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Letter to the Editor

Cutaneous complications after tattooing in Finland from 2016 to 2021

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Editor,

The prevalence of tattooing is about 18% worldwide [1]. In 2017, we reported the first retrospective case series of 31 patients with cutaneous complications on tattoos from 2008 to 2016 from Finland [2]. We wish to present an additional series of 45 patients from the following five years.

We collected prospectively the data from all the outpatients referred for tattoo reactions between 2016 and June 2021. Patients were either i) referred at the Department of Dermatology at Helsinki University Hospital (n=30), ii) attended the author's private practice (n=7), iii) email consultations from other Finnish dermatologists (n=6) or directly from patients (n=2). We

analyzed the demographics, clinical diagnosis and microscopic findings. We compared the results to our previous study. One patient has been published in a previous letter [3].

Forty-five patients (28 women, 62%) with a median age of 34 years and a mean age of 37.4 ± 11.4 years, were included. Permanent make-up tattoos were involved in 4.5% (2/45) of the cases. Data are summarized in *table 1*. Briefly, non-infectious granulomatous reactions within black tattoos were the most common diagnosis (35%), including sarcoidosis in 4 cases (25% of the cases of granulomas, 9% of all cases). Only 24% of the patients presented with an allergic tattoo reaction, mainly against red shades (91%). Ultrapotent corticosteroid ointments or topical tacrolimus were applied on tattoo allergies and granulomas. In two cases of red tattoo allergies, local infiltrations of corticosteroids provided relief. In both cases of environmental mycobacterial infection, eruption subsided before completion of the oral doxycycline (200 mg/day for three months). Oral hydroxychloroquine and cyclines were the treatment of choice for non-infectious cutaneous granulomas, in case of local treatments' failure.

The present series complete our previous research with a total of 76 patients [2]. The most common cutaneous complication remain allergies on red tattoos (30%), followed by foreign-body/sarcoidal granulomas on black tattoos (28%), benign lesions and acute cutaneous infections (10.5% both). The high prevalence of granulomas and sarcoidosis within black tattoos in our recent series is surprising as allergy to red shades is usually the most common cause for consultation [4,5]. This could be a fortuitous finding resulting from a bias of recruitment. Finns may display a preference towards exclusive black tattoos, but there is no epidemiologic study to date supporting this hypothesis [6]. Patients sometimes display a "combined pattern" as in one of our case with a lichenoid reaction associated with a granulomatous reaction in the dermis [10]. The patient had a positive patch test for the red ink sample favoring a tattoo allergy. Systemic sarcoidosis remains globally rather rare. In most of the cases of granulomatous reaction, laboratory findings and chest X-rays are unremarkable. The difficulties to classify a patient with isolated sarcoidal granulomas in tattoos without any other symptoms are well-known [7,8]. Follow-up of patients with granulomatous reactions towards involvement of internal organs is warranted. Cutaneous malignancies remain exceptional and still a fortuitous event. Among isolated cases, contact eczema to products applied during or after tattooing (aftercare product) are easy to diagnose as the rash is not *restricted* to the tattoo and should not

be hastily diagnosed as ink allergy. Lichen planus should be ruled out in cases of lichenoid reaction. Lastly, “overworked tattoo” due to repetitive needle trauma is a rare complication (9% of the cases in a Danish series) [9]. It usually manifests within the first days after tattooing. The customer and tattooist are usually worried as the tattoo is painful with inflamed crusts, edema and improper tattoo healing [9]. The tattoo will eventually heal, with loss of pigments and/or scars. Distinguish this adverse event from a primary infection is difficult. Concomitant signs of infection prompt to initiate inevitably oral or local antibiotics.

Aknowlegding the limits of our studies (bias of recruitment), our new series is globally in line with the litterature, even though a slight shift with an increased number of granulomatous reactions on black tattoos has been observed.

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Table 1. Demographics and diagnosis of the present and past [2] Finnish series

	Present series (2016-2021) <i>n</i>, (%)	Past series (1992-2016) [2] <i>n</i>, (%)	Total <i>n</i>, (%)
N	45	31	76
Gender M:F	17:28	16:15	33:43
Mean age (years) ± SD	37.4±11.4	37.8±12.4	37.5±11.7
Hypersensitivity reaction / tattoo allergy	11 (24) ^{a,d}	12 (39) ^b	23 (30)
Red color	10/11 (91)	11/12 (92)	20/23 (87)
Violet color	1/11 (9)	2/12 (17)	3/23 (13)
Infection	6 (13)	2 (6.5)	8 (10.5)
Possible atypical mycobacteria	2 (4.5)	1 (3)	3 (4)
Pyogenic infection	4 (9) ^c	-	4 (5)
Other	-	1 (3)	1 (1)
Granulomatous reactions	15 (33) ^d	6 (19)	21 (28)
Foreign body or sarcoidal reaction	11 (24)	4 (13) ^b	15 (20)
Sarcoidosis ^e	4 (9)	1 (3)	5 (7)
TAGU	-	1 (3)	1 (1)
Lichen planus	2 (4.5) ^a	2 (6)	4 (5)
Skin tumours	5 (11)	7 (23)	12 (16)
<i>Benign tumours</i>	4 (9)	4 (13)	8 (10.5)
Naevi	-	3 (10)	3 (4)
Seborrheic keratoses	4 (9)	-	4 (5)
Dermatofibroma	-	1 (3)	1 (1)

<i>Malignant tumours</i>	1 (2)	3 (10)	4 (5)
Melanoma	-	3 (10)	3 (4)
Lymphoma	1 (2)	-	1 (1)
Miscellaneous			
Non-allergic transient local inflammation	2 (4.5)	-	2 (3)
Contact eczema	2 (4,5) ^f	-	2 (3)
Overworked tattoo	1 (2) ^c	-	1 (1)
Sensitive skin after application of CS	1 (2)	-	1 (1)
Tattoo blowout	1 (2)	4 (13)	5 (7)
Isolated itch	1 (2)	-	1 (1)
Depigmentation	1 (2)	-	1 (1)
Sparing phenomenon	1 (2)	-	1 (1)

CS: corticosteroids; F: female; M: male; SD: Standard Deviation; TAGU: TATtoo Granuloma with Uveitis

^aOne patient with a lichenoid reaction to red color presented a lichenoid network on the oral mucosa. The patient has been also included as having possibly lichen planus.

^bCompared to the original publication [2], we distinguished granulomatous reactions from tattoo allergies.

^cOverworked tattoo ± local infection

^dOne patient had a combined pattern of lichenoid reaction to red associated with some granulomas, so he was considered as having a tattoo allergy as he had a strong positive (++) patch test to the red tattoo ink.

^eSarcoidosis was diagnosed either in case of a past history of confirmed systemic sarcoidosis (n=1), active systemic sarcoidosis (n=1), scar sarcoidosis outside the tattoo (n=1) or elevated levels of angiotensin-converting enzyme (n=1)

^fContact eczema to dexpanthenol (n=1) and to a tattoo transfert cream (n=1)