

After-Effects of Burns to the Hand - Epidemiological and Clinical Data: 192 Cases

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Abstract

Original Research Article

Hand burns are very common and of various etiologies, which can be isolated or associated with more extensive burns. They are functionally serious. They can be minor or major. In order to study the epidemiological and clinical characteristics of burnt hands, we carried out a retrospective study within the plastic surgery and burns department at the Center Hospitalier Universitaire Mohammed VI in Marrakech spanning five years which made it possible to collect 192 cases. It appears from this work that nearly one out of two patients has a burn on at least one hand among patients hospitalized for burns. It also shows the frequency of injuries to young adults (42%) and children under the age of six (33%), in the context of domestic accidents (76%), the frequency of burns on the back of hands by butane flames in the context of a "Hand-Face syndrome" in adults, and the frequency of burns of the palmar face by contact in children. Intermediate burns were the most frequent (51%). Regarding the sequelae phase, our study shows the frequent association of major sequelae and minor sequelae. The sequelae were dominated by digital and digito-palmar retractions (65.5%). A functional deficit was observed in more than two thirds of the cases.

Keywords : Burns, Hands, Burns After-Effects.

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INTRODUCTION

The hand is an extension of the brain and the interface with the world around us. It accounts for just 2.5% of the body's surface area, but plays a major social, aesthetic, relational and professional role [1]. It is a highly exposed area, due to the defense reaction to any aggression [2]. Burns to the hand are common [1], are not life-threatening, but are often serious because of their potential for sequelae, aesthetics and function, requiring specialized care from the acute phase [3]. We carried out a retrospective study over 5 years, collecting 192 cases treated in the Plastic Surgery and Burns Department at the Mohammed VI University Hospital in Marrakech, with the aim of collecting epidemiological and clinical data on hand burns, and reviewing the literature on hand burns and drawing up the main recommendations.

PATIENT AND METHODS

This study identified 192 patients, who were classified into two categories:

Category 1:

122 was the number of patients referred to us for management of burns in the acute phase (Inclusion

criteria: patients of all ages with burns on at least one hand / Exclusion criteria: burn victims who died within the first few days after admission and patients with incomplete records).

Category 2:

104 patients were treated for the sequelae of hand burns. Of these, 34 were hospitalized in our department during the acute phase of the burn (category 1 patients) and 70 patients were not initially managed in our department. (Inclusion criteria: Patients of any age with sequelae on at least one may, hospitalized and surgically treated for sequelae / Exclusion criteria: Tumoral sequelae (Marjolin's ulcer, etc.), Patients not surgically treated for sequelae. And those with incomplete files).

RESULTS

I. Frequency of Burns and Burn Sequelae of the Hand:

In our series and during the study period we collated 192 cases (Table 1) 259 patients were admitted to the department for the management of burns in the initial phase (all burns combined). Of these 259 patients,

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122 had burns on at least one hand, i.e. 47% of all burn victims.

370 patients were hospitalized for management of burn sequelae. Of these patients, 104 had hand sequelae, i.e. 30% of all cases.

II. Epidemiological Profile :

1. Age:

The mean age of our patients at the time of the accident was 21.3 years, with extremes of 3 months and 82 years. The average age of patients consulting for sequelae was 19.7 years, with extremes of 1 year and 57 years. The cases studied fell into the following age brackets (Figure1, 2). Young adults between the ages of 19 and 40 were the most affected, followed by children under the age of six.

- Gender:** Of 192 cases observed, a sex ratio of 1.2 was calculated, i.e. a slight male predominance (Table II).
- Socio-Economic Level:** In our series, we found that 62.5% of patients lived in unfavorable conditions.
- Pathological History :** Among the patients in our study, 35 had a pathological history (Table III).
- Causal Agent :**

Thermal origin was incriminated in 93% of cases. Butane flame injury alone accounted for 42% of cases. Of the 64 cases under 6 years of age, 48 (75%) were burned by contact.

We observed 12 cases of electrical burns and a single case of chemical burns caused by hydrochloric acid.

5. Circumstances:

The burn was due to a domestic accident in 76% of cases. Burns in baths occurred after loss of consciousness or after a convulsive seizure in the majority of cases (figure 3).

II. The Burned Hand in the Acute Phase :

Of the 192 cases in our series 122 patients were managed in our department during the acute phase of the burn.

1. Clinical Data :

1.1 Burned Skin Surface Area: The mean burned skin area was 21.16%, with extremes of 1% and 65%.

1.2 Hand Burns:

79 patients had burns on both hands (64.7% of patients), 26 patients had burns on the right hand (21.3%) and 17 patients had burns on the left hand (13.9%). Our study therefore covers a total of 212 burned hands.

