

Inoculation Tuberculosis in a Tattoo: A Diagnostic Challenge

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ABSTRACT

Literature has acknowledged that disease such as lupus vulgaris caused by M. Tuberculosis bacteria can be induced by a tattoo implantation. Tattoo procedure is an invitation at every step, for acquiring various infections like cutaneous tuberculosis. Here in, we report a tattoo induced lupus vulgaris in two young males who got their tattoo implantation at an unauthorized place and antitubercular therapy for 6 months led to complete resolution of lesions.

Keywords: Inoculation tuberculosis, lupus vulgaris, mycobacterial infections, tattoo.

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INTRODUCTION

Lupus vulgaris is a form of cutaneous tuberculosis which typically originates from an endogenous source of infection (1). It can also arise after exogenous inoculation such as after a tattoo (2). Recent times have seen a spike in popularity of tattooing practice and its complications show simultaneous increase (3). Cutaneous reactions to tattoos can present in a variety of patterns, often showing only nonspecific histopathological changes (4). This coupled with the difficulty in diagnosing lupus vulgaris, a paucibacillary infection; gives a high probability of missing the infection, unless a high index of suspicion is maintained (1).

CASE REPORT

Case 1

A 28-year-old male complained of a 2 month history of reddish-brown raised lesions followed by ulceration over red tattoo injected with red ink on his right upper arm, at a local salon 7 months back. Patient had no history of immediate reaction over the tattoo. Patient had no history of fever, cough or weight loss. There was no family history of tuberculosis. There were no complaints of any similar lesion elsewhere on body. Patient had taken multiple courses of oral antibiotics and corticosteroids prescribed by local practitioners, without relief. On examination, a well-defined erythematous infiltrated plaque of size 15 x 6 cm with multiple areas of ulceration and pus discharge was present within the margins of the tattoo. **[Fig 1a]** There was no axillary or cervical lymphadenopathy. Skin biopsy showed a hyperplastic epidermis. Within the dermis, there were large numbers of epithelioid cell granulomas with Langhans' giant cells and areas of caseous necrosis. **[Fig 3a]** Periodic acid-Schiff stain (PAS), acid fast and gram stains were

negative. Skin biopsy submitted for mycobacterial culture did not grow any organism. A tuberculin skin test was strongly positive (17 mm). ESR was significantly raised (70mm/hr). Chest X-ray did not reveal any abnormality. On the basis of clinical features, positive tuberculin test and suggestive histopathological findings, patient was started on anti-tubercular treatment (ATT) which consisted of isoniazid 300 mg, rifampicin 600 mg, pyrazinamide 2 g, ethambutol 1200 mg (on basis of patient's weight) and pyridoxine 50 mg to be taken every day for 6 months. Patient improved significantly and had complete resolution of lesion after 6 months of ATT. **[Figure 1b]** No recurrence was noted on the last follow-up.

Case 2

A 20-year-old male presented with a raised lesion showing on and off pus discharge over a tattoo mark since 2 months. The tattoo was injected on the dorsum of his right hand in red and blue ink at a site of pilgrimage visited by patient 6 months back. There was no immediate reaction and tattoo site remained asymptomatic for initial 4 months. Examination showed a well-defined, elevated, infiltrated, erythematous plaque of size 5 x 2 cm with verrucous surface within the margins of tattoo. **[Fig 2a]** There was no history of fever, cough and recent weight loss. Skin biopsy revealed caseous necrosis with epithelioid cells and lymphocytes in dermis. **[Fig 3b]** No acid-fast bacilli could be demonstrated and mycobacterial culture of the biopsy material came negative. However the tuberculin skin test was again strongly positive in absence of any past history of tuberculosis. ESR was elevated. For confirmation, PCR for detection of mycobacterial DNA was ordered. It was positive for mycobacterium tuberculosis. Patient was given same anti-tubercular regime as above with dose modification as patient's weight was less than 50 kg

(ethambutol 600 mg and pyrazinamide 1.5 g). Again, significant reduction in size of lesion was noted after 6 months of therapy. [Fig 2b]

DISCUSSION

The reaction of the skin to tattooing is polymorphous and depends upon the interplay between the exogenous foreign material introduced and the host's immune system. The incidence of tattoo complications has been reported to be as high as 2% and is likely to increase further (5).

Tattoo inks contain an admixture of various ingredients and numerous potentially allergenic or carcinogenic compounds. Besides the hazardous potential of these pigments, tattooing entails a significant risk of transmission of infection (4).

Though the clinical manifestations of tattoo reactions are often not specific and histological patterns overlap, [Table 1] they can be divided into 3 main categories: inflammatory, infectious and neoplastic (6). The most common are the inflammatory reactions which are histologically classified as a) eczematoid i.e. Contact or photoallergic dermatitis attributed to hypersensitivity to tattoo inks; b) lichenoid and; c) granulomatous reactions viz. Sarcoidal and foreign body granulomas. A rare type is pseudolymphomatous reaction which is cutaneous lymphoid hyperplasia presenting as erythematous or violaceous plaques (7).

Infections in tattoos can present as early as within few weeks like in the case of acute pyogenic infections. Besides bacterial infections, transmission of viral and fungal agents can also complicate tattoo injection. Infections because of the atypical mycobacteria most often due to *M. Chelonae* and *M. Abscessus* are increasingly been reported and typically present within 1 month. Those secondary to *M. Tuberculosis* are less common and usually appear after a latency of at

least several months (7). The infection originates from the use of contaminated inks and insufficient sterilization procedures especially in informal settings such as during cultural rituals where needles and inks may be shared among several users (5).

