

Tattoo Sarcoidosis: Report of 2 cases and Review of the literature

Dexter Yeo ¹ and Nisha Suyien Chandran²

¹NUS

²Natl Univ Singapore Hosp

June 27, 2023

Case Report

Tattoo Sarcoidosis: Report of 2 cases and Review of the literature

Dexter Yeo Shih Tong^a, Nisha Suyien Chandran^{b,c}

^aMinistry of Health Holdings, Singapore

^bDivision of Dermatology, Department of Medicine, National University Hospital, Singapore

^cDepartment of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Corresponding Author:

Name: Dexter Yeo Shih Tong

Address: 1 Maritime Square, #11-25, 099253

Contact Number: +6592282952

Email: dexteryeast@gmail.com

Keywords: Tattoo Sarcoidosis, Intralesional Steroids Injection, Cutaneous sarcoidosis, Aseptic Abscess Syndrome

Corresponding Author:

Dexter Yeo Shih Tong

Ministry of Health Holdings

1 Maritime Square, #11-25, 099253

Tel: +6592282952

E-mail: dexteryeast@gmail.com

Number of Tables: 1

Number of Figures: 3

Word count: 2405

Keywords: Tattoo Sarcoidosis, Complication of Intralesional Steroids Injection, Cutaneous sarcoidosis, Aseptic Abscess Syndrome

Abstract

We report 2 cases of cutaneous sarcoidosis developing in response to tattoo pigments. Our first case explores aseptic microabscess formation precipitated by the interplay of systemic sarcoidosis and repeated intralesional steroid injections over tattoo sites. Our second case explores tattoo sarcoidosis as an indicator of inadequate medical therapy for treatment of systemic sarcoidosis.

A 71-year-old Chinese female patient developed bilateral eyebrow rash, itch, and swelling over the site of eyebrow embroidery which was done 18 months prior. A dermatopathological examination revealed non-caseating granulomas consistent with cutaneous sarcoidosis. She was started on monthly intralesional steroids injection which were complicated by painful erosions and crusting over both eyebrows. A repeated biopsy showed aseptic microabscesses with sarcoid-type granulomas. An acute flare of cutaneous sarcoidosis was diagnosed and the rashes improved with a 3-month course of oral hydroxychloroquine. Shortly after, she started to experience altered coloured vision. Ocular sarcoidosis was diagnosed after FFA (fundus fluorescein) and ICG (indocyanine green) angiography, and the patient was started on oral prednisolone.

Our second case is a 36-year-old Indian male who was diagnosed with systemic sarcoidosis 5 years prior when an endomyocardial biopsy and FDG PET thorax scan revealed myocardial and pulmonary sarcoidosis respectively. He was started on a tapering dose of oral prednisolone. 6 months later, on a tapered prednisolone dosage of 2.5mg per day, he presented with painless and pruritic papules delineating the tattoos over his chest and left arm done 3 years prior. Dermatopathological examination showed non-necrotizing granulomas consistent with cutaneous sarcoidosis. The patient would develop steroid-dependent tattoo sarcoidosis, reporting painful swelling and itch of his tattoos each time oral prednisolone was stopped or tapered. Weekly methotrexate injections were initiated in place of oral prednisolone which lead to a resolution in his symptoms.

Introduction

Sarcoidosis is a granulomatous disease presenting with multi-system manifestations. The skin is involved in 25 percent of patients with sarcoidosis [8]. Sarcoid granulomas have an affinity for old scars, tattoos, or sites of inoculated foreign material [5].

Cutaneous manifestations can be the sole physical sign of systemic sarcoidosis [1], hence skin biopsy for tissue diagnosis is crucial. We describe 2 cases of cutaneous sarcoidosis over cosmetic tattoo sites, one with a known history of systemic sarcoidosis.

