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CASE SERIES

A Narrative Case Series of Flame Burns due to Aarti in Navratri Puja in Developing Country

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Keywords:
Burn, Diya flame burn, Household accidental burn, Navratri

ABSTRACT

Fire is a very important part of Hindu rituals, such as being the central witness of the rite-of-passage ritual in Hindu weddings, in the Upanayana ceremony, as well being part of the deep in festivals such as Diwali and during Aarti poojan. Navaratri is one of the most revered festivals in Hinduism, celebrated in India for 9 nights, during which Goddess Durga is worshipped with great zeal and enthusiasm. During the performance of aarti, a ritual involving lighted lamps, sometimes the victim's clothes accidentally get engulfed in the flames of diyas. The loose-fitting inflammable clothes usually worn by Indian women are a major factor to contributes burn injuries and are associated with very high mortality rates. At our centre, we present a case series of 5 patients who sustained second to third-degree burns while performing aarti, due to clothes catching fire from lighted diyas during Navratri in October 2023. All 5 patients were female, age ranging from 45 to 70 years with the presence of comorbidities sustaining major deep burns and a resultant mortality of 80%.

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INTRODUCTION

Burns can occur due to various social habits and traditions, religious beliefs and activities, and social events or festivals.[1] Candle, lightning lamp, and burning incense sticks are part of the rituals in households worldwide. Sanskrit meaning of fire is *Agni* and connotes the Vedic fire deity of Hinduism.[2] In the classical cosmology of the Indian religions, Agni as fire is one of the five inert impermanent elements along with space, water, air, and earth, the five combining to form the empirically perceived material existence.[3] Agni remains an important part of Hindu traditions such as Hindu weddings, the Upanayana ceremony, and being part of festivals such as Diwali and Arti in pooja.[3] Navaratri is the most widely celebrated festival among them all over India according to regional traditions. It is celebrated over nine days, a festival devoted to the worship of the goddess Durga. Navaratri comes two times a year, firstly in March-April (ending on the 9th and final day which is celebrated as Ram Navami) and September-October (ending on the 10th day celebrated as Dashain also called Dussehra), dates being fixed according to the lunar calendar of Hindu. The people observe fasts and worship Ma Durga.[4] When Arti poojan is performed, the performer faces the deity of god and concentrates on the form of god by looking into the eyes of the deity to get immersed. Arti poojan is waved circularly, in a clockwise direction around the deity. Sometimes during the performance of aarti, the clothes of the victim accidentally get engulfed in the flames of diyas. The loose-fit and inflammable clothes usually worn by Indian women are a major contributing factor to flame injuries. The burns sustained are usually major burns and are associated with high mortality.[5] flame burns get exacerbated because the patients are usually old, debilitated with slow reflexes, and unable to raise an alarm.

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We present a case series of 5 patients who sustained second to third-degree flame burns while performing aarti, due to their clothes catching fire from lighted diyas.

AIMS AND OBJECTIVES

To study the following parameters:

- Patient demographics.
- Pattern of burns (superficial, partial-thickness, full-thickness)
- Extent of burn
- Mortality rate/ outcome

METHODOLOGY

This is an observational descriptive study involving burn patients between 14th October 23 to 24th October 23 during the Navratri festival, admitted at King George's Medical University, Lucknow, India.

On admission, after primary management and resuscitation, a thorough evaluation was done which included history and examination. Assessment of the total percentage of burn area, pattern of distribution, and depth of burns was noted using the Rule of nine and the Lund and Browder Chart.

RESULTS

There was a total of 14 burn admissions during the Navratri festival period, of which 5 (35.7%) patients had received flame burns due to their clothes catching fire from a lighted diya (lamp) while performing the ritual of aarti. All 5 (100%) of these patients were females.