The prevalence of all forms of cutaneous tuberculosis is generally low, ranging from 0.25-0.6 % in various Indian studies (8). Primary inoculation of the skin produces a tuberculous chancre in the non-immune host and tuberculosis verrucosa cutis in the immune host. Lupus vulgaris as a form of cutaneous inoculation tuberculosis is rare, as it more commonly originates from an endogenous focus of infection (1). The disease can have many different clinical presentations as papules, nodules, plaques, ulcers, verrucous lesions, papillomatous tumors, vegetative reactions, or cicatricial infiltrations (9). The typical presentation of lupus vulgaris in form of infiltrated plaques can resemble other tattoo-associated granulomatous reactions (7). Still further, it is a paucibacillary form of cutaneous tuberculosis and bacilli are seldom demonstrable. Also obtaining a successful culture is difficult. Diagnosis usually requires newer techniques like detection of mycobacterial DNA using PCR which are more costly and not considered as routine investigations (1). Due to all these reasons, a high index of suspicion is must to diagnose a case of lupus vulgaris. A therapeutic trial of antitubercular therapy must be considered in cases where the diagnosis is difficult. A clinical response is expected within 4–6 weeks (10).

CONCLUSION

With the worldwide increased interest in tattooing, the risks of adverse effects have also increased. Clinical examination serves as an essential tool in conjunction with histopathological findings, to reach a diagnosis. Inoculation cutaneous tuberculosis must be suspected in any

persistent lesion at the site of a tattoo and thoroughly evaluated with due consideration given to special stains, cultures and PCR where necessary.

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Table 1: Histopathological findings in cutaneous tattoo reactions

Type of tattoo reaction	Histopathological findings
Eczematous	Parakeratosis, acanthosis and spongiosis of the epidermis with variable infiltration by lymphocytes (7).
Lichenoid	Interface changes with acanthosis and vacuolar alteration of basilar keratinocytes. Tattoo pigment intermixed in a band-like infiltrate of lymphocytes at dermo-epidermal junction (7).
Granulomatous	<ul style="list-style-type: none"> <li data-bbox="237 737 597 768">• Foreign body granuloma <li data-bbox="237 846 545 877">• Sarcoidal granuloma
Mycobacterial granuloma	<ul style="list-style-type: none"> <li data-bbox="334 1119 521 1150">➤ Tubercular <li data-bbox="334 1392 488 1423">➤ Atypical
Pseudolymphomatous reaction	Dense nodular perivascular lymphoid infiltrate with admixed eosinophils and plasma cells and early germinal center formation (7).

Tattoo Induced Cutaneous Tuberculosis



Fig 1a: On presentation: Erythematous infiltrated plaque with pus filled ulceration over the tattoo mark.



Fig 1b: Complete resolution of lesion after 6 months of ATT.



Fig 2a: On presentation: Thick verrucous plaque over the tattoo mark.



Fig 2b: Complete resolution of lesion after 6 months of ATT.

Tattoo Induced Cutaneous Tuberculosis

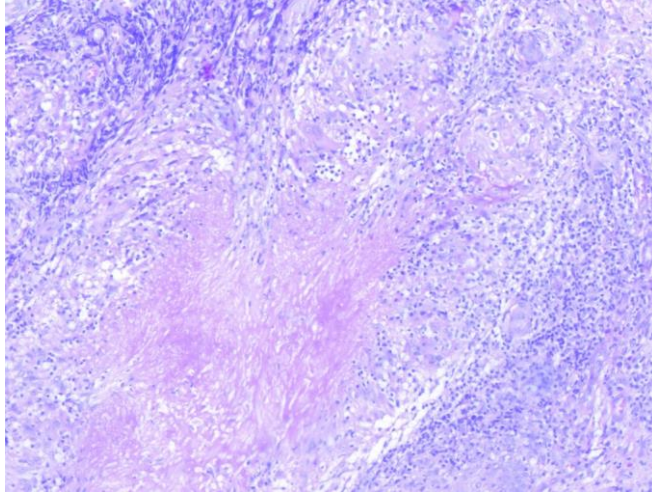


Fig 3a: H&E, $\times 10$: Showing caseating necrosis in upper and mid dermis with epithelioid cells and lymphocytes.

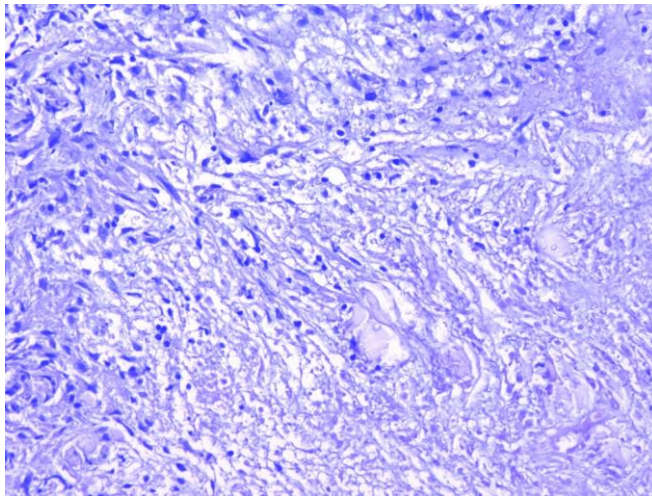


Fig 3b: H&E, $\times 10$: Showing caseating necrosis with epithelioid cells and lymphocytes in dermis.