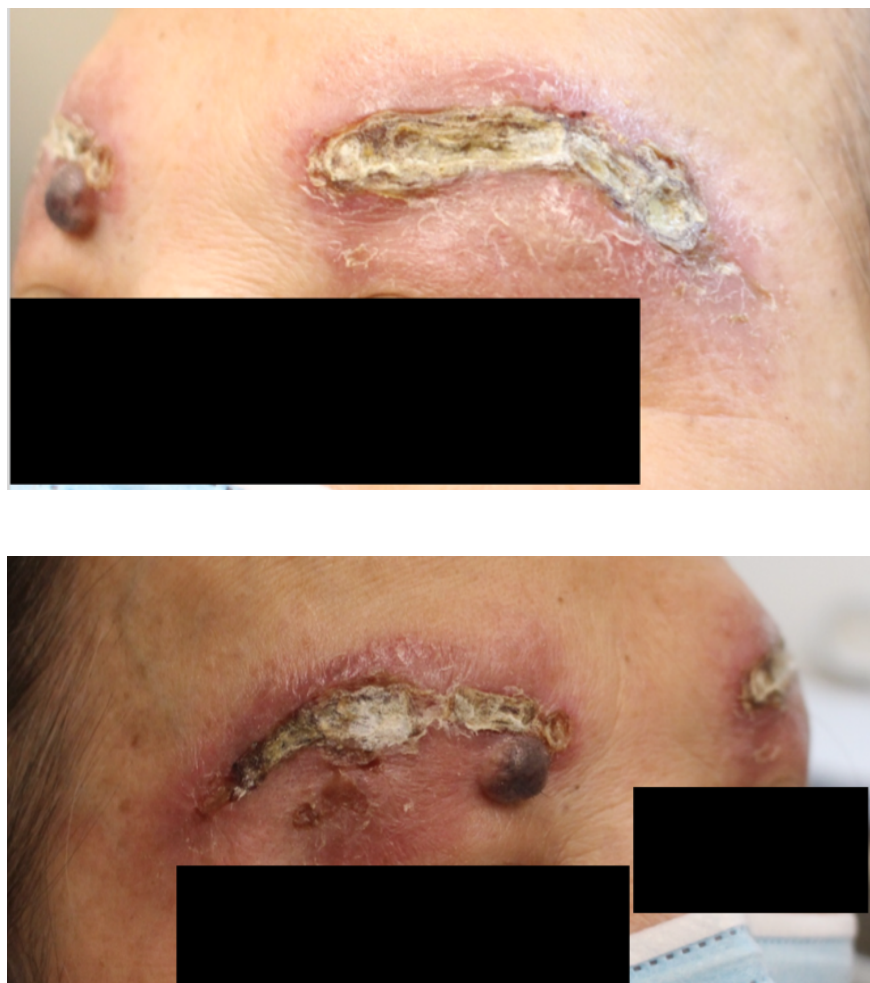
Case Report

We describe a 71-year-old Chinese female who presented with bilateral eyebrow rash, itch, and swelling over the site of eyebrow embroidery which was done 18 months prior. She experienced generalized arthralgia, myalgia, and bilateral ankle swelling. Occasional dryness and grittiness of her eyes and ulcers over the buccal mucosa were reported. She had no family or personal history of autoimmune disease. She had previously done similar eyebrow embroidery over the past few decades without any reaction.

On examination, there were raised, indurated, smooth, and firm skin-coloured plaques adhering to the eyebrow tattoo over the eyebrow regions (shown in Fig. 1). Histology of these plaques revealed sarcoidal type non-caseating granulomatous reaction infiltrating the superficial dermis. The granulomatous inflammation is composed mainly of epithelioid histiocytes, some containing brown/red tattoo pigment, and some multinucleated giant cells and lymphocytes. No polarizable foreign body material, necrosis, AFB, fungi, or malignancy was noted.



Chest X-Ray showed mild bulkiness over the left hilar point, with no focal consolidation or pleural effusion seen. Pulmonary function tests and electrocardiogram were normal. She had a raised ANA (speckled, 1:160) and raised ESR of 40. ENA and SLE panels were negative. Her Full Blood Count, C-Reactive Protein, Renal Panel, Liver Function Test, serum calcium, and ACE were all normal.



A diagnosis of cutaneous sarcoidosis within her tattoos was made. Intralesional triamcinolone injections were initiated at monthly intervals.

A month after the second dose was administered, she developed painful erosions and crusting over both eyebrows (shown in Fig. 2). Examination revealed mild edema, seropurulent discharge and crusting, and underlying curvilinear erosions which adhered to the curve of the eyebrows.

