Florid pseudoepitheliomatous hyperplasia related to tattoo: a case report

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Abstract

Pseudoepitheliomatous hyperplasia is a benign condition defined by an exuberant proliferation of the epithelium with downward progression into the dermis. It may occur in reaction to several conditions including chronic cutaneous wound. We describe an unusual case of a florid pseudoepitheliomatous hyperplasia mimicking a well-differentiated squamous cell carcinoma, restricted to the red part of a rose tattoo.

Introduction

Pseudoepitheliomatous hyperplasia is a benign condition that may simulate well-differentiated squamous cell carcinoma (SCC). It is characterised by hyperplasia of the epidermis and may occur in response to underlying infectious, inflammatory and neoplastic conditions such as chronic osteomyelitis, chronic cutaneous wounds or cutaneous lymphoma (1). Pseudoepitheliomatous hyperplasia related to tattoo (PEH-t) is rare (2–4). We report here the case of a florid PEH-t presenting as a verrucous large tumour and arising shortly after a tattooing procedure.

Case report

A 50-year-old woman without any medical history or under any medication presented with a verrucous lesion arising on a tattoo located on the external lower side of her left lower leg. The tattoo was done 5 months earlier by a professional artist (Figure 1). One month after the tattooing procedure, she developed an itchy and verrucous nodule restricted to the red part of the tattoo. On examination, we noticed a 30-mm large well-demarcated tumour and three satellite 10-mm papules restricted to the red part of the tattoo (Figure 2). The rest of the physical examination was otherwise eventless. Laboratory tests and chest radiographic imaging were all within normal range. Skin biopsy cultures for microorganisms were negative. Deep skin biopsies revealed an irregular marked epidermal hyperplasia with hyperkeratosis and dermal infiltrate of chronic inflammatory cells. The infiltrate was made of lymphocytes and histocytes without any granuloma (Figure 3). There were no keratinocyte atypia or viral inclusions and immunoreactivity for keratinocyte p53 was weak. Higher magnification revealed the presence of exogenous tattoo pigments both in the dermis and inside the macrophages (Figure 4). A complete surgical resection of the lesion was done followed by a histopathological analysis, which confirmed the diagnosis of pseudoepitheliomatous hyperplasia reaction. An energy dispersive X-ray spectroscopy (EDS, panalytical axios, 4 kW) analysis was done and identified zirconium, bromine, silica, iron, sulphur, chlorine, magnesium elements in the red pigment.

Key Messages

- we report here the case of a florid PEH-t presenting as a verrucous large tumour and arising very quickly after tattooing procedure
- a 50-year-old woman without any medical history or under any medication presented with a verrucous lesion arising on a tattoo located on the external lower side of her left lower leg
- on examination, we noticed a 30-mm large well-demarcated tumour and three satellite 10-mm papules restricted to the red part of the tattoo
- deep skin biopsies revealed an irregular marked epidermal hyperplasia with hyperkeratosis and dermal infiltrate of chronic inflammatory cells
• a complete surgical resection of the lesion was done followed by a histopathological analysis, which confirmed the diagnosis of pseudoepitheliomatous hyperplasia reaction
• an energy dispersive X-ray spectroscopy analysis was done which identified zirconium, bromine, silica, iron, sulphur, chlorine, magnesium elements in the red pigment
• in this case, the lack of clinical involution and crateriform silhouette was also in favour of this diagnosis
• EDS analysis of the red dye showed the presence of zirconium, silica and magnesium
• infectious aetiologies should also be considered, especially when involving inexperienced tattoo artists or unsanitary procedures
• to conclude, it is rare for red tattoo pigments to induce exuberant epidermal proliferation resulting in pseudoepitheliomatous hyperplasia
• dermatologists and professionals involved in wound care must still be aware of this rare entity that can occur shortly after a tattooing procedure
• the histopathological examination of the entire resected lesion is required to distinguish PEH-t from neoplastic process

**Figure 1** The rose tattoo 1 week after the tattooing procedure.

**Figure 2** Physical examination reveals a large verrucous tumour and three satellite 10-mm papules confined to the red areas of the tattoo.

**Figure 3** Irregular epidermal hyperplasia with hyperkeratosis and dermal chronic inflammatory cell infiltrate (H&E, original magnification ×10).

**Discussion**

PEH-t is usually preceded by a pruritic rash and appears soon after tattooing (typically between 2 weeks and 3 months after the procedure) (3). Often, it clinically presents as a non-specific well circumscribed nodule or restricted verrucous plaque suggesting a clinical diagnosis of granulomatous reaction or viral warts. Florid PEH-t has been exceptionally described (5). It must be differentiated from well-differentiated SCC and keratoacanthoma (KA) (6). The distinction can be very difficult and preferably requires a histopathological examination of the entire resected lesion (5).
True cutaneous malignant neoplasms are exceptionally reported and usually occurred many years after the tattoo procedure. In contrast, KA and PEH-t arise within a matter of weeks or months (7). Diagnostic clues that favour PEH-t include, identification of tattoo pigments within the dermis, irregular acanthosis involving the epidermis and follicular infundibula, absence of epidermal keratinocytic atypia and a paucity of mitotic activity (4). In our case, the lack of clinical involution and crateriform silhouette was also in favour of this diagnosis. As in other tattoo-induced reactions (e.g. lichenoid, granulomatous, eczematous, pseudolymphomatous) PEH-t often develops at the location of the red pigments (2,3,5). It is often attributed to the metallic salts present in tattoo pigments. Although mercury salts like mercuric sulphide have now been replaced by mercury-free agents like ferric hydrate (sienna), cadmium selenide (cadmium red) and various organic vegetable dyes (e.g. sandalwood, brazilwood), reactions to red dyes still occur for unclear reasons (5,8). EDS analysis of the red dye showed the presence of zirconium, silica and magnesium. All these elements are not ‘tissue inert’ and may cause delayed-type allergic, non-allergic granulomatous reactions, foreign body reactions and thus could be the causative agents of the pseudoepitheliomatous reaction. Infectious aetiologies should also be considered, especially when involving inexperienced tattoo artists or unsanitary procedures. Special stains and biopsy cultures can reasonably be recommended to exclude the presence of fungal, bacterial or mycobacterial organisms. PEH-t tends to persist (3). Tangential resection, laser treatment and corticosteroids can be relevant as first-line treatment options for restricted and small-sized lesions. Corticosteroid ointment application resulted in complete subsidence of a small PEH-t in one case (3), whereas in another case intralesional corticosteroid injections were ineffective (9). Florid PEH-t usually requires surgical resection. As mentioned above, surgical removal of the entire hyperplastic area followed by a thorough histologic examination is recommended to rule out the possibility of a disguised neoplastic lesion (3). A close clinical follow-up is advised.

To conclude, although it may be rare for red tattoo pigments to induce exuberant epidermal proliferation resulting in pseudoepitheliomatous hyperplasia, dermatologists and professionals involved in wound care must nevertheless be aware of this entity that can occur shortly after a tattooing procedure. Histopathological examination of the entire resected lesion is required to distinguish PEH-t from neoplastic process.

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References