The dorsal surface was the area most affected by burns (84% of burned hands), followed by the palmar surface (45% of burned hands).

1.3 Associated Burns :

Of the 122 patients (Figure 4):

- 16 had isolated hand burns, i.e. 13% of cases.
- The area most frequently associated with hand burns was the face, and Face-Main syndrome was found in 56 patients (46%).
- 56 were severe burns, i.e. 41% of cases.

1.4 Depth :

The initial clinical examination of our patients showed a predominance of intermediate 2nd-degree burns (51% of cases), followed by superficial 2nd-degree 1st burns (23%) (Figure5).

I. The Burned Hand in the After-Effects Phase:

The number of cases collected was 104, of which 34 cases were managed in our department during the acute phase of the burn.

1. Clinical Data :

1.1 Topography of Sequelae:

Sequelae were localized in the right hand in 42 cases (40.5%), compared with 38 (36.5%) in the left hand. 24 patients had a bilateral localization. Our study therefore covers 128 hands.

1.2 Type of Sequelae Observed :

A. Major Sequelae :

- Bridles and retractions were the main reason for encountering them in over 95% of cases.
- Pathological scars associated with retractions in over a third of cases (Table IV).

B. Minor Sequelae : Minor skin sequelae were associated in almost two-thirds of cases:

Dyschromic scars were the most frequent, occurring in 82% of our patients in areas of spontaneous healing and in grafted areas. Pruritus was present in 45% of our patients. Cutaneous hyperesthesia was present in 22% of cases, and scar fragility in 28% of patients.

1.3. Functional Examination:

- Fingers in flexion with limited extension: 78 hands
- Retraction in extension of MP joints, with palmar limitation: 38 hands.
- Limitation of commissure opening: 55 hands
- Finger palms: 12 hands

DISCUSSION

Epidemiological statistics for our study were compared with those found in the literature.

1. Epidemiology:

1.1 Epidemiology of Hand Burns:

In our study series, we noted that 47% of cases hospitalized for burns (all burns combined) had burns of at least one hand. The hand is the second most affected area by burn sequelae (30% of all sequelae locations), after the cervico-cephalic area.

In France, at least 71,000 hands are burned every year [4].

Our results are in line with the literature. Indeed, hand burns are present in 50% of patients hospitalized in burn centers, and one in five burned children [1].

a. Age :

In our study series, burns mainly affected a young population, with an average age of 21.3 years at the time of the accident. The age range between 18 and 40 years accounted for 42%, and children under 6 for a third of cases (33%). Patients aged over 40 account for only 14%.

In terms of age of sequelae, the age groups most affected are young adults (36.5%) and children under 6 (31%).

Sex :

In developing countries, boys generally predominate among children, while among adults, women are more often burned than men, due to the importance of accidents during meal preparation [5, 6].

In our study, for all ages, there was a slight male predominance (54.6%). The sex ratio in favor of men is found in the different series of burned hands in the primary or sequellar phase (Table V).

Socio-Economic Level:

In our series, 62.5% were of low socio-economic status.

In addition to the significantly higher incidence of burns in developing countries according to the WHO [7], there are also differences according to socio-economic status within countries [8].

Medical Background

Burns occur in subjects at risk, and the patient's history is both a predisposing and prognostic factor in the evolution of the burn [9].

In our series, we observed 13 cases of psychic disorders and 10 cases of epilepsy. Burns are frequent in patients with psychic problems in the context of autolysis. They are also frequent in epileptics, who fall on a source of heat at the time of the convulsive seizure, especially in the Maurs baths in our Moroccan context.

Burn Circumstances:

In our series, the accident occurred mainly at home (76%), a result close to the literature [10, 11].

Work-related accidents accounted for only 7.2% of cases in our series, which differs markedly from the series by Kang-an Wang (60.85%), L.Bourdais (20%) and S.EL Mazouz (24%).

This difference in results could be explained by the fact that the latter studies were carried out in industrial towns where work-related accidents are frequent. But the low incidence of occupational accidents may also be linked to the size of the paediatric population in our study.

Causal Agent:

In our patients, thermal origin was incriminated in 94% of cases. Flames were involved in 59% of cases.

Of the 64 cases under 6 years of age, 48 (75%) were burned by contact with a boiling liquid or a hot solid object. In this age group, flame was responsible for only 16% of burns.

II. Acute Hand Burns:

2.1 Clinical Data:

a. Lesion Topography:

Hand burns can be bilateral, making their management even more delicate. In our series, this represents a percentage of 64.7%.