For the concern of atypical mycobacterial infection, further intralesional steroid injections were held off and a repeat biopsy was arranged. The histology again showed sarcoidal-type non-necrotizing granulomatous inflammation in the dermis with an epidermal cyst and accompanying chronic inflammatory cells. No polarizable foreign body or pigment material, necrosis, AFB, fungi, or malignancy were noted. TB PCR and aerobes/anaerobic culture returned negative.

An acute flare of cutaneous sarcoidosis was diagnosed and oral hydroxychloroquine 200mg OD was initiated, with topical therapy of Protopic®, Duoderm®, and Octenisept® gel for the eyebrows.

After a 3 month course of oral hydroxychloroquine, the eyebrow rashes flattened but remained dull and erythematous with hypertrophic scarring with mild itch and pain. Chest X-Ray showed that left hilar bulkiness became less prominent.

2 weeks after the 3-month follow-up, she started to see altered colours within red colours from her right eye and was worked up with macular OCT (ocular computed tomography) scan to have a right eye choroidal

lesion with overlying subretinal fluid. Subsequent workup of FFA (fundus fluorescein) angiography and ICG (indocyanine green) angiography confirmed the diagnosis of ocular sarcoidosis, for which she was started on oral prednisolone 30mg OD, tapered 2.5mg weekly to 10mg OD. After a 2-month course of oral prednisolone, she experienced significant improvement in her colour vision but still notes mild colour disturbance in the right eye.

Our second case is a 36-year-old Indian male who presented with painless and pruritic papules arising from the tattoos over his chest and arms. The involved tattoos were done 3 years prior.

He was diagnosed with systemic sarcoidosis 5 years prior when an endomyocardial biopsy was performed alongside an epicardial VT (ventricular tachycardia) ablation for recurrent VT, and histology revealed myocardial sarcoidosis. FDG PET thorax scan 3 months later showed ground-glass changes in the mediastinal nodes and upper lobes of his lungs, which suggested pulmonary sarcoidosis.

Given his PET findings, he was diagnosed with systemic sarcoidosis and started on oral prednisolone 20mg per day. 6 months later, on a tapered prednisolone dosage of 2.5mg OD, the development of the papules described above occurred in association with pain and morning stiffness of fingers.





On examination, pigmented papules arising from the tattoos were noted along the tattoo lines on the left arm and chest (shown in Fig. 3).

Biopsy of a pigmented papule over the chest tattoo showed well-formed non-necrotizing granulomas without admixed lymphoplasmacytic infiltrate in the superficial dermis. Black pigment material was noted within the dermis and granulomas. Infective investigations were similarly negative.

A diagnosis of cutaneous sarcoidosis in the setting of systemic sarcoidosis was made.

Subsequently, the patient would report painful swelling and itch of his tattoos each time oral prednisolone was stopped or tapered below a dose of 5mg OD. Given his steroid dependence, he was started on 50mg/2ml weekly methotrexate injections and with topical clobetasol cream for affected sites. He successfully weaned off steroids and showed significant resolution in itch, pain, and swelling over the tattoos after 9 months. A repeat FDG PET scan showed a marked reduction in FDG-avidity of the myocardium and ground-glass opacities in the lungs.

Discussion

Reports of sarcoidal reactions within tattoos date back as early as 1939 [9], with the understanding that tattoo pigment, a foreign body, acts as a nidus for granuloma formation [5]. Inflammatory skin manifestations can occur between 6 months to 40 years after initial exposure to the tattoo pigment [5]. Definitive diagnosis hinges on histopathologic findings and clinical manifestations, after other causes of granulomatous inflammation such as infection, have been excluded. The classic histopathological description of tattoo sarcoidosis is that of non-caseating sarcoid granulomas showing aggregates of epithelioid cells surrounded by peripheral rings of lymphocytes, with polarizable foreign material and pigment granules [1].

The morphological patterns of tattoo sarcoidosis are usually confined to tattoo sites, consisting of papulonodular erythematous eruptions with induration [15]. The degree of pigmentation of the papules varies depending on the tattoo pigment [5,8,11], with itch and pain variably present [2]. Tattoo sarcoidosis often co-presents with systemic manifestations of visceral sarcoid granulomas [13,15], and in other cases preceding systemic presentations by 4 months to 4 years [12]. In 30% of systemic sarcoidosis, skin lesions develop after systemic manifestations [13]. Common extracutaneous manifestations of systemic sarcoidosis include

pulmonary sarcoidosis, uveitis, hilar or mediastinal lymphadenopathy [10,11], with occasional reports of sensorineural hearing loss, arthralgia or joint effusion [2].

