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Nicholas S. Kalson*

Baljit Dheansa

Queen Victoria Hospital, Regional Burns Service,

East Grinstead, Surrey M23 9LT,

United Kingdom

*Corresponding author. Tel.: +44 7815287602

E-mail address: nickkalson@gmail.com (N.S. Kalson)

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Letter to the Editor

Auricular keloid burn

Dear Editor,

Ear keloids are frequent. They usually appear as shiny, smooth, globular fibrous lesions; they are frequently symptomatic: patients can report pain, pruritus, numbness and redness in the area of the lesion [1]. Keloids can occasionally grow in areas of minimal tension because of the proliferation of trapped dermal elements in predisposed individuals, especially after injury [2]. Auricular keloids can develop as a



Fig. 1 – Heat superficial dermal burn on auricular keloid.

result of ear-piercing, trauma, burn and surgery (otoplasty, excision of different skin or soft tissues benign lesions or more aggressive surgery).

At our Plastic Surgery Department we have a dedicated clinic, weekly, in which patients with keloids are assessed and treated thoroughly.

A 54-year-old-female patient, already in treatment, presented to our clinic with a superficial dermal burn on her right ear keloid. She referred having sustained her injury after being sat at her hairdresser with the drying hood on her head for 45 min. We decided to treat the burn conservatively; it resolved spontaneously and healed successfully in 3 weeks (Fig. 1).

When a patient experiences a burn in a specific part of the body without being aware and/or with a relatively low heat source, that happens because the interested skin area has not a normal sensation. Well known, in the plastic surgery literature, is the numbness of skin flaps post abdominoplasty and post breast reconstruction. An interesting study presented four free DIEP flap patients who sustained postoperative thermal injury to the reconstructed breasts. During the elevation of the DIEP flap, while the motor nerves supplying rectus abdominis are spared where possible, cutaneous nerves innervating the cutaneous tissue of the flap are necessarily sacrificed, therefore the transferred flap ultimately has reduced sensibility. This impaired sensibility prevents adequate thermoregulatory reflexes, like vasodilatation, sweating and protective behaviors, leaving the reconstructed breast considerably more susceptible to thermal insult [3].

Trying to explain why an ear keloid may have altered sensation, we considered a paper by Hochman et al. investigating nerve fibres in keloids. In samples from normal and keloid skin, keloid nerve fibres were thinner or apparently compressed by the extracellular matrix compared with those from normal skin, even if there was a statistically significant increase in the number of fibres in the keloid samples compared with normal skin samples. In addition, the median depth of the most superficial nerve fibres in keloid samples was greater than in normal skin samples [4].

Another interesting study, investigating itch and pain in keloids, showed that the mean cold sensation threshold occurred at a cooler temperature in keloids versus perikeloidal and control skin; the mean warmth threshold was significantly higher in keloidal skin versus perikeloidal and control skin; the mean heat pain threshold was significantly increased in keloidal skin versus perikeloidal and control skin. These findings suggested a small nerve fibre neuropathy, clinically correlated with an increased susceptibility to heat burn, even in presence of low heat sources [5].

This is the first case reported in the literature of a heat burn developing on auricular keloidal skin.

Conflict of interest

None.

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REFERENCES

- [1] Froelich K, Staudenmaier R, Kleinsasser N, Hagen R. Therapy of auricular keloids: review of different treatment modalities and proposal for a therapeutic algorithm. *Eur Arch Otorhinolaryngol* 2007;264(December (12)):1497–508.
- [2] Chike-Obi CJ, Cole PD, Brissett AE. Keloids: pathogenesis clinical features, and management. *Semin Plast Surg* 2009;23(August (3)):178–84.
- [3] Enajat M, Rozen WM, Audolfsson T, Acosta R. Thermal injuries in the insensate deep inferior epigastric artery perforator flap: case series and literature review on mechanism of injury. *Microsurgery* 2009;29(3):214–7.
- [4] Hochman B, Nahas FX, Sobral CS, Arias V, Locali RF, Juliano Y, Ferreira LM. Nerve fibres: a possible role in keloid pathogenesis. *Br J Dermatol* 2008;158(March (3)):651–2.
- [5] Lee SS, Yosipovitch G, Chan YH, Goh CL. Pruritus, pain, and small nerve fiber function in keloids: a controlled study. *J Am Acad Dermatol* 2004;51(December (6)):1002–6.

Bianca Aceto

Fabrizio Schonauer*

Department of Plastic Surgery, University Federico II, Naples, Italy

*Corresponding author. Tel.: +39 335436692

E-mail address: fschona@libero.it (F. Schonauer)

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Letter to the Editor

Delayed diagnosis of white phosphorus burn

Chemical injuries comprise 2.1–6.5% of burn center admissions [1]. White phosphorus burns are special rare types of chemical burns, occurring in battle, from fireworks, accidents in agricultural plants or industrial accidents. Although rare, even minimal burn areas can be fatal and can be treated with an extended hospital stay with delayed wound healing [2]. In the presence of air exposure, the corrosive action of phosphoric acid appears and the chemical injury occurs in deep tissues. Therefore, rapid recognition of lesions and proper resuscitation is crucial. There are several forms of phosphorous in the environment such as white, yellow, black and red, however it is most commonly seen in white phosphorus due to impurities. Since it is highly lipolytic, potentially important systemic effects include an increased risk of hepatic and renal dysfunction with metabolic and toxic disorders [3].

A 6-year-old boy watching the firework displays of a wedding reception was struck in the neck by a white colored burning material. Despite all his efforts to remove it quickly, the material continued to burn and a full-thickness injury occurred. The patient was admitted to a regional medical center and followed up for 3 days changing his dressings three times a day. Thus the phosphorus continued to inflict



Fig. 1 – White phosphorus burn injury with total left peripheral facial paralysis.

damage forming potentially corrosive phosphoric acid in tissues. As mild inspiratory stridor and tachypnoea were noticed within the 3 days of admission, the patient was transferred immediately to our burn and wound care center for further management. Intermittent bronchodilator therapy was begun and we provided 2 l of oxygen per minute continuously by nasal cannula. Posteroanterior chest X-ray, blood gas measurements, blood biochemistry and blood calcium and phosphorus levels were analyzed. The monitoring consisted of invasive blood pressure, electrocardiography, peripheral oxygen saturation and temperature. In his physical examination the area of burn necrosis at 1.5 cm depth in tissue under the mandible on the left side of the patient's face, accompanying hyperemia, edema and subcutaneous emphysema, was observed (Fig. 1). The lesion extended deeply into the underlying tissue so that the facial artery and vein could be seen clearly on wound inspection. The patient had a total left peripheral facial paralysis. Combined antibiotic therapy and fluid resuscitation with dexamethasone were begun. High protein feeds were used. The cavity was filled with wet dressings twice a day following the irrigation of wound with sterile distilled water solution. The surgical removal of necrotic skin from the burn injury was performed daily under sedation. Smoldering phosphorus particles were removed on debridement. Since copper sulfate has a potential risk for systemic toxicity, we preferred ultraviolet light (Wood's lamp) for identifying small phosphorus particles. Raman spectroscopy is another method that has been proposed for this purpose [4]. After 9 days in hospital, the patient was transferred to the division of facial plastic and reconstructive surgery without any systemic complications.

Because fireworks play an important role in the etiology of chemical burns, they should be used in a safe and careful manner. White phosphorus burns should be considered in presence of burns with progressive necrosis. Emergency resuscitation is crucial and simple for the management of injury. However in a misdiagnosis or delayed diagnosis, this type of injury can be life threatening or fatal.