

Eruptive Milia Within a Tattoo: A Case Report and Review of the Literature

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ABSTRACT

Of the many tattoo reactions the most common are allergic, granulomatous, lichenoid, photosensitive, pseudolymphomatous, and infectious. Eruptive milia are a rare complication with only three prior reports in the English literature. A 19-year-old African American female presented with tiny, white papules confined within the margins of a tattoo. She denied trauma or associated symptoms at the site. Biopsy demonstrated deposits of black granular material within the dermis and a small infundibular cyst; a diagnosis of eruptive milia within tattoo was made. The milia responded to treatment with urea 40% cream and tretinoin 0.1% cream. Given its rarity, it is important to recognize the presentation of this disorder as other tattoo reactions require more aggressive management. While further research is necessary to determine the exact pathogenesis of this condition, the authors propose a mechanism along with a review of the literature to discuss management.

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INTRODUCTION

The most frequently reported tattoo-related dermatoses, according to a study of 234 tattooed patients, are allergic,[1] infectious,[2,3] and granulomatous[4,5] reactions occurring in 2.1% of this population.[6] Less common reactions are lichenoid,[7] photoallergic,[8] pseudolymphomatous,[9] discoid lupus erythematosus,[10] incidental skin neoplasm,[11] and koebnerization of psoriasis.[12,13]

Milia within tattoos are rare, with only three reports in the English literature (Table 1). This case is used to illustrate relevant findings, discuss the proposed pathogenesis and review treatment options.

CASE REPORT

A 19-year-old African American female with no past medical history presented with new white papules arising within a tattoo on the left upper chest, shoulder, and arm. Lesions appeared one month after tattoo placement, which was inked six months prior to presentation. Prior to the visit, the patient had tried over the counter antibiotic ointment with no improvement. She denied pruritus, pain, bleeding, or other symptoms. Aside from tattoo placement, there was no trauma to the site. She denied use of other topical or systemic medications.

On physical examination there were multiple, minute, firm, monomorphic, white papules arising within various pigments of the tattoo (Figure 1). Lesions were confined within the margins of the tattoo, sparing adjacent skin (Figure 2). Similar findings were absent from her other tattoos.

A punch biopsy of a lesion on the left shoulder demonstrated deposits of black granular material in the dermis and small, infundibular cysts containing cornified cells (Figures 3 and 4). There were no signs of a primary inflammatory process. Periodic Acid-Schiff stain was negative for hyphae (Figures 3 to 5).

Daily urea 40% cream was prescribed with significant reduction in size and number of milia. Upon follow-up, her treatment regimen was supplemented with tretinoin 0.1% cream.

DISCUSSION

Tattoos serve both religious and aesthetic decorative purposes. Previously, tattoos were associated with regimented and marginalized groups, however, increasing popularity over the last two decades has made them mainstream.[14]

Clinically, milia within tattoos present as small, yellowish papules within tattoo pigments. There is no accompanying history of trauma and the lesions can appear at any time following inking. While the condition can be pruritic, patients are mostly asymptomatic and typically present weeks-to-months following placement of the tattoo. However, milia have also even been reported within a longstanding tattoo, appearing in the setting of a lichenoid reaction to red ink.[15]

Histopathologically, milia in tattoos are characterized small keratinized cysts lined by stratified squamous epithelium with keratin arranged in concentric lamellae.[16] Pigment is found within macrophages and extracellularly in the dermis. Inflammation and spongiosis are absent.

The pathogenesis of eruptive milia is incompletely understood, although it is most likely due to trauma. Generally, milia are

TABLE 1.

Case Reports of Milia in the Literature

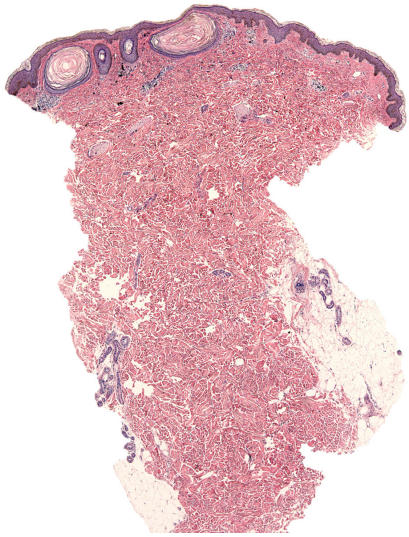
Case	Clinical Description	Histopathologic Description	Treatment(s)	Resolution/ follow-up
Koh et al[17]	Pin-point white papules arising in areas of tattoo after color was added (1 month prior to presentation) to the original black outline of tattoo figure (3 years prior to presentation) in Malay male; no history of lesions in other tattoos.	Acanthotic and hyperkeratotic epidermis; small inclusion cyst in dermis containing small amounts of keratin flakes with keratinizing squamous epithelium. Lymphocytic and histiocytic superficial infiltrate.	Urea 10% cream; Salicyclic acid 2% wash	"mild improvement"/ not stated
Lucke et al[15]	Single and grouped milia arising in area of tattoo with biopsy-proven lichenoid reaction to red ink implanted. Area not treated previously.	None taken for diagnosing milia.	None stated	None stated
Miller et al[18]	Three-month history of monomorphic, yellowish-white, firm papules confined to the yellow and red pigment of two distinct tattoos (left, upper chest and upper back) placed 6-months prior to presentation.	Epidermal acanthosis with elongation of rete ridges; small cyst containing "keratohyalin," lined by stratified squamous epithelium in the dermis; dark pigment within macrophages of the upper dermis. Spongiosis and inflammation absent.	None prescribed	Complete/6 months
Present case	Minute, firm, white papules arising in all pigments of the tattoo, distinctly confined to the margins of ink placement in African American female.	Epidermal acanthosis; small infundibular cyst containing cornified cells; no signs of a primary inflammatory process; periodic acid-Schiff stain negative for hyphae.	Urea 40% cream; tretinoin 0.1% cream	Resolved/8 weeks

