

Papular Rash in a New Tattoo

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A healthy 21-year-old woman presented with a pruritic papulovesicular rash on the left arm of 2 days' duration. The day before rash onset, she received a black ink tattoo on the left arm to complete the second half of a monochromatic sleeve-style design. She previously underwent initial tattooing of the left arm by the same artist 2 weeks prior and experienced a similar but less extensive rash that self-resolved after 1 week. She had 8 older tattoos on various other body parts and denied any reactions. Physical examination showed numerous scattered papules and papulovesicles confined to areas of newly tattooed skin throughout the left arm. In the larger swaths of the tattoo, the papules coalesced into well-defined plaques. There was a discrete rim of faint erythema bordering the newly tattooed skin. No erosions, ulcerations, or purulent areas were observed, and there was no tenderness or excess warmth of the affected skin. Adjacent previously tattooed areas of the left arm were unaffected.

WHAT'S YOUR DIAGNOSIS?

- allergic contact dermatitis
- cellulitis
- foreign body (tattoo) granuloma
- nontuberculous mycobacterial infection
- sarcoidosis

PLEASE TURN TO **PAGE E27** FOR THE DIAGNOSIS

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THE DIAGNOSIS: Allergic Contact Dermatitis

This patient's history and physical examination were most consistent with a diagnosis of allergic contact dermatitis, likely from an additive or diluent solution within the tattoo ink. Her history of a similar transient reaction following tattooing 2 weeks prior lent credence to an allergic etiology. She was treated with triamcinolone cream 0.1% as well as mupirocin ointment 2% for use as both an emollient and for precautionary antimicrobial coverage. The rash resolved within 2 days, and she reported no recurrence at a 6-month follow-up. The cosmesis of her tattoo was preserved.

Acute cellulitis may follow tattooing, but the absence of warmth, pain, or purulence on physical examination made this diagnosis less likely in this patient. Sarcoidosis or other granulomatous reactions may present as papules or nodules arising within a tattoo but would be unlikely to occur the next day. Nontuberculous mycobacterial infection likewise tends to present subacutely or chronically rather than immediately following tattoo application.

Tattooing has existed for millennia and is becoming increasingly popular.^{1,2} The tattooing process entails introduction of insoluble pigment compounds into the dermis to create a permanent design on the skin, which most often is accomplished via needling. As a result, tattooed skin is susceptible to both acute and chronic complications. Acute complications prominently include allergic hypersensitivity reactions and pyogenic bacterial infections. Chronic granulomatous, inflammatory, or infectious complications also can occur.

Allergic eczematous reactions to tattooing are well documented in the literature and are thought to originate from sensitization to pigment molecules themselves or alternatively to ink diluent compounds.³ Although reactions to ink diluent chemicals typically are self-resolving, allergic reactions to pigment can persist beyond the acute phase, as these insoluble compounds intentionally remain embedded in the dermis. The mechanism of action may involve haptenization of pigment molecules that then induces allergic hypersensitivity.^{3,4} Black pigment typically is derived from carbon black (ie, amorphous combustion byproducts such as soot). Colored inks historically consisted of inorganic heavy metal-containing salts prior to the modern introduction of synthetic azo and polycyclic dyes. These newer colored pigments appear to be less allergenic than their metallic predecessors; however, epidemiologic studies have suggested that allergic reactions still occur more commonly in colored tattoos than black tattoos.¹ Overall, these reactions may occur in as many as one-third of individuals who receive tattoos.^{2,4}

As with any process that disrupts skin integrity, tattooing carries a risk for transmitting various infectious

pathogens. Microbes may originate from adjacent skin, contaminated needles, ink bottles, or nonsterile ink diluents. Although tattoo parlors and artists may undergo licensing to demonstrate adherence to hygienic standards, regulations vary between states and do not include testing of ink or ink additives to ensure sterility.^{4,5} Staphylococci and streptococci commonly are implicated in acute pyogenic skin infections following tattooing.^{5,6} Nontuberculous mycobacteria increasingly are being recognized as causative organisms for granulomatous lesions developing subacutely or even months after receiving a new tattoo.^{5,7} Local and systemic viral infections also may be transmitted during tattooing; cases of tattoo-transmitted viral warts, molluscum contagiosum, and hepatitis B and C viruses all have been observed.^{5,6,8} Herpes simplex virus transmission (colloquially termed *herpes compunctorum*) and HIV transmission through tattooing also are hypothesized to be possible, though there is a paucity of known cases for each.^{8,9}

Chronic inflammatory, granulomatous, or neoplastic lesions may arise within tattooed skin months or years after tattooing. Foreign body granulomas, sarcoidosis, pseudolymphoma, pseudoepitheliomatous hyperplasia, and keratoacanthoma are some representative entities.^{3,5} Cases of cancerous lesions in tattooed skin have been documented, but their incidence appears similar to nontattooed skin.³ These broad categories of lesions are clinically diverse but may be difficult to definitively diagnose on examination alone; therefore, a biopsy should be strongly considered for any subacute to chronic skin lesions within a tattoo. Patients may be hesitant to disrupt the cosmesis of a tattoo but should be counseled on the attendant risks and benefits to make an informed decision regarding biopsy.

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