STATIC ELECTRICITY SPARKS HOUSEHOLD CLEANING AGENT CAUSING FACIAL BURN

BRÛLURE DU VISAGE PAR ÉTINCELLES D'ÉLECTRICITÉ STATIQUE PENDANT L'UTILISATION D'UN DÉTERGENT MÉNAGER

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SUMMARY. Static electricity is the build up of an electrical charge secondary to the redistribution of electrons between two non-conducting materials as they rub against one another. In the domestic setting, a static discharge rarely causes significant injury, as although the voltage can be higher than normal domestic voltage (240V), the current is relatively low. However, in cases where highly flammable substances are used, the risk of a static charge causing a flash is much greater. Our institution presents the first documented case of static electrical ignition of a substance causing facial burns. While cleaning a large plastic bin sprayed with 'Ambersil', a highly flammable mould-removing aerosol spray that can be purchased for domestic use, the 60-year-old female patient placed her face inside the bin to reach the bottom and received a large flash burn to her face and right arm that was 2.5% TBSA (total body surface area) and superficial dermal in nature. She was treated conservatively and discharged. Despite advances in electrical safety in the domestic and industrial settings, there are still real risks of significant burn injuries, which manufacturers, employers and the general public should be made aware of.

Keywords: burns, static electricity, superficial dermal burn, facial burn

RÉSUMÉ. *L'électricité statique est générée par la redistribution des électrons lors du frottement entre 2 matériaux non conducteurs. Au domicile, une décharge d'électricité statique est rarement délétère car, bien que pouvant être d'un voltage > 240V, l'intensité est habituellement faible. Toutefois, un matériau inflammable peut alors être mis à feu. Nous présentons le premier cas de brûlure du visage due à ce phénomène. Alors qu'elle nettoyait une grande cuvette en plastique avec un spray d'Ambersil® (produit anti- moisissure utilisable à domicile, très inflammable), une femme de 60 ans s'est penchée dedans et a subi une brûlure superficielle du visage et du membre supérieur droit (2,5% SB) due la flamme allumée par une étincelle d'électricité statique. Cette brûlure a guéri sans intervention chirurgicale. Malgré les progrès dans la sécurité électrique et industrielle, il existe toujours des risques de brûlure dont les employeurs et le public devraient être avertis.*

Mots-clés : *brûlure, visage, superficielle, électricité statique*

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Manuscript: submitted 21/03/2019, accepted 25/03/2019

Introduction

Static electricity is the build up of an electrical charge secondary to the redistribution of electrons between two non-conducting materials as they rub against one another.[1,2] This electrostatic potential will discharge if the material comes into contact with another surface of a different potential to itself. In the domestic setting, a static discharge rarely causes significant injury, as although the voltage can be higher than normal domestic voltage (240V), the current is relatively low. However, in cases where highly flammable substances are used, the risk of a static charge causing a flash flame or even explosion is much greater. The most famous case of this is thought to be the Hindenberg airship disaster on 6th May 1937, which killed 36 people.[3] We present a case of flash flame burn to the face resulting in a superficial dermal burn, caused by a static discharge while a domestic plastic container was being cleaned with the highly flammable cleaning product 'Ambersil'[i].

Fig. 1 – Image of burn sustained

Case study

This is the first documented case of static electrical ignition of a substance causing facial burns. A 60-year-old female worker in a plastic moulding workshop was cleaning a large plastic bin. The bin had been vacuum cleaned and then sprayed with 'Ambersil', a highly flammable mould-removing aerosol spray that can be purchased for domestic use. The patient attempted to wipe the bin, but when she placed her face inside it to reach the bottom, she sustained a large flash burn to parts of her face and her right arm, which was superficial dermal in nature and approximately 2.5% TBSA (total body surface area). Her clothing at the time consisted of a cotton and polyester T-shirt and trousers, and rubber-soled running shoes. She was given first aid consisting of 15 minutes of cold running water prior to presentation. Fortunately, she did not sustain any inhalation or ophthalmic injury. She was treated conservatively with liquid paraffin 50% in white soft paraffin ointment and after being admitted overnight for airway observation, was discharged home. *Fig. 1* shows the image of the burn sustained.

Discussion

Most industrial plants and businesses use flammable liquids and powders in some capacity. The UK Health and Safety Executive, a body aimed at reducing work-related death, injury and ill health, advise that care should be taken to prevent static discharges in potentially explosive atmospheres, using measures such as anti-static work clothes and footwear.[4] In the domestic setting, however, these resources may not be readily available. Despite some precautions being taken, our case demonstrates that serious injury may still occur. This article aims to raise awareness of the potential hazards these do-

[i] Manufacturer information: CRC Industries UK Limited, Ambersil House, Wylds Road, Castlefield Industrial Estate, Bridgewater, Somerset, TA6 4DD, UK.

mestic products can harbour. Furthermore, it should be noted that advances in the prevention of electrical injury through added insulation measures might paradoxically increase the difficulty of preventing or even worsen the risk from static electricity.[5]

The industrial cleaner used was 'Ambersil Mould Solv'. The online safety leaflet of this product states that it is an extremely flammable aerosol that should be kept away from heat and sources of ignition, and precautionary measures are advised against static discharges.[6] The patient confirmed that no machinery was running at the time and there were no open flames or ignition sources in the vicinity. Therefore, the likely cause of the flash burn was ignition by static discharge. This is likely to have been generated by vigorous cleaning of the plastic bin while wearing rubber-soled shoes, thus allowing the charge to build with no earth route, and to subsequently have discharged, causing the explosion. We implore manufacturers to increase the visibility of the level of damage these products can cause.

There have been no prior cases documented in the literature of static electricity causing burns in the domestic setting. There has been one prior case in a hospital operating room, where presumed static charge ignited an alcohol-free liquid barrier film (CavilonTM) normally used for skin protection,[7] causing a superficial/epidermal burn to the forehead. This is therefore the first case of a superficial dermal burn caused as a result of a static discharge ignition and flash within a community setting.

Conclusion

Despite advances in electrical safety in the domestic and industrial settings, there are still real risks of significant burn injuries, which manufacturers, employers and the general public should be made aware of.

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