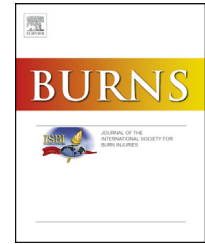


Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/burns](http://www.elsevier.com/locate/burns)

# Steam vaporizers: A danger for paediatric burns



Sarah Lonie\*, Paul Baker, Rodrigo Teixeira

Department of Plastic and Maxillofacial Surgery, Royal Children's Hospital, Melbourne, Australia

## ARTICLE INFO

### Article history:

Accepted 13 May 2016

### Keywords:

Paediatrics  
Burns  
Vaporizers  
Prevention

## ABSTRACT

**Background:** Steam vaporizers are used to humidify air in dry environments. They are marketed to moisten children's airway secretions and thus to help relieve symptoms associated with upper respiratory tract infections. Unfortunately the steam emitted from the unit can also pose a significant risk of burns to children. Our study aimed to ascertain patterns of injury and treatment outcomes from steam burns resulting from these devices. Potential preventative measures are discussed.

**Methods:** Children who had sustained vaporizer scald burns were identified at the outpatient burns clinic over a 10-month period (November 2014–August 2015). Medical records were reviewed retrospectively and data collected on pattern of injury, management and outcomes.

**Results:** Ten children were treated for vaporizer steam burns over the study period. The mean age was 1.6 years and 8 (80%) patients were male. Operative intervention was undergone in 5 (50%) cases; four acutely and one as a secondary reconstructive procedure. Hand burns accounted for 8 (80%) of cases.

**Conclusions:** Steam vaporizers can cause significant burns in the paediatric population. Toddlers were most at risk, frequently sustaining hand burns that underwent skin grafting. Greater public awareness of the danger is indicated and measures to prevent such injuries should be addressed by appropriate authorities.

© 2016 Elsevier Ltd and ISBI. All rights reserved.

## 1. Introduction

Steam vaporizers are marketed to help relieve common respiratory ailments, such as colds, flu, bronchitis and croup. Suggested benefits of increasing indoor humidity are thought to include soothing irritated throats, thinning phlegm and reducing coughing. This is thought to apply to all age groups, including newborns.

Despite some variations in design, steam vaporizers usually consist of a plastic chamber that boils water in order to emit a continuous steam vapor. Manufacturers recommend

that they are kept on the floor after safety concerns that children could potentially pull the devices down on top of themselves. Constant supervision is therefore paramount if these devices are used in this way as they become readily accessible to curious and mobile toddlers. Steam is usually 100 °C and full-thickness burns can result very rapidly in children from brief exposure of their relatively thinner dermis to these temperatures.

Over the course of a single winter we anecdotally observed a sudden increase in paediatric scalds resulting from contact with steam vaporizers. We performed a retrospective analysis in order to ascertain the scale of the problem.

\* Corresponding author at: Department of Plastic and Maxillofacial Surgery, Royal Children's Hospital, 50 Flemington Rd, Parkville, Victoria 3052, Australia. Tel.: +61 419106782; fax: +61 3 93456585.

E-mail address: [sjlonie88@gmail.com](mailto:sjlonie88@gmail.com) (S. Lonie).

<http://dx.doi.org/10.1016/j.burns.2016.05.009>

0305-4179/© 2016 Elsevier Ltd and ISBI. All rights reserved.

## 2. Methods

Children were identified from outpatient data on mechanism of injury. All patients sustaining burns associated with the use of steam vaporizers were included. Patients sustaining scalds from other mechanisms were excluded. Data was collected retrospectively from medical records and included demographics, injury patterns, first aid, type and duration of dressings, time to healing, surgical management and treatment outcomes.

This research project was approved by the Ethics Committee and consent was obtained for publication of photographic records.

## 3. Results

Between November 2014 and August 2015 we identified 10 children who presented to the burns clinic with burns resulting from contact with steam vaporizers (Table 1). These cases were mostly over winter with 90% between May and August. The majority of patients were male (80%). The mean age was 1.6 years (median 1.2, range 11 months–5 years). First aid had been adequately administered in 80% of cases. Wounds had been initially dressed with Acticoat (Smith & Nephew, Florida, United States) by the referring general practitioner and/or emergency department in 90% of cases. The mean time to presentation at the burns clinic was 7.7 days after-injury. The burns clinic operates 3 days per week and delays were largely due to geographical and travel constraints. Routine treatment of scald burns in our clinic, if not full thickness, is initial conservative treatment of the scald, using Acticoat (Smith & Nephew, Florida, United States) dressings and delayed grafting of areas not healed at 2–3 weeks.

Eighty percent of these burns involved the hands, mostly palmar surface of the fingers and 75% involving the webspace. Five children (50%) underwent surgery, all of whom had skin graft reconstruction. Four of these were performed acutely and one as a secondary reconstructive procedure after delayed referral from general health care provider with a burn scar contracture that limited hand function and underwent second webspace release with skin graft (Fig. 1).



**Fig. 1 – Healed vaporizer hand burn, awaiting webspace release, following delayed referral from a non-burn centre.**

The mean day of acute skin grafting was 16.5 days after injury. Patients who underwent surgery received a mean number of 2 theatre visits, often receiving at least one dressing change in theatre. The time to complete healing, defined as discontinuation of dressings, was on average  $27.3 \pm 11.9$  days. We acknowledge that healing might have been achieved earlier for some cases, as protective dressings are often used in young children. After healing, eight (80%) children underwent further scar management strategies with use of taping, silicone, garments and splinting to prevent hypertrophic scarring, which was documented in one case. It was the case of an 11-month old child with burns to middle and ring fingers, managed conservatively, that healed 23 days after injury. The hypertrophic scarring with thickening of the scar over the palmar surface of the middle finger but no contractures was treated conservatively with splinting and silicone to subsequently resolve 11 months after-injury.

## 4. Discussion

Steam vaporizers are used for management of symptoms of upper respiratory tract infection, particularly in children. They can however pose a significant risk of burn. To reach boiling point and for water to be converted to steam, it must reach

**Table 1 – Vaporizer burns and management.**

Age	Anatomical distribution	Burn thickness	Surgery	Days to heal	Scar prevention
11 m	L palmar IF/MF (2nd web space)	Deep dermal	FTSG (day 13), 2× COD	17	Silicone, glove, night splint
13 m	R palmar IF/MF (2nd webspace)	Deep dermal	FTSG (day 17)	24	Silicone, night splint
15 m	L palmar MF/RF (3rd web space)	Deep dermal	None	46	Splint
14 m	Palmar index finger	Mid dermal	None	13	None
11 m	L palmar MF/RF (3rd webspace)	Mid dermal	None	23	Splint, silicone
16 m	R dorsum IF	Superficial dermal	None	14	Tape
16 m	R palmar MF/RF (3rd webspace)	Deep dermal	FTSG, SSG (day 25)	31	Tape, silicone, splint
11 m	L distal palm (2nd web space)	Deep dermal	FTSG contracture release	43	Silicone, night splint
19 m	L volar forearm	Deep dermal	None	23	None
5 y	Dorsum bilateral feet	Deep dermal	SSG (day 11), 3× COD	39	Garment, splint

m = months; y = years.

IF = index finger; MF = middle finger; RF = ring finger.

L = left; R = right.

COD = change of dressing; FTSG = full thickness skin graft; SSG = split skin graft.

Download English Version:

<https://daneshyari.com/en/article/5636211>

Download Persian Version:

<https://daneshyari.com/article/5636211>

[Daneshyari.com](https://daneshyari.com)