations of children victims of hand burns by electric shock, admitted between 2017-2019 at pediatric intensive care unit in hospital establishment november 1st oran.

Our hospital establishment houses a major burns service intended for adults, this pending the opening of a hospital specially dedicated to severe burns and reconstructive surgery. Any child suffering from a burn with clinical consequences is initially admitted to intensive care for initial treatment of vital emergencies.

observations:

1st observation: 18-month-old infant is found on the ground, unconscious by his mother, with a bare low-voltage electric wire (220 volts). He is admitted in December 2017 in pediatric intensive care, the clinical examination finds a conscious infant with a 3rd degree circular burn on the right hand, blisters on the 2nd and 4th finger of the right hand. the exit port was seen at the pinna of the right ear.

Systolic blood pressure at 90 mmHg, diastolic blood pressure at 45 mmHg, respiratory rate at 25 cycles per minute, temperature at 37.5 degrees Celsius, supple abdomen, the respiratory auscultation is normal, the cardiac auscultation returns to tachycardia at 115 beats per minute, the remainder of the clinical examination is normal

In addition to volume expansion with monitoring of hemodynamic parameters A discharge excision with an anterior splint was recommended. ECG monitoring did not find any abnormalities. The child is put out at H24

2nd observation: child aged 25 months, admitted for burns of the hand after an electric shock. He was in the patio on his mother's back who received a high voltage electric shock. the father on his return home found the deceased mother and her unconscious son who brought him back to pediatric intensive care unit in 2018. On admission The clinical examination found a child in tonic clonic convulsions, intermediate pupils not very reactive, with a HR of 160 b / min, respiratory rate at 35 c / min, SPIO2 at 94%.

Skin examination found a superficial 2nd degree burn on the right hand and blisters on the left foot. The EKG confirms the sinus tachycardia. The dosage of troponins returns unremarkable.

Volume expansion was the rule with monitoring of hourly diuresis, then the child received a loading dose of benzodiazepines and phenobarbital. A dressing of his skin lesions was recommended the evolution was marked by a cessation of convulsive seizures, the child wakes up and discharged after 3 days of hospitalization

3rd observation: 12-year-old boy took in his house an electric cable from his neighbor, naked which was projected into the balcony of the child's house. He arrives in pediatric intensive care sleepy with a 2nd degree burn of the right thumb , the exit orifice was not found. heart rate at 102 beats / min, respiratory rate at 30 cycles / min, temperature at 37.2

Cardiac Electrocardiogram monitoring revealed sinus arrhythmia with right bundle branch block.

Troponin dosage returned to normal, blood count, kidney function returned to normal.

the evolution was marked by a recovery of consciousness after 4 hours, a normal control electrocardiogram at 12 hrs The child is discharged after two days of hospitalization.

Discussion:

Electrical burns account for 2 to 3% of burns requiring emergency room admission in developed countries, or more than 2,000 cases per year [1] [2]. Low voltage burns are the most frequent. They occur, mainly, in children aged between: 2 to 7 years, of which the domestic accident is the main etiology in 95%. children are involved in 20% of cases [2].

In contrast to thermal burns, the lesions of which are extensive on the surface, in electrical burns the importance of deep lesions contrasts with the dimensions of the cutaneous damage (point of penetration of the current).

The appearance of these burns is very variable. The minimal lesion is a very small rounded or elliptical yellowish or greyish lesion with a slightly depressed center that appears to be embedded in the surrounding healthy skin. (cases 1 and 3).

To a greater degree, the burn is a rounded or oval lesion, readily appearing at the point of contact with the live conductor and sometimes at what is called the point of exit.

In our 03 observations Cardiac rhythm disturbances (like the 2nd case, and the 3rd case) are limited to transient abnormalities.

True electrical burns cause a burn at the point of contact known as the point of entry but also all along the path that the electric shock will follow in the body and at the point of exit. The skin damage may appear minor and does not prejudge the underlying organic lesions where cell destruction exists throughout the path traveled by the current (vasculo-nervous network, muscles, ...).

One should never neglect an electric burn of the hand, because even if it is apparently not extensive, This explains the seriousness of true electric burns which are characterized by the absence of parallelism between a slightly damaged skin covering and extensive damage. deep tissue.

it can cause an electric shock with possible heart problems and seizures in children (case 2) and even acute renal failure by rhabdomyolysis [3]

The severity of these burns is correlated with the voltage of the electric current: compared to low voltage, high voltage electric current causes much greater tissue destruction, with an increased incidence of compartment syndromes and rhabdomyolysis [4-7]

the management of our patients was initially done in a multi-purpose pediatric intensive care unit in our institution 1st november oran, then in the pediatric plastic surgery department. Support for vital functions is a pillar of burn resuscitation. The implementation of an early volume expansion strategy is a major determinant of the vital prognosis (case 2)

The risk of acute myoglobinuric renal failure requires an increase in the usual rules of vascular filling. The burnt skin area, usually used as a reference in formulas for calculating volume requirements but in this case does not correspond to the reality of deep lesions, should not be used for the evaluation of fluid intake. . Hourly urine output is the main parameter to monitor, with an optimal figure set at 2 mL / kg / h .

In the event of significant rhabdomyolysis (blood creatine phosphokinase level > 1000 IU / L), Urine alkalization should be associated with this volume expansion strategy to prevent myoglobin precipitation, with a urine pH target above 6.5. [8]

For our part, when the lesion is limited with a normal ECG, a normal biological assessment, without any disturbance of the child's consciousness, the child is discharged after having received local care (cases 1 and 3)

From a local point of view, the procedure to be performed urgently remains a relief incision in the event of a circular burn (case n ° 1). The relief incisions are covered with fatty tulle which will be changed at the same time as the rest of the burnt dressing [9]. Deferred, excision of the burnt area is performed, which must be sparing in terms of noble tissues, the latter having to be covered by living

tissue. in some literatures: Therapeutically, the procedures performed on admission consist of: incision of discharge 5%, aponeurotomy 15%, amputation 15% and directed healing 65%. [10 -12] in our experience, the 03 observations did not have recourse to the management of sequelae of electric burns, the clinical symptoms on admission were less severe,

While the management of the sequelae of electrical burns has been cited by some authors involves: Z-plasty 36.5%, skin graft 27.5%, flaps 18%, commissuroplasty 9% and skin expansion 9%. [13 - 15]

The hospital stay is at least 24 hours when the child is seen immediately after the electrical accident. For our part, when the lesion is limited with a normal ECG, a normal biological assessment, without disturbance of consciousness, the child is discharged after having benefited from local care (cases 1 and 3) after 24 hours of hospitalization.

When it occurs, beyond 24 hours, hospitalization is for a few days for evaluation of skin lesions and possible additional assessment if necessary. Then between the 5th and the 7th day, the child is sent to a structure specializing in brulology, child plastic surgery.

#### Conclusion:

High voltage electrification accidents in children are rare and serious medico-surgical emergencies involving both the child's vital, functional and psychological prognosis

To limit the risk of electric burns in children Prevention remains, however, the capital point. This operation is based on the monitoring of children and the elimination of risk factors in homes, maintaining the electrical installations as well as by informing and educating the public. in order to easily avoid inevitable tragedies.

The authors declare no conflicts of interest

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