The location of the burned areas of the hand enabled us to divide the 212 burned hands in our study into 3 categories:

- Isolated dorsal burn: 116 hands (55%)
- Isolated palmar burn: 34 hands (16%)
- Dorsal and palmar burns (circular): 62 hands (29%)

For our patients of all ages, the dorsal surface was the area most affected by burns (84% of burned hands), followed by the palmar surface (45% of burned hands).

In children under 6 years of age, the palmar surface was affected in over 92% of burned hands, compared with 30% for the dorsal surface.

In adults and children over 6 years of age, the dorsal aspect was more frequently involved, with 94.5% and 68.2% respectively.

These results are in line with the findings of the literature [12-9].

Circular involvement (29% of our patients) is a criterion of severity in deep burns. It can lead to distal ischemia, particularly of the fingers. In such cases, discharge incisions are required.

b. Burnt Skin Surface:

The mean SCB in our series was 21.16%. Other series report different averages (Table XII).

This high mean SCB may be explained by the burn mechanism found in our patients, many of whom were burned by butane flames or scalded in the Maure bath, resulting in burns that were often extensive.

c. Associated Burns:

Among the lesions associated with hand burns, facial burns were in first place (46% of cases), resulting in the classic Face-Main syndrome. Bourdais reports a similar result (53.4%).

In our context, this association can be explained by explosions of small 3kg gas cylinders or splashes of hot liquid, and corresponds to the reflex to protect the face and eyes.

Only 13% of our patients were admitted for isolated hand burns, which differs markedly from Bourdais' series (26.4%) [8], and Kang-an Wang's series (28.84%) [15].

d. Burn Depth:

On admission, 51% of our patients were diagnosed with intermediate hand burns.

The most common profile of hand burns in our series:

- Male gender.
- Children under 6 and young adults.
- Thermal flame burns in adults and contact burns in children
- Domestic accident
- Dorsal burns in adults and palmar burns in children
- Hand-face syndrome.
- Intermediate burn.