The female patient had her eyebrows tattooed repeatedly decades prior, but had no reaction previously, although it is unclear if the same tattoo pigment was used. The interplay of repeated trauma to the dermis, the foreign nature of the tattoo pigment, and interferon-alpha produced secondary to exogenous antigens (infectious or environmental) can cause an immunological imbalance favouring Th-1 response and the manifestation of cutaneous sarcoidosis via the Koebnerization phenomenon.

In cutaneous sarcoidosis alone, there is evidence-based practice suggesting the use of repeated intralesional injection of triamcinolone (3-10mg/ml) as mono-therapy [3,5]. Sullivan et al. explored the efficacy of cortisone injections into papules of cutaneous sarcoidosis, revealing unanimous improvement in all treated lesions as compared to controls [14]. 3-4 weekly intralesional triamcinolone injections have also achieved better therapeutic response against other intralesional corticosteroids in the treatment of cutaneous sarcoidosis [6]. Hydroxychloroquine and methotrexate are commonly used systemic steroid-sparing agents for disfiguring or intractable skin lesions in cutaneous sarcoidosis [3].

The formation of subcutaneous abscesses following intralesional steroid injection has thus far been reported to be due to the seeding of cutaneous tuberculosis and atypical mycobacterium infections [7].

Given the negative infective investigations of the lesional tissue in our first patient, the pustulation and microabscesses are unlikely a result of infection. The chronic inflammatory cells surrounding the non-necrotizing granulomas on histology do not suggest a recent acute sarcoidosis flare. We hence postulate that the inflammation and localized atrophy caused by the steroid injections could have precipitated the formation of sterile abscesses. This would be the first such reported case of the adverse effect of pustulation due to intralesional steroid injections in cutaneous sarcoidosis.

With regards to sterile abscess formation in sarcoidosis, previous literature has discussed aseptic abscess syndrome (AAS) as a rare manifestation of systemic inflammatory conditions [4]. AAS is characterized by the sterile aggregation of neutrophils in various organs, including the spleen, skin, liver, lymph nodes, and lungs. There has been a prior case of established sarcoidosis-associated AAS in the liver [4]. However, there have been no reported cases of cutaneous aseptic abscesses associated with sarcoidosis. The management of AAS usually involves the use of steroids, other disease-modifying anti-rheumatic drugs (DMARDs), and biologics. While relapse of AAS while on maintenance courses of steroids has been reported, remission without relapse was achieved with DMARDs [4]. It should be noted that the characteristic pathological finding of neutrophilic infiltration of the deep tissues seen in AAS is not reported in our first patient [4].

Conclusion

From the 2 cases discussed, it can be appreciated that tattoo sarcoidosis can both be a presenting sign or a subsequent manifestation after a protracted course of systemic sarcoidosis. Our first case explored cutaneous sarcoidosis as a result of the Koebner phenomenon from repeated trauma of the tattoo pigment and the tattoo gun, complicated by aseptic microabscess formation precipitated by the interplay of systemic sarcoidosis and repeated intralesional steroid injections. Our second case presented with monomorphic pigmented papules delineating the tattoo sites. The tattoo sarcoidosis in this patient was however precipitated by tapering the dose of systemic steroids to treat a protracted course of systemic sarcoidosis.

Tattoo sarcoidosis can be appreciated as both a presenting sign of systemic sarcoidosis and an indicator of therapeutic response, making it relevant in the clinical algorithm of diagnosing and managing systemic sarcoidosis.