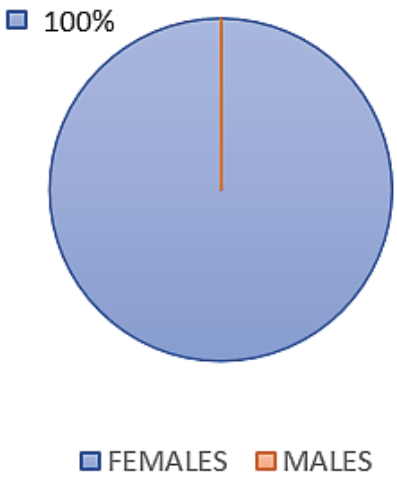


Figure 1: Pie chart showings the sex distribution of patients

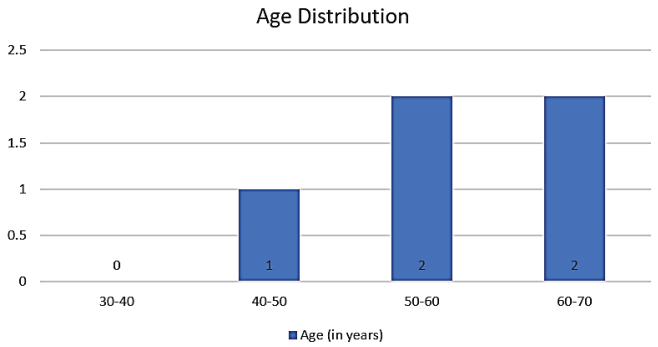


Figure 2: Bar diagram showing the age distribution of patients

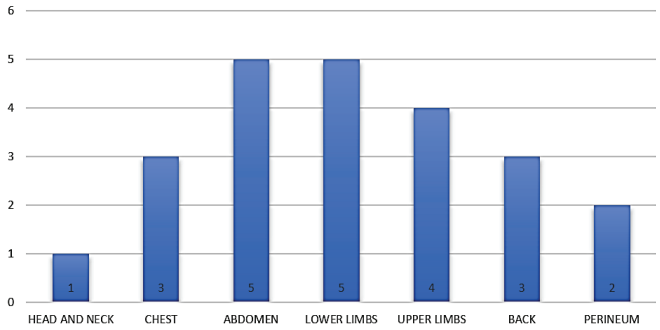


Figure 3: Bar diagram showing the area involved in patients

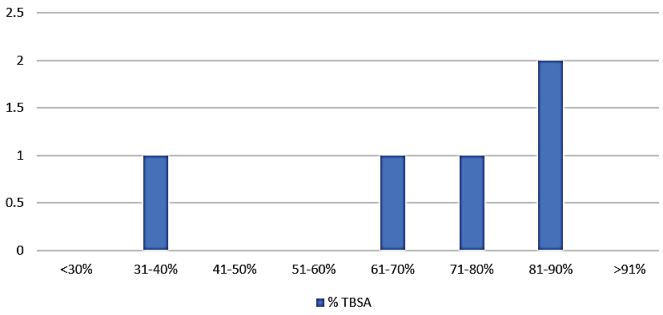
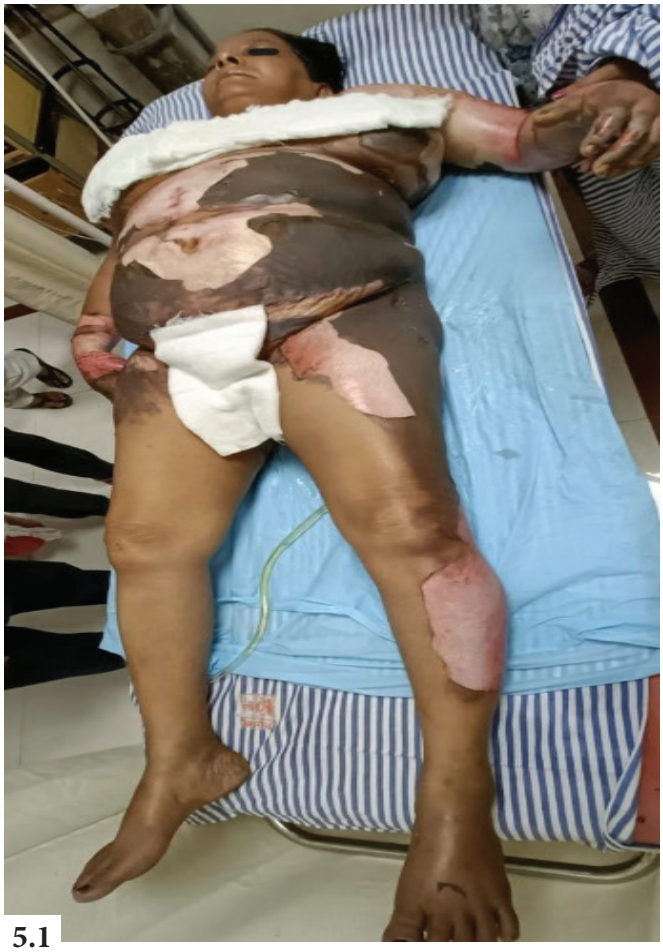


