

Basal cell carcinoma arising in tattoos: a clinical report of two cases

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Summary—Two clinical examples of basal cell carcinoma arising in tattoos are presented with a review of other reports of malignancy in tattoos. A possible aetiological explanation is offered.

The art of tattooing has been practised for over 4000 years as shown by the presence of tattoos on the skin of some Egyptian mummies. The word "tattoo" itself was brought to us by Captain Cook, who in 1796 wrote of the Polynesian practice of inlaying black pigment under the skin, which was called "tattow" in their language.

Various papers have dealt with the complications of tattooing, of which the contributions of Beerman *et al.* (1954) and Goldstein (1979) are good examples, the latter being the most recent and comprehensive review at present available.

This short paper describes two cases of basal cell carcinoma arising in tattoos, a complication which has not been previously reported.

Case 1

This man, when 19 years old, had a red, green and blue tattoo inflicted on his right shoulder. Some 55 years later an ulcerated lesion developed in the red part of the tattoo. There was no history of recent trauma and after two and a half years the patient, now aged 76, presented for excision of the lesion (Fig. 1). Histological examination of the specimen revealed a completely excised ulcerated superficial basal cell carcinoma. In the dermis beneath and beside the tumour were particles of green, red and black pigment, some of which lay in macrophages and some lay free.

Case 2

This man, when 24 years old, had a tattoo in dark pigments inflicted on the dorsum of his right hand. Some 40 years later he developed an ulcer at the distal apex of the tattoo (Fig. 2) with no history of trauma. Histological examination of the excised specimen revealed a basal cell carcinoma with hyperkeratinisation of the surface epithelium and marked chronic inflammatory infiltration in the upper dermis. There were several foci containing small particles of black pigment, mainly in the mid-dermis and generally deep to the basal cell lesion.



Fig. 1

Figure 1—Basal cell carcinoma in right shoulder tattoo.

Discussion

Goldstein (1979) does not mention malignant change as a complication of tattooing although he does mention the occurrence of keratoacanthoma in the red portion of tattoos. Beerman and Lane (1954) cite one case of malignant melanoma, reported in 1938, in which a 9-year-old boy punctured his forehead with an indelible pencil and 3 months later developed the tumour. In another case, reported in 1943, a reticulo-histio-sarcoma was found arising in the blue colour on a forearm 17 years after tattooing.



Fig. 2

Figure 2—Basal cell carcinoma in tattoo dorsum of right hand.

The red pigmented areas of tattoos have been implicated in many complications of a proliferative type such as hypersensitivity reactions, sarcoid formation and the development of keratoacanthoma (McGrouther *et al.*, 1977; Goldstein, 1979). Indeed the basal cell carcinoma in our first case arose in the red area of the tattoo. However, in our second patient it was not possible to identify a close relationship between the site of the tumour and any specific colour due to the fading of the tattoo.

Neuman *et al.* (1963) have suggested that skin cancer formation after trauma may well involve the implantation or displacement of living epithelial elements into the subcutis with paralysis of the cellular and enzymatic mechanisms which normally combat this invasion. It is not difficult to imagine the same mechanism occurring during the process of tattooing. It is, of course, impossible to prove conclusively that the tattoos in our patients caused skin cancers, but in view of the circumstantial evidence in both cases and the unusual site for a basal cell carcinoma (as seen in Case 1), it seems reasonable to regard the tattoo as at least a contributory carcinogenic agent.

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References

- Beerman, H. and Lane, R. A. G. (1954). A survey of some of the literature concerning the medical complications of tattooing. *American Journal of the Medical Sciences*, **227**, 444.
- Goldstein, N. (1979). Complications from tattoos. *Journal of Dermatologic Surgery and Oncology* (New York), **5**, 869.
- Levy, J., Sewell, M. and Goldstein, N. (1979). A short history of tattooing. *Journal of Dermatologic Surgery and Oncology* (New York), **5**, 851.
- McGrouther, D. A., Downie, P. A. and Thompson, W. D. (1977). Reactions to red tattoos. *British Journal of Plastic Surgery*, **30**, 84.
- Neuman, Z., Ben-Hur, N. and Shulman, J. (1963). Trauma and skin cancer. *Plastic and Reconstructive Surgery*, **32**, 649.

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