

Pediatric deep burns caused by hot incense ashes during 2014 Spring Festival in Fuyang city, China

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ABSTRACT

BACKGROUND: The Chinese people in Fuyang city, a northwest city of Anhui Province, are accustomed to burning incense at home for blessing during the Spring Festival. Their children, especially toddlers, like playing around the burning incense and are at risk of burning by hot incense ashes. The purpose of this study was to describe the unique cause and clinical characteristics of pediatric deep burns caused by hot incense ashes during 2014 Spring Festival.

METHODS: Twelve consecutive children admitted to our Burn Center and Fuyang People's Hospital during 2014 Spring Festival, with burn injuries caused by hot incense ashes which were epidemiologically studied retrospectively. Data on age, gender, size, depth and site of burn, incidence by day, number of operation, hospital stay, and causes of burns were collected.

RESULTS: All patients came from Fuyang city. Of the 12 patients, the average age was 2.17 years, with a range of 1–6. The boy-to-girl ratio was 2: 1. The mean total burn surface area (TBSA) was 5.83%, and 91.67% of the children sustained full-thickness burn. Hands were the most common parts of the body to be injured. Dry necrosis developed in 14 fingers of 3 patients. January 31, 2014, the first day of the Chinese New Year, was the time of highest incidence. Six patients (50%) required surgical intervention while the number of operations including escharectomy, excision, skin grafting, or amputation of necrotic fingers, per patient was 2. A total of 14 fingers were amputated of the necrotic parts. All children survived and mean length of hospital stay of the patients was 20 days.

CONCLUSION: Hot incense ashes cause serious injuries to children in Fuyang city during the Spring Festival. Preventive programs should be directed towards high risk groups to reduce the incidence of this burn.

Key words: Burns; children; incense ashes.

INTRODUCTION

The first day of the first lunar month is regarded as the New Year of the Chinese – the Spring Festival. It is the most important and ceremonious traditional festival in China, just like Christmas in the West. Many special customs accompany the Spring Festival across the country. Burning incense at home is a typical custom during the Spring Festival in Fuyang city, a northwest city of Anhui Province. With the increase income in the recent years, people have started burning more and more incenses in their homes for blessing during the festival

and this custom has become surprisingly popular in Fuyang city.

Before the New Year's bell sounded, dozens or even hundreds kilograms of incenses had been placed layer by layer on the ground at home. People believe that the more they burn incense, the more prosperous the family will be next year. With the beat of the Spring Festival bell, people ignite incense at the top. The burning incense always lasts for several days. Children, especially toddlers, like playing around the burning incense. When children carelessly fall on hot incense ashes, they will suffer from severe burns due to direct contact (Fig. 1). During the 2014 Spring Festival in Fuyang city, a total of twelve children sustained severe burns by hot incense ashes and admitted to burn centers. The burn wound is mostly deep. Dry necrosis always sets in fingers, sometimes making it necessary to have the affected parts amputated. The aim of this study was to describe the unique cause and clinical characteristics and provide data towards improvement of prevention and management of this type of burn.

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MATERIALS AND METHODS

A total of twelve children, whose burns were sustained by hot incense ashes during 2014 Spring Festival were identified. All of the children were from Fuyang city, Anhui province. After the burn injury, they were admitted to the burn unit of Fuyang People's Hospital and ten of them were referred to the burn center of the Anhui Medical Hospital of Anhui Medical University. The children whose burns were minor and treated as outpatients were not enrolled in the present study. Data were collected on age, gender, size, depth and site of burn, incidence by day, number of operation, hospital stay, and causes of burns. This study was approved by the Ethics Committee of Anhui Medical Medical University (No.20131071). The guardians who, on behalf of the children, enrolled in this study gave their consent for the publication of their information and signed the permission.

RESULTS

Age and Gender

The age of these twelve children ranged from 1 to 6 years (mean 2.17 ± 1.40 years). There were 8 boys and 4 girls (Table 1).