FIGURE 1. Milia within red, orange, green, brown and black pigments of a tattoo. Note: sparing of non-inked skin.

categorized as primary or secondary. Primary lesions arise from pilosebaceous units of vellus hair follicles. Secondary milia result from trauma or bullous and inflammatory disorders.[16] The authors suggest that needling used for ink placement results in traumatic implantation of the epidermis into the dermis; the process also

FIGURE 2. Magnified view of milia confined within the margins of a tattoo.

FIGURE 3. Dark granules of pigment intra- and extra-cellularly and small cysts containing lamellar keratin (Hematoxylin & Eosin, original magnification x 40).



disrupts adnexal structures. Additionally, application of a tattoo produces an acute, aseptic inflammatory reaction. A prior report of milia within a lichenoid tattoo reaction showed disruption of adnexal structures on histology.[15] This trauma, therefore, is akin to that of secondary milia formation. Moreover, post-tattoo care regimens, such as ointment massage and occlusion, may increase accumulation of keratin debris within the needle wounds and follicular ostia. Although this may further follicular obstruction and milia formation, there are likely other factors involved, as these care regimens would likely affect normal adjacent skin.

While the condition is benign and self-limited, patients often request therapy secondary to aesthetic concerns. In cases with few lesions, a needle or scalpel can be used to express individual cysts. Keratolytics, such as tretinoin, urea, and salicylic acid, have been used to reduce ostial plugging by normalizing epidermal maturation. They hasten resolution through exfoliation. Non-ablative and ablative lasers can also improve milia within tattoos, but are likely to disrupt the design clarity and pigment, making this a less favorable treatment.

In summary, this case of eruptive milia in a tattoo demonstrates an exceedingly rare complication of skin-inking. It is important for clinicians to be able to distinguish this reaction from others that likely require more aggressive therapy. As tattooing is a trend on the rise, dermatologist can expect to see an increased number of tattoo-related dermatoses in their practice.[14]

DISCLOSURES

All authors have no relevant financial interests, relationships, or affiliations to disclose.

FIGURE 4. Dermal cysts containing lamellar keratin within the follicular infundibulum (Hematoxylin & Eosin, original magnification x100).

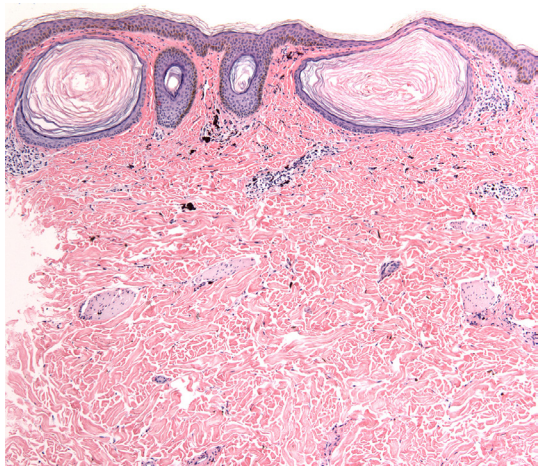
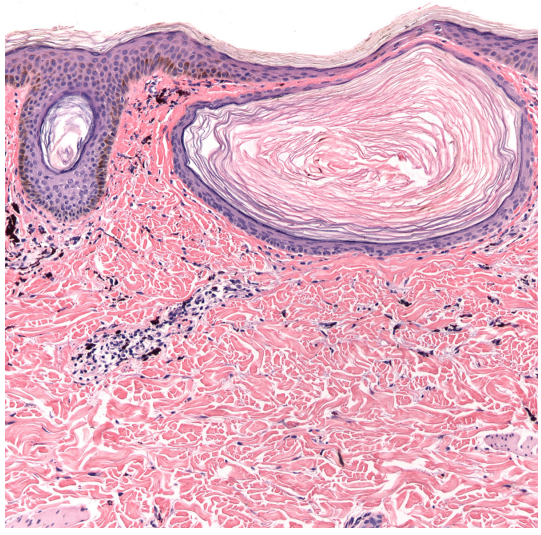


FIGURE 5. Dermal cysts; note that two within follicular infundibula, containing lamellar keratin (Hematoxylin & Eosin, original magnification x200).



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