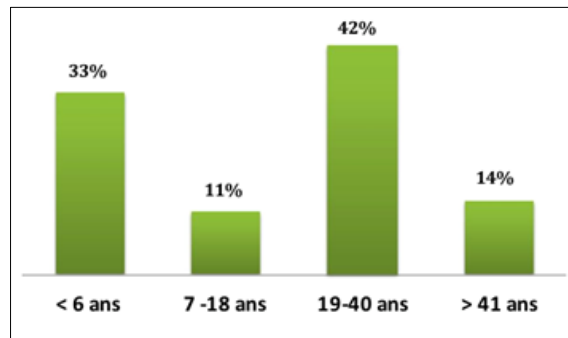


Fig. 1: Distribution of patients by age at time of accident

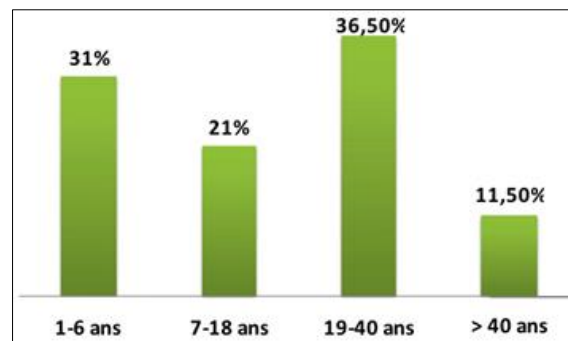


Fig. 2: Distribution of patients by age of sequelae

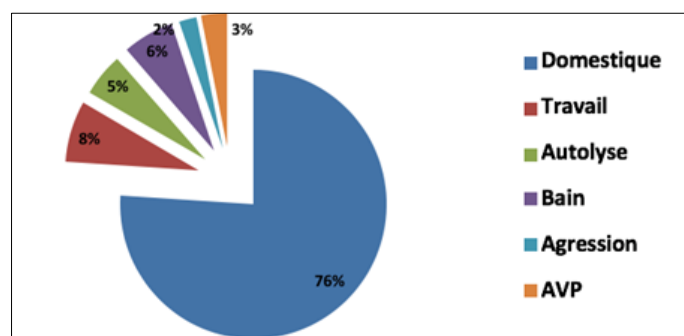


Fig. 3: Distribution of patients according to burn circumstances

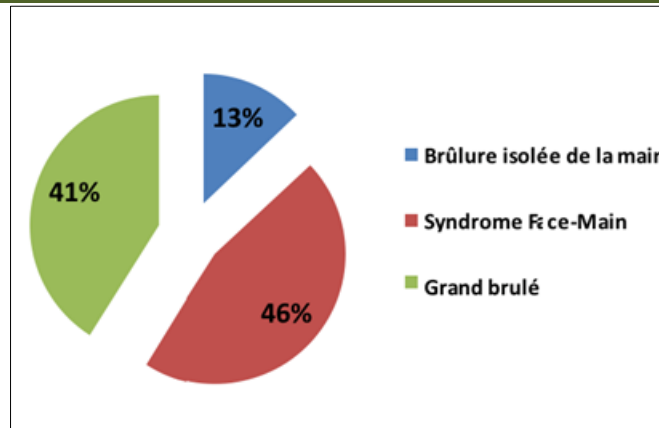


Fig. 4: Distribution of patients by associated burns

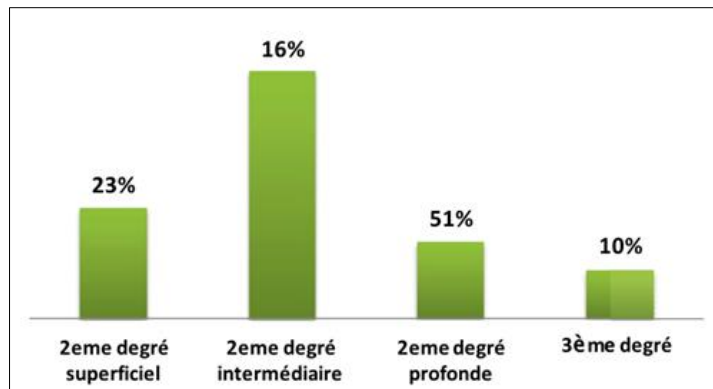


Fig. 5: Distribution of patients by burn depth

Table I : The incidence of burned hands in the acute phase in our department

Motif d'hospitalisation	Toutes les localisations	Localisation au niveau de la main	Pourcentage %
La prise en charge initiale des brûlures	259	122	47%
la prise en charge des séquelles des brûlures	370	104	30%

Table II : Breakdown by gender

	Hommes	Femmes
Nombre de cas	105	87
Pourcentage	54,6%	45,4%

Table III: Pathological history of patients.

Background	Case name
Psychiatric Disorder	13
Epilepsy	10
Hypertension	5
Diabetes	3
Heart Disease	2
Bilateral Blindness	1
Hypothyroidism	1

Table IV: comparison of sex ratios between different series

Série	Homme	Femme	Sexe ratio
Rafik (2011–2015) [133]	53%	47%	1,12
Kibadi (2010–2014) [135]	53%	47%	1,12
Benbrahim (2003–2007) [142]	69,2%	30,8%	2,24
Ettalbi (2004–2005) [143]	57%	43%	1,32
Boukind (2004–2012) [165]	50%	34%	1,47
El Mazouz (1998–2007) [126]	49%	51%	0,49
Bourdais (2007–2008) [8]	74,3%	25,6%	2,90
Kang-an (2009–2013) [144]	76,98%	23,02%	3,34
Sheridan (1985–1995) [70]	71,3%	28,7%	2,48
Notre série (2013–2017)	54,6%	45,4%	1,2

Table V: type of retraction observed

Type de rétraction	Nombre des mains
Brides digitales	44 (34,3%)
Brides digito- palmaires	40 (31,2%)
Placards cicatriciels dorsale	46 (35,9%)
Brides de la 1 ^{ère} commissure	38 (29,6%)
Bride des autres commissures	26 (20,3%)
Placards cicatriciels palmaire (sans atteinte des doigts)	20 (15,6%)

CONCLUSION

Burns frequently affect the hand. Nearly 50% of hospitalized burn victims have hand burns.

In our series, we mainly find two typical patients:

- The first is a young adult, the victim of a thermal burn from a butane flame, causing burns on the dorsal surface of both hands as part of the Face-Main syndrome.
- The second was a child with a thermal burn caused by scalding or contact with a hot object, resulting in burns on the palmar surface of the hands.

During the healing phase, particular attention must be paid to mobilizing and immobilizing the burned hands. The role of physiotherapy is indisputable.

Burns to the hand result in both aesthetic and functional sequelae, which are most often interlinked. Skin flaps and retractions are the most frequent, and represent the major problem of these sequelae.

Deformities resulting from severe burns are a combination of claw finger, palmar retraction, deformed

commissures, scarring and hypertrophy, nail dystrophy and amputations.

Prevention is the weapon of choice, and involves various companies raising awareness of safety rules to prevent accidents in the home and at work. It also involves early and effective treatment of burn victims in the acute phase of an accident, with regular long-term follow-up.

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