

Case Report

Thermal burns on lower limb resulting from laptop use: A case report and review of literature

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ABSTRACT

We report a case of a 29-year-old man with a background history of incomplete quadriplegia, who sustained a second degree thermal burn of the lower limb from prolonged proximity to the extractor fan of his laptop. We have also reviewed all other reported cases of thermal burns associated with laptop use. This literature review highlights the variability in the extent of injury and the subsequent management of laptop induced burns.

KEY WORDS

Burns; second degree; paraplegia; quadriplegia

INTRODUCTION

Six previously published cases of burns sustained in relation to the use of laptops have been found and reviewed.

Laptops are an uncommon cause of burns. Areas mainly affected include thighs and perineum. Factors increasing risk of injury include lack of protective cover, i.e., clothing and causes of impaired or altered sensation such as paraplegia/quadruplegia and neuropathy related to conditions such as diabetes.

CASE REPORT

We present a case of a 29-year-old man who presented to accident and emergency in November 2011 with

a second degree thigh burn, following the use of a Toshiba satellite laptop for approximately 5 h. The burns sustained were in close proximity to the extractor fan of the laptop.

He is wheelchair bound and has impaired sensation of the lower limbs. This is due to an incomplete quadriplegia following a C6 level fracture, which he sustained in a road traffic accident in 2003.

On examination, he had two clear blisters on the left thigh-approximately 4 cm × 3 cm and 3 cm × 2 cm in size, surrounded by mild erythema [Figure 1]. Fluid was aspirated from the blisters under aseptic precautions and sent for culture and sensitivities. Blisters were de-roofed and silver based dressings were applied and changed regularly. Follow-up in clinic 4 weeks later, revealed that the burns had healed well with no complications. Cultures from the aspirate were negative.

DISCUSSION

There are six previously documented case reports of laptop induced thermal burns. As in the above

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Figure 1: Second degree burns on left thigh

case, they are most commonly associated with thigh burns.^[1-5] However, there is a case report of a laptop-induced burn causing irritation and oedema of the penile prepuce with associated blistering of the scrotum.^[6] More recently, there has been a case in which the use of a notebook computer, led to severe second and third degree burns of the foot, which eventually necessitated forefoot amputation.^[1]

Documented exposure time between laptop and user was between 1 and 6 h in all documented cases. In all but two cases, there were no clear predisposing risk factors. In one, the patient was completely fit and healthy and not under the influence of alcohol or recreational drugs.^[5] In another, the patient was an insulin dependent diabetic without definite neuropathy, but was also under the influence of alcohol at the time the burn was sustained.^[3] This, together with our case report, reinforces the need for “at-risk users” with impaired sensation, to be educated about the use of protective equipment with prolonged laptop use.

With regard to management, only two out of the six cases required operative intervention. In the first of these cases, a full thickness lower leg burn from a laptop power adaptor required debridement and was initially reconstructed using an allograft. The patient was later taken back to theatre and underwent subsequent autografting. The second of these cases involves second and third degree burns to the dorsal foot. Due to her severe injuries, multiple surgeries had to be performed, finally resulting in an amputation of her left hallux, first metatarsal bone and medial and inter-medial cuneiform bone. Reconstruction was

performed with split-thickness skin grafts harvested from her upper left leg.

The extractor fan and undersurface of the laptop, usually in close proximity to the battery, are the areas where the highest temperatures are attained on prolonged use. A study has been performed comparing the operating temperatures of popular laptop brands showed surface temperatures up to 62°C after 3 h of heavy use with obstruction to the ventilation.^[1]

There have however, been very few cases of burns developing, despite it being found that temperatures as low as 43°C can cause first degree burns in humans,^[7] and 47°C over a period of time is sufficient to cause full thickness burns in rat studies by Suzuki *et al.*^[8]

There have been about 9 cases reported of a skin condition called erythema ab igne, also known as “toasted skin syndrome,” resulting from prolonged laptop use. This has received wide press coverage due to its possible risk of skin cancers.^[9]

SUMMARY

This literature review shows that thermal burns associated with laptop use are increasing in prevalence. They are most commonly associated with second and third degree thigh burns. Most cases can be managed conservatively but more severe injury may require operative intervention such as debridement and grafting, or in severe cases, amputation. Patients with impaired lower extremity sensation, altered consciousness, or decreased mobility are at higher risk for laptop burns. We highlight the importance of educating laptop users about the risk of thermal burns and the need to use protective equipment to prevent such injuries.

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