

E-cigarette burns: A new age

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Background

- Smoking is associated with many chronic health conditions including ischaemic heart disease, COPD and many cancers.
- E-cigarettes were invented in China in 2003 as a nicotine replacement device that replicates the action of smoking.
- E-cigarettes are handheld battery powered devices that vaporise a nicotine containing liquid which is then inhaled by the user.
- The Cancer Council estimated in 2016 that almost 9% of Australian adults had used an e-cigarette.
- Worldwide, there are increasing numbers of burns cases attributed to e-cigarette use and subsequent malfunction.
- Burn injuries result from Lithium-ion battery failure, causing in flame (75%), chemical/alkali (10%) and thermal burns.

Method: A PubMed search was performed for articles reporting burn injuries caused by e-cigarettes.

Mean age	30	(Range: 17-58)
- Male	96.4%	
- Female	3.6%	
Mean %TBSA	4.8	(Range 1-28)



Anatomical distribution of injuries

- Usually involves multiple anatomical sites.
- The lower limbs and genitalia are most commonly affected
 - In >40% of cases, the e-cigarette exploded in the patient's pocket.
- Most common combination of sites is upper thigh +/- genitalia, plus the hand.
- Also commonly affects face and anterior torso.
- Case reports of facial bone, oral, eye and inhalation injuries.

Burn depth

- Majority of burns were mid to deep dermal, or full thickness.
- 40-50% of patients with a burn caused by e-cigarettes required surgical management of their burn.
 - Wounds usually require debriding and grafting

Suggested management

- 1) Assessment and initial management per EMSB protocol
- 2) Wound assessment including:
 - Inspection for metallic debris
 - pH testing
- 3) Alkali burn injury
 - pH <7.0, metallic debris present in burn injury
 - Removal of debris and irrigation with mineral oil
 - Irrigation with water contraindicated due to potential reaction with alkali metals
- 4) Isolated thermal or flame burn injuries
 - pH neutral and no metallic debris
 - Irrigate with copious cool water per EMSB protocol
- 5) Ongoing assessment of burn injury
 - Consideration of operative vs. non-operative management

Conclusion

- E-cigarette burns are typically deep burns to multiple small areas, including hands, face and genitalia.
- The burns may have multiple mechanisms.
- E-cigarette burns frequently require operative management.
- Given the increasing use of e-cigarettes, it is likely that we will see more presentations with burn injuries caused by e-cigarettes.
- Understanding the mechanism and management of these burn injuries is integral to their management.

References

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