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Case Series

Acneiform eruptions – Side effect of laser tattoo removal: A case series

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ABSTRACT

Laser tattoo removal is a popular and generally safe procedure. The well-documented side effects include erythema, blistering, and pigmentary changes. This case series presents seven patients who developed acneiform eruptions following laser tattoo removal, which was an unexpected, hitherto unreported adverse effect.

Keywords: Acneiform eruptions, Lasers, Tattoo

INTRODUCTION

There is a significant increase in laser tattoo removal procedures, especially with Q-switched lasers, in recent years.[1] These lasers target tattoo pigment with minimal damage to surrounding skin, making them effective in the removal of both amateur and professional tattoos.[2] While the procedure is generally well-tolerated, common side effects include erythema, blistering, crusting, scarring, and pigmentary changes.[3]

Acneiform eruptions are typically associated with drug reactions, trauma, inflammation, or exposure to heat.[4] To our knowledge, acneiform eruptions have not been documented as a side effect of laser tattoo removal. This case series details the occurrence of acneiform eruptions following laser tattoo removal in seven patients.

CASE SERIES

We present seven cases of laser tattoo removal done with the Q-switched neodymium-doped yttrium aluminum garnet (Nd:YAG) laser that presented with hitherto unreported side effects of acneiform eruptions following laser treatment. All the patients were north-Indian males with rural background, aged between 18 and 22 years, with skin type IV–V, who were getting tattoos removed to meet the recruitment criteria for the army. All the tattoos were amateur. Notably, these eruptions were predominantly seen over the upper arm. Some patients had a few lesions of pre-existing acne over the site.

The laser used was Q Switch Nd:YAG Laser model HS-250E by Apolomed, with a pulse width of <10 ns. The laser parameters used in all patients included an average energy setting of 2.8 J/cm^2, a spot size ranging between 2 and 4 mm and a frequency of 10 Hz. All the patients

were given a single pass of laser with frosting as the endpoint. The total number of sessions for tattoo clearance varied between 4 and 8 sittings done at a monthly interval. After each session, patients were given a combination of topical betamethasone and fusidic acid to apply for 7 days. No other topical application was advised. Patients were asked to keep the treated area loosely covered with physical protection, such as a full-sleeved shirt or handkerchief, to avoid direct sun exposure. The eruptions were noted when the patients returned for their next scheduled session at a 1-month interval. None of the patients sought treatment for this side effect. Since the patients did not report the side effects and the treating doctor noted them on the follow-up visit, the onset of side effects could not be ascertained. No treatment in the form of either oral or topical medication was given. In some instances, the lesions persisted, while in others, they resolved spontaneously [Table 1].

Case 1

A 22-year-old male presented with a black patterned tattoo on his upper arm, seeking removal. After the first session of Q-switched Nd:YAG laser treatment, acneiform eruptions developed, localized to the area treated by the laser. While the patient had a few pre-existing acne lesions, the clustered appearance of new lesions during follow-up strongly suggested that these eruptions can be attributed to laser treatment [Figure 1]. Other side effects in this case included paradoxical hyperpigmentation and scarring.

Case 2

A 22-year-old male with a black animal-faced amateur tattoo on his upper arm underwent laser tattoo removal. Following the first session, he developed acneiform eruptions despite having no prior history of acne or skin lesions, indicating a potential side effect of the treatment [Figure 2]. In addition, hypopigmentation was observed after the 4th laser treatment session.

Case 3

A 20-year-old male with a black symbolic tattoo on his upper arm presented for laser removal. Acneiform eruptions appeared after the first laser session but resolved within the next 4 weeks [Figure 3]. The patient had no pre-existing acne or skin lesions. Post-treatment, multiple depigmented macules along the border of the tattoo were also observed in this case following laser treatment.

Case 4

A 19-year-old male with a black snake-shaped tattoo on his upper arm sought laser tattoo removal. Acneiform eruptions appeared after the first session. The patient had a few lesions of acne lesions on the upper arm during the first session of laser treatment. A significantly increase in number of acneiform lesions was observed at the first follow-up. Paradoxical hyperpigmentation was also observed after the first laser session but resolved after the second sitting.