Size and depth of burn

The total burn surface area (TBSA) ranged from 3% to 12%

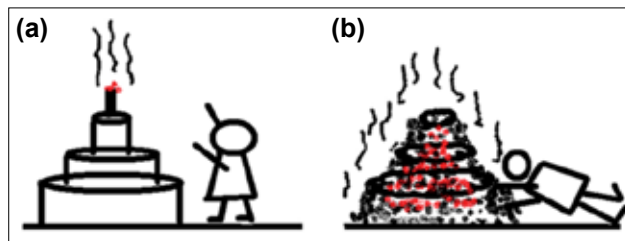


Figure 1. Diagram of pediatric hot incense ashes burns. (a) The child likes playing around the burning incense. (b) Once the child trips or falls on the hot incense ashes, deep burns arise due to the direct contact.

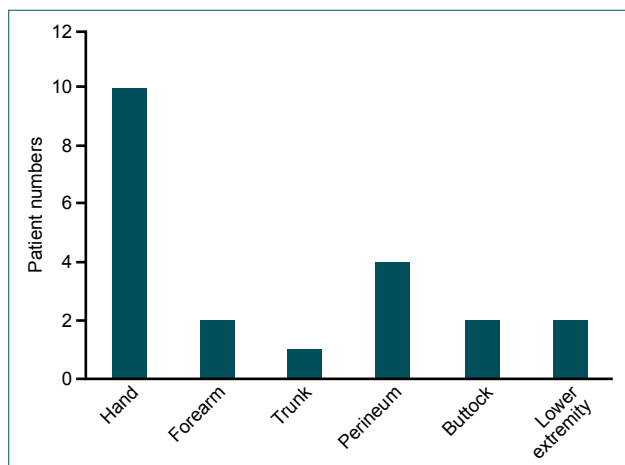


Figure 2. Sites of burn injury.

(mean $5.83 \pm 2.62\%$). Eleven children sustained full-thickness (FT) burn (91.67%). The mean percentage of FT burn was $1.96 \pm 2.39\%$ (range 0–8%). Dry necrosis developed in 14 fingers of 3 patients (Table 1).

Site of Burn

The commonest area of the body to be injured was the hands (10 patients), followed by the perineum (4), then the forearm (2), the buttocks (2) and lower extremities (2), with the trunk (1) least likely to be injured (Fig. 2). More than one region was involved in 41.67% of the cases.



Figure 3. A 1-year-old boy sustained deep hand burns by hot incense ashes. (a) Full-thickness burn on the right hand. (b) Early excision of palm and skin graft were performed on the 7th day post-burn. Although the skin graft took well, dry necrosis developed on the five fingers of right hand. (c) One month later, the demarcation line of dry necrosis was clear and the necrotic parts of fingers were amputated. (d) On the 42nd day postburn, the wounds on the right hand almost resurfaced after the amputation of the necrotic fingers.



Figure 4. A 1-year-old girl sustained deep hand burns by hot incense ashes. (a) Full-thickness burn on the left hand and forearm. Dry necrosis developed on the left ring finger and little finger. (b) After excision and skin graft, and amputation of the necrotic parts of fingers, the wounds on left hand were completely epithelialized. (c) Full-thickness burn on the right hand. (d) The wounds on right hand had completely resurfaced 15 days after excision and grafting.

Table 1. Summary of patient characteristics

Patient	Sex	Age (years)	BSA burned (%)	Full-thickness burn (%)	Burn site	Operation times	Surgical interventions	LOS (days)
1	Male	2	5	1.5	Both hands	2	1. Escharectomy. 2. ESG.	14
2	Male	2	5	0.5	Both hands and perineum	0	N/A.	13
3	Female	1	10	8	Both hands, left forearm, lower limbs, and perineum	3	1. Escharectomy. 2. ESG. 4 th and 5 th fingers amputation (left hand). 3. SGGW.	28
4	Male	1	4	2.5	Both hands	2	1. ESG. 2. Five fingers amputation (right hand).	48
5	Male	3	3	1	Both hands	1	ESG.	18
6	Male	3	5	0.5	Both hands	1	ESG.	18
7	Female	2	5	0.5	Both hands	0	N/A.	19
8	Male	1	5	3	Both hands	3	1. Escharectomy. 2. ESG. 3. 2 nd , 3 rd , 4 th and 5 th fingers amputation (right hand), 1 st , 2 nd , and 5 th fingers amputation (left hand).	41
9	Male	2	7	0	Right hand, perineum, buttocks and right lower extremity	0	N/A.	10
10	Female	6	4	0.5	Right hand, and right forearm	0	N/A.	7
11	Male	2	12	5	Trunk	0	N/A.	16
12	Female	1	5	0.5	Buttocks and perineum	0	N/A.	8

