

Milia: A Unique Reaction to Tattoos

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Tattoo-related dermatoses are varied and uncommon. Although rare, reactions to tattoos have been reported with a multitude of tattoo pigments and most commonly present with an eczematous reaction pattern. Milia are small keratinous cysts that may arise as primary lesions or secondary to some other trauma to the skin. We report the case of a 28-year-old man who presented with a papular eruption of 3 months' duration confined to the area of recently placed tattoos; the eruption was diagnosed as milia.

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Case Report

A 28-year-old man presented with a papular eruption on his chest and back of 3 months' duration. The eruption was confined within 2 separate multicolored tattoos placed 6 months prior. The lesions had been stable in size and appearance since their onset. There was no history of new trauma or prior untoward reactions at the tattoo sites. The patient denied pain, pruritus, or other associated symptoms. He also denied systemic symptoms and had no remarkable medical history. No attempt was made to treat the lesions prior to his initial assessment.

Physical examination revealed multiple firm, monomorphic, yellowish white, 1-mm, dome-shaped papules limited to the red and yellow areas of the tattoos located on the left side of the upper chest and upper back (Figure). A 2-mm punch biopsy specimen was obtained for histopathologic examination. The biopsy specimen showed a small keratinized cyst and dark pigment located extracellularly and within macrophages in the upper dermis. The wall of the cyst was stratified squamous epithelium containing keratohyalin granules. There also was epidermal acanthosis and elongation of the rete ridges with basilar



An eruption consisting of multiple, monomorphic, yellowish white, 1-mm papules on the left side of the upper chest, mostly within the red but also the yellow ink of a tattoo.

hyperpigmentation. Substantial spongiosis and inflammatory infiltrates were not seen.

The patient was diagnosed with milia arising in red and yellow tattoos. No treatment was performed, as the patient remained asymptomatic, and the lesions resolved almost completely during 6 months of follow-up.

Comment

Tattoo-related dermatoses are uncommon. Allergic reactions, granulomatous reactions, and infections accounted for a complication rate of 2.1% in 234 patients studied.¹ In addition, there have been case reports of localized skin diseases such as psoriasis, discoid lupus erythematosus, sarcoidosis, and lichen planus arising in areas of tattoos. Incidental neoplasms, such as basal cell carcinoma, squamous cell carcinoma, and melanoma, also have been reported.¹

Reactions to tattoo pigments have been seen with red mercuric sulfide (cinnabar), yellow cadmium sulfide, chromium oxide green, cobalt aluminate blue, brown iron oxide, zinc, titanium white, copper, carbon black, and purple manganese salts.² The most frequent reactions including

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allergic (eczematous), lichenoid, photosensitive, granulomatous, and pseudolymphomatous reactions are characterized by various histologic patterns. These delayed hypersensitivity reactions occur within days or up to several years after tattooing.² The eczematous reaction pattern is the most common.³ Eczematous, lichenoid, granulomatous, and pseudolymphomatous reactions are all most often seen with cinnabar.^{4,6} Yellow cadmium sulfide often is used by itself or to brighten cinnabar. Historically it is the tattoo pigment most identified with photosensitive reactions⁷; the reason is unclear. Although yellow cadmium sulfide is the most common source of photosensitive reactions, one study using x-ray microanalysis on tattoo biopsies suggested that photoaggravation of tattoos is not confined to cadmium-containing tattoos and also may be seen in tattoos containing iron, titanium, and mercury.⁸ Modern alternatives to cinnabar include ferric hydrate, cadmium selenide, and organic vegetable dyes; however, sensitivity to these mercury-free dyes still occur.⁸ Our patient's biopsy results did not reveal any of these reactions; milia were mostly confined to the red but also the yellow pigments.

Milia are small keratinous cysts believed to derive from the pilosebaceous follicle. They are classified as primary milia, which arise spontaneously most often on the eyelids and cheeks, and secondary milia, which usually occur from trauma or inflammatory disease of the skin. Examples of secondary causes include dermabrasion; second-degree burns; subepidermal blistering disorders such as epidermolysis bullosa, bullous pemphigoid, and porphyria cutanea tarda; and inflammatory skin conditions such as herpes zoster.^{9,10} Additionally, multiple milia have been reported with a number of genodermatoses.¹⁰ Primary milia are derived from the infundibula of vellus hair follicles. In contrast, secondary milia may develop from a variety of adnexal structures including sweat ducts, sebaceous glands, hair follicles, and the epidermis, as they attempt to reepithelialize the damaged epidermis.¹¹

In our patient, the mechanism of the development of milia within red and yellow tattoo pigments

remains unclear. According to a PubMed search of articles indexed for MEDLINE using the terms *milia*, *miliium*, *tattoo*, *reactions*, and *lichenoid*, there has been 1 reported case of milia arising within a lichenoid tattoo reaction.¹¹ It is possible that our patient may have had a prior lichenoid reaction or another reaction that caused the milia to appear as a secondary phenomenon, especially as the milia were limited to the area of involved skin. Although cinnabar and yellow cadmium sulfide are not uncommon agents to cause tattoo reactions, x-ray microanalysis was not performed to determine the composition of the pigments.

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