Figure 4: Bar diagram showing the percentage area involved in patients

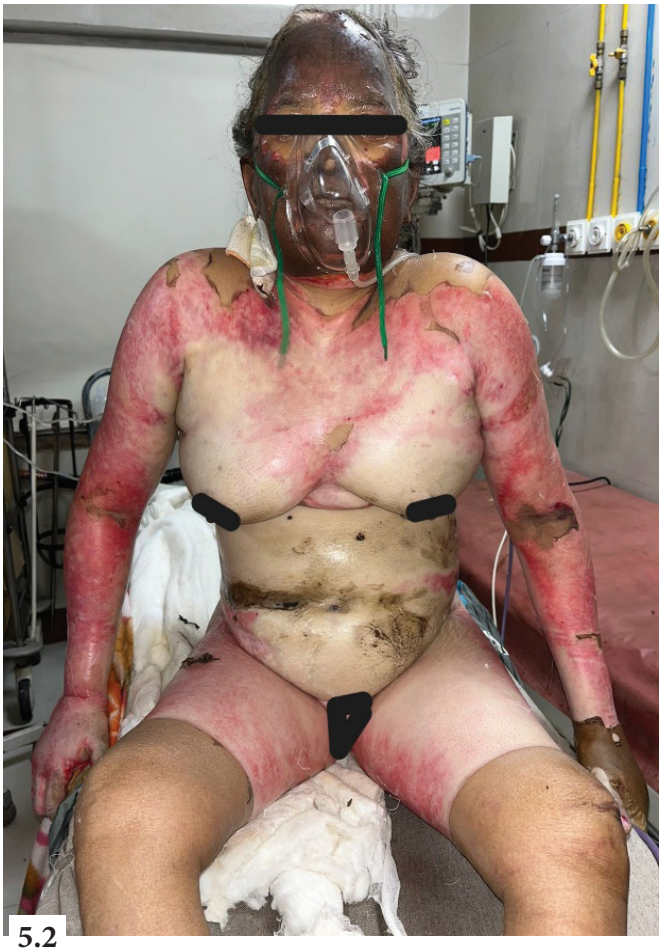
The age ranged from 45 to 70 years, with 4 out of 5 patients (80%) aged more than 50 years.

The abdomen and thighs were involved in all 5 cases (100%). This was followed by upper limbs (80%), chest and back (60%), perineum (40%) and head and neck (20%), respectively. The pattern of burns ranged from superficial to deep burns.

A total of 3 out of 5 patients (60%) received more than 80% TBSA burns with 1 patient (20%) involving 90% TBSA flame burns. 4 patients (80%) suffered from some degree of inhalational burn injury characterized by singing of nasal hair, presence of soot in oro-nasal cavities and hoarseness of voice.



5.1



5.2

Figure 5 (1 & 2): 2nd degree deep burns to chest, abdomen, perineum, bilateral thighs, bilateral upper limbs and perineum