BSA: Body surface area; ESG: Excision and skin grafting; SGGW: Skin grafting on granulation wound; LOS: Length of stay.

Incidence by Day

The 2014 Chinese New Year Day is on January 31. In terms of the time of incidence, eight children (66.67%) of the total cases sustained hot incense burns on the first day of the Chinese New Year. One, two, and one children were injured on the eve of New Year, the second day, and the fifth day of the Chinese New Year, respectively.

Surgical Interventions

After admission, three children underwent escharectomy due to the circumferential deep burn. Six patients did not agree to surgical operations and were treated conservatively. Early excision and skin grafting were performed on six cases. Dry necrosis of the finger was found in three children and a total of 14 fingers were amputated of the necrotic parts (Figs. 3,

4). The number of operations per patient was 2.

Length of hospital stay

All patients survived the burn injury. The length of stay in hospital for the cases varied between 7 and 48 days, with an average of 20 days. Two children were confined in the hospital for more than 1 month.

Cause of injury

All children in this study were burned as a result of a contact with hot incense ashes, reaching close to 400 degrees during the 2014 Chinese Spring Festival. During the New Year, the children, especially toddlers, like playing around the burning incense. However, accidentally falling on the hot incense ashes may bring a serious tragedy to themselves and their families.

DISCUSSION

Through burning incense, people express good luck and blessings for the next year and also entrust their hopes and yearning for good life. In order to carry out more wishes, people in Fuyang city always burn more and more incense at home during the Spring Festival. However, tragedies occur time to time due to negligence. Although hot incense ashes burns still represent only a small proportion of the total number of children we see and the TBSA is not too large, this pediatric burn commonly and deeply affects the hands, and therefore, have serious functional and aesthetic consequences.^[1]

In this study, only one child was six years old, the others aged 1–3 years. Children between 1 to 3 years of age start learning to walk and toddlers are the most frequent victims of burn injuries.^[2] Toddlers have weak self-consciousness and are less risk-averse, giving high incidence of thermal trauma.^[3] In addition, another reason is that children have strong curiosity and are active. In particular, male predominance occur in this burns. Boys tend to like playing with fire^[4] and are more curious and active than girls.

In our study, although the total burn surface area in this burn was small (mean 5.83%), the wound was mostly deep. Full-thickness burn was found in 91.67% of the children. A contact temperature of 70 °C for one second's duration is recognized as sufficient to cause a full-thickness burn.^[5] Young children have a relatively thin skin and can quickly sustain a full-thickness burn. Children generally sustain burns more severely than adults under the same condition.^[4] Incense can actually burn around 400 °C in stick form.^[6] Once the child trips or falls on hot incense ashes, deep burns, even dry necrosis of the fingers, always arise due to direct contact. In this series, 14 fingers of three patients developed dry necrosis in various degrees at different levels. The deep burn caused by hot incense ashes in children can result in prolonged suffering, disability, disfigurement, and in impaired physical and mental development.

The burning incense is always piled on the ground directly. Once the child tumbles, the hands will be at greatest risk to be injured.^[3] Perineum was the second most common area of injury. In the developing area of China, a baby always wears open-seat pants with the perineum cut open. This garment contributes to the higher risk of burn injury to the perineum in children.^[4]

All 12 children were from Fuyang city, which has the largest population in Anhui province. In this area, residents are accustomed to burning incense for blessing during the Spring Festival, the most important festival in China. The highest incidence of hot incense ashes burns is on January 31, 2014, the first day of the Chinese New Year. This is related to the peak of incense burning on the first day of Spring Festival.