Case 5

A 19-year-old male with a black animal-faced tattoo on his upper arm underwent laser tattoo removal. Acneiform eruptions were noted after the first session. The patient had no prior history of acne or skin lesions. No additional side effects were recorded.

Table 1: Summary of patients with Acneiform eruptions secondary to laser tattoo removal.

Case no.	Site of tattoo	Color of tattoo	Acneiform eruptions appeared after	Resolved after	Laser parameters	Other side effects
1	Upper arm	Black	1st session	Persistent	E-2.82 J/cm^2 ss-3	Paradoxical hyperpigmentation, scarring
2	Upper arm	Black	1st session	Persistent	E-2.38 J/cm^2 ss-4	Hypopigmentation
3	Upper arm	Black	1st session	2nd session	E-2.82 J/cm^2 ss-3	Depigmented macules
4	Upper arm	Black	1st session	Persistent	E-4.24 J/cm^2 ss-3	Hyperpigmentation
5	Upper arm	Black	1st session	Persistent	E-1.59 J/cm^2 ss-4	None
6	Upper arm	Black	1st session	3rd session	E-4.24 J/cm^2 ss-3	Hypopigmentation, crust formation
7	Upper arm	Black	1st session	Persistent	E-1.98 J/cm^2 ss-4	None

E: Energy of the laser, ss: Spot size

Figure 1: (a) Before 1st session. (b) Before the 2nd session. (c) Before the 4th session.

Figure 2: (a) Before 1st session. (b) Before 2nd session. (c) Before 3rd session.

Figure 3: (a) Before 1st session. (b) Before 2nd session. (c) Before 5th session.

Case 6

A 24-year-old male had a black symbolic tattoo on his upper arm. Acneiform eruptions appeared during the first session but resolved spontaneously after three sittings without any treatment. The patient had no pre-existing acne lesions. However, he experienced hypopigmentation and crust formation as side effects during treatment.

Case 7

A 21-year-old male with a black bird-shaped tattoo on his upper arm underwent laser tattoo removal. After the first session, few acneiform eruptions developed in the laser-treated area. The patient had a prior history of acne. No other significant side effects were observed throughout the treatment.

DISCUSSION

The findings of this case series suggest a novel side effect of acneiform eruptions localized predominantly on the upper arm, which is an acne-prone area.[5]

Acneiform eruptions develop in response to various factors, including drugs, heat, and mechanical irritation.[4] In this case series, the laser energy delivered by the Q-switched Nd:YAG laser likely induced localized trauma and heat at the level of the pilosebaceous units. The thermal effect of the laser may have disrupted the epidermis and dermis, leading to follicular obstruction and triggering an inflammatory cascade.[6,7]

Similar reactions have been seen in other uses of the Nd:YAG laser, such as in laser hair removal or acne scar treatment.[8,9] The occurrence of similar lesions in the current case series suggests that the mechanism of acneiform eruptions may be consistent across various applications of Nd:YAG lasers. However, to our knowledge, acneiform eruptions have not been previously reported as a side effect of laser tattoo removal, highlighting the uniqueness of these findings.

The patients in this case series were all young males aged between 18 and 22 years, raising the possibility that age-related hormonal activity, particularly higher androgen levels which may have contributed to their susceptibility to acneiform eruptions.

The color of the tattoos in all cases was black, which absorbs the laser energy more effectively compared to lighter pigments.[10] This increased absorption may lead to more pronounced thermal effects in the treated area, possibly exacerbating local inflammation and triggering acneiform lesions.

The occurrence of acneiform eruptions in this series underscores the need for dermatologists and laser practitioners to be vigilant in identifying this side effect, particularly when treating tattoos located in seborrheic zones like the upper arm.

Prevention and future recommendations

Given that this side effect has not been previously reported, further research is warranted to investigate the underlying mechanisms and to establish evidence-based guidelines for prevention and management. A larger cohort of patients experiencing this side effect would provide greater insight into potential risk factors, including the patient's age, skin type, tattoo color, anatomical location of the tattoo, and laser settings.

CONCLUSION

This case series introduces acneiform eruptions as a previously unreported side effect of laser tattoo removal. Although rare, acneiform lesions highlight the importance of recognizing and managing unexpected dermatologic reactions to laser treatments.

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