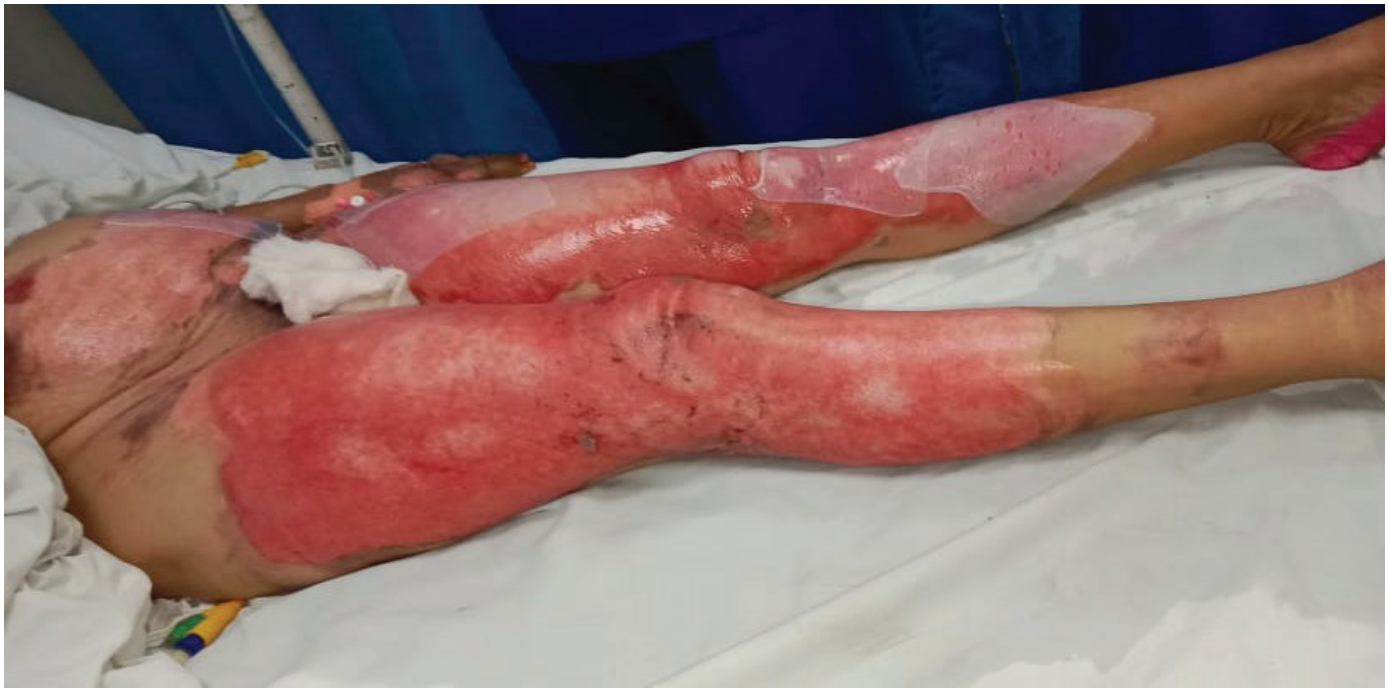


Figure 5.3: 2nd degree with 3rd degree burns to lower abdomen and bilateral lower limbs

Figure 5 (4 & 5): Charateristic flame burns due to burning clothes revealing undergarment markings.

Table 1: Patients with total body surface area (TBSA) burns.

S.No.	Age/ Sex	% TBSA	Comorbidity	Outcome
1.	46y/F	80%	Obesity with Type 2 DM, HTN	Expired due to MODS
2.	52y/F	35%	Paroxysmal AF	Conservatively managed
3.	58y/F	85%	CHD with MR, CKD, type 2 DM	Expired due to MODS
4.	63 y/F	70%	IHD	Expired due to MODS
5.	70 y/F	90%	Obesity with HTN with DM	Expired due to MODS

Mortality

4 out of 5 burn victims with TBSA > 70% succumbed to their injuries during treatment despite management in an intensive care unit.

DISCUSSION

Burns continue to be one of the major causes of morbidity and mortality across the world, especially affecting lower- and middle-class people in developing countries like India.[6] It is estimated that around 7,00,000 to 8,00,000 burn patients are admitted annually in India.[7,8] Although a great majority of burns are accidental in nature, a specific category of ritual-related burns is noticed amongst the Hindu community in India. Lewis *et al.* reported an unusual presentation of camphor burn in South Indian communities, where camphor is used as a part of the Arti ceremony in Hindu community. The devotees first have to fast for few days and then place 'camphor' on their palms and set it on fire, resulting in a full thickness burn of the palmar skin.[9]

Kuiri *et al.* in 2015 reported that 99 out of 1984 burn patients (5%) admitted at a tertiary care hospital in West Bengal were a result of flame burns from kerosene lamps or a diya-baked clay lamp.[10] Pereira *et al.* reported in a study in 2022 that out of 298 burn admissions in the study period, 122 patients had sustained flame burns, out of which 25 (20.49%) had sustained burns related to religious rituals, accounting for 8.38% of the total burn admissions.[5]

It is thus imperative to understand the epidemiology of flame burns especially due to an innocuous-looking *diya*, which can easily become a source of fire during the festivities. In our study, we observed that elderly women were the main victims possibly owing to their slow reflexes and wearing loose-fitted clothes which are easily engulfed in flames. As the family members are usually busy in celebration and festivities, a majority of elderly people are left unsupervised and thus unable to put out the flames leading to deeper burns involving larger body surface areas. We reported 3

out of 5 patients (60%) with more than 80% TBSA involved in flame burns. Old age and prevalent comorbities make management of such patients very difficult, resulting in a higher mortality amongst such patients. In our study, 4 out of 5 patients (80%) expired despite being admitted to an ICU under specialised care of a team comprising of anaesthetists and plastic surgeons dedicated to management of burn injuries.

Primary prevention is, therefore, the best possible means to avoid morbidity and mortality associated with flame burns due to diyas during the ritual of aarti. The following safeguards should be strictly adhered to when performing the ritual of aarti:

- Avoid loose fitting clothes and free waving head covers/*dupattas*.
- Avoid fabrics that catch fire easily e.g., silk, cotton or linen.
- Avoid multiple diyas or diyas with large flames.
- All elderly should perform rituals under the supervision of able-bodied relatives.
- Placing fire extinguishers in the vicinity.

CONCLUSION

A small clay baked earthen lamp or *diya* can be a source of flame engulfing the clothes of an unsuspecting person, leading to extensive deep burns. The elderly women are usually the most commonly involved, with the trunk and the lower limbs being the most commonly affected areas. The flames quickly engulf loose-fitted clothes leading to extensive burns. Old age, comorbidities and a higher percentage of body surface area burns make the management of such patients very difficult with a resultant high mortality rate.

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