In this study, a total of six children needed surgical intervention, with an average of 2 operations. Children treated as outpatients were excluded from the study, and those who were admitted often required long periods of time in hospital. Mean length of hospital stay was 20 days. High surgical rate and long hospitalization reflects the severity of this burns. The wounds were mostly deep burns and dry necrosis was always present in the fingers, which often required multiple surgical resections, or even amputation.

Injury prevention programs are effective in reducing burn-related hospitalizations of infants and toddlers.^[7] On the analysis of the causes during our study, the following measures, we believe, could bring down the incidence of this burn injury significantly: First, adequate supervision of children remains a major prevention tool for avoiding accidents of all types, including hot incense ashes burns.^[8] Second, the parents should educate children in recognizing and addressing risks for burn when they burn incense. They should reinforce the importance of their role in ensuring the safety of their child.^[9] Third, encourage parents/caregivers to put fence aside when burning incense and limit distractions. Don't leave hot incense or ashes unattended.

Burns couples with renewed efforts to reduce the social and environmental correlates of burn injuries.^[10] With this educational program and a change in the blessing behavior, the incidence of this burn injury, we believe, can be reduced and people will enjoy the festival.

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Declaration of Conflicting Interests

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ORJİNAL ÇALIŞMA - ÖZET

Çin'in Fuyang şehrinde 2014 Bahar Festivali sırasında kızgın tütsü küllerinin neden olduğu pediatrik derin yanıklar

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AMAÇ: Anhui eyaletinin kuzeybatısındaki Fuyang şehrinde yaşayan Çinliler, Bahar Festivali boyunca evlerinde tütsü yakmaya alışkınlardır. Çocuklar, özellikle yürümeye yeni başlayan çocuklar, yanan tütsünün etrafında oynamayı sevdikleri için kızgın tütsü külleri ile yanma riskine karşı savunmasız durumdadır. Bu çalışmanın amacı, 2014 Bahar Festivali sırasında kızgın tütsü küllerinin neden olduğu pediatrik derin yanıkların klinik özelliklerini ve kendine özgü sebeplerini tanımlamaktır.

GEREÇ VE YÖNTEM: Ardışık 12 çocuk, 2014 Bahar Festivali boyunca Yanık Merkezimize ve "Fuyang People's Hastanesi"ne başvurdu. Kızgın tütsü küllerinin neden olduğu yanık yaraları geriye dönük olarak ve epidemolojik açıdan incelendi. Yaş, cinsiyet, boyut, yanık derinliği ve bölgesi, günlük insidans, hastanede kalış süresi ve yanık nedenleri hakkındaki veriler toplandı.

BULGULAR: Bütün hastalar Fuyang şehri yerliydi. On iki hastanın ortalama yaşı 2.17 yıldır (dağılım, 1–6). Kız/Erkek oranı 2:1 idi. Ortalama toplam yanık yüzey alanı %5.83 olmakla birlikte çocukların %91.67'sinde tam kat yanıklar mevcuttu. Vücudun en yaygın şekilde yara alan bölgesi ellerdi. Kuru kangren üç hastanın 14 parmağında gelişti. Çin Yeni Yılı'nın ilk günü olan 31 Ocak 2014 en yüksek insidansa sahip olan gündü. Altı hastada (%50) cerrahi operasyona gerek duyulurken eskarektomi, eksizyon, deri grefti ve kangren olan parmakların amputasyonu operasyonlarının sayısı hasta başına iki idi. Nekrotik kısımlarından kesilen parmak sayısı 14 idi. Bütün çocuklar sağ kaldı ve hastaların hastanede kalma süreleri ortalama 20 gündü.

TARTIŞMA: Kızgın tütsü külleri, Bahar Festivali sırasında Fuyang şehrinde yaşayan çocuklarda ciddi yanıklara sebep olmaktadır. Bu tür yanıkların insidansını düşürmek için yüksek riskli gruplara yönelik olacak önleyici programlara ihtiyaç duyulmaktadır.

Anahtar sözcükler: Çocuklar; tütsü külleri; yanık.

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