Statements

References

1. Antonovich, D. D., & Callen, J. P. (2005). Development of Sarcoidosis in Cosmetic Tattoos. *Archives of Dermatology*, 141 (7), 869–872. <https://doi.org/10.1001/archderm.141.7.869>

2. D'Alessandro, R., Bardelli, M., Frediani, B., & Selvi, E. (2021). Tattoo induced sarcoidosis. *Sarcoidosis Vascutitis and Diffuse Lung Disease* , 38 (2), e2021030. <https://doi.org/10.36141/svld.v38i2.11291>
3. Doherty, C. B., & Rosen, T. (2008). Evidence-Based Therapy for Cutaneous Sarcoidosis. *Drugs* , 68 (10), 1361–1383. <https://doi.org/10.2165/00003495-200868100-00003>
4. Fillman, H., Riquelme, P., Sullivan, P. D., & Mansoor, A. M. (2020). Aseptic abscess syndrome. *BMJ Case Reports* , 13 (10), e236437. <https://doi.org/10.1136/bcr-2020-236437>
5. Ghorpade, A. (2015). Sarcoidosis detected due to tattoo swellings in an Indian female. *Indian Journal of Pathology and Microbiology* , 58 (3), 362. <https://doi.org/10.4103/0377-4929.162901>
6. Khatri, K. A., Chotzen, V. A., & Burrall, B. A. (1995). Lupus Pernio: Successful Treatment With a Potent Topical Corticosteroid. *Archives of Dermatology* , 131 (5), 617–618. <https://doi.org/10.1001/archderm.1995.01690170121026>
7. Kumar, S., Joseph, N. M., Easow, J. M., & Umadevi, S. (2011). Multifocal keloids associated with Mycobacterium fortuitum following intralesional steroid therapy. *Journal of Laboratory Physicians* , 3 (2), 127–129. <https://doi.org/10.4103/0974-2727.86850>
8. Lyons, A., Brayman, G., & Tahhan, S. (2018). Tattoo Sarcoidosis. *Journal of General Internal Medicine* , 33 (1), 128–128. <https://doi.org/10.1007/s11606-017-4168-x>
9. Madden, J. F. (1939). REACTIONS IN TATTOOS. *Archives of Dermatology* , 40 (2), 256. <https://doi.org/10.1001/archderm.1939.01490020083011>
10. Rorsman, H., Brehmer-Andersson, E., Dahlquist, I., Ehinger, B., Jacobsson, S., Linell, F., & Rorsman, G. (1969). TATTOO GRANULOMA AND UVEITIS. *The Lancet* , 294 (7610), 27–28. [https://doi.org/10.1016/S0140-6736\(69\)92600-2](https://doi.org/10.1016/S0140-6736(69)92600-2)
11. Saygin, D., Karunamurthy, A., English, J., & Aggarwal, R. (2019). Tattoo reaction as a presenting manifestation of systemic sarcoidosis. *Rheumatology (Oxford, England)* , 58 (5), 927. <https://doi.org/10.1093/rheumatology/key316>
12. Sharma, N., Sharma, R., Sharma, V., & Mahajan, V. (2007). Cutaneous sarcoidosis: Clinical profile of 23 Indian patients. *Indian Journal of Dermatology, Venereology and Leprology* , 73 (1), 16. <https://doi.org/10.4103/0378-6323.30645>
13. Shiva Prasad, B., Omprakash, H., & Narendra, K. (2016). Isolated cutaneous sarcoidosis with two different skin lesions. *Indian Journal of Rheumatology* , 11 (4), 232. <https://doi.org/10.4103/0973-3698.193586>
14. Sullivan, R. D. (1953). LOCAL INJECTION OF HYDROCORTISONE AND CORTISONE INTO SKIN LESIONS OF SARCOIDOSIS. *JAMA: The Journal of the American Medical Association* , 152 (4), 308. <https://doi.org/10.1001/jama.1953.03690040012005>
15. Tong, C., Zhang, X., Dong, J., & He, Y. (2014). Comparison of cutaneous sarcoidosis with systemic sarcoidosis: A retrospective analysis. *International Journal of Clinical and Experimental Pathology* , 7 (1), 372–377.

Statement of Ethics

Written informed consent was obtained from the patients for publication of their case details and accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

No funding sourced.

Author Contributions

Dr Dexter Yeo Shih Tong – drafted initial case report, and worked together with A/Prof Nisha to refine the report.

A/Prof Nisha Suyien Chandran – responsible for drafting both patients as subjects for case report writing,

edited meticulously, and provided extensive suggestions for refining the case report, in addition to providing expert opinion on the subject matter.

Data Availability Statement

Data regarding the cases retrieved from National University Health Systems electronic medical records are accessible only to authors of this case series and staff in charge of their care.