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Surgical suturing-induced melanocytic nevi. A new type of eruptive melanocytic nevi?

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Abstract

Background: Nevogenesis is a complex process involving several pathogenetic mechanisms, including genetic factors, hormonal influences and UV-radiation. Trauma has been described as a triggering factor for an alternative pathway of nevogenesis. Eruptive melanocytic nevi (EMN), related either to immunosuppression or to blistering disorders, represent a special type of nevi probably induced by the disruption of the dermo-epidermal junction and consequent proliferation of quiescent pigment cells during re-epithelization.

Main observations: We report two patients with three melanocytic nevi that developed de novo along the direction of surgical suturing, following surgical operation for other reason. The lesions exhibited special dermoscopic characteristics and histology revealed features of acquired melanocytic nevi.

Conclusions: Such cases may represent a new type of eruptive nevus, the surgical suturing-induced nevus, which should be included in the differential diagnosis of new pigmentation developing within a scar. (*J Dermatol Case Rep*. 2016; 10(3): 49-52)

Introduction

Nevogenesis is a complex process involving both constitutional and environmental factors.[1] Many aspects of this process still remain unclear. Apart from the classical pathway, it appears that alternative pathways do exist. The paradigm of eruptive melanocytic nevi (EMN) falls into this category. EMN have been associated with immunosuppressive conditions, immunodeficiency and blistering disorders.[2,3] In addition, trauma has been reported as a triggering factor for the development of melanocytic nevi.[4]

We report two cases of melanocytic nevi arising de novo within surgical scars, and following the direction of the suturing. We feel that surgical trauma, especially suturing, should be recognized as a trigger for EMN development.

Case Reports

Case 1

A 60-year-old Greek male was referred to the Dermato-oncology Unit of our Department for evaluation of two pigmented lesions on the median thoracic line. The lesions had been present for a few years, but definitely not since young age. The patient also reported that approximately five years ago he had undergone a by-pass surgery for coronary disease. He did not recall having any nevi or lentigines on this anatomic location. Clinical examination revealed a linear vertical scar due to a mid-thoracotomy, and within the scar, two horizontal, linear pigmented lesions, extending along the direction of the metal sutures used. Clinically, the lesions

presented as light to dark brown, well-circumscribed linear macules, 1 cm and 6 mm in diameter, respectively (Fig. 1a). Dermoscopically, both lesions exhibited brown thin parallel lines, which did not extend beyond the scar area. The background of the lesion excibited a homogeneous, pinkish pigmentation, which was attributed to the hue of the scar. There was also a hint of a typical reticular pigment network at the part of the lesion neighbouring the healthy skin (Fig. 1b-c). Histopathologic examination of the larger of the two lesions revealed findings consistent with a Clark's-dysplastic melanocytic nevus.

Case 2

A 28-year-old Greek male presented to the outpatient clinic of our Department for a pigmented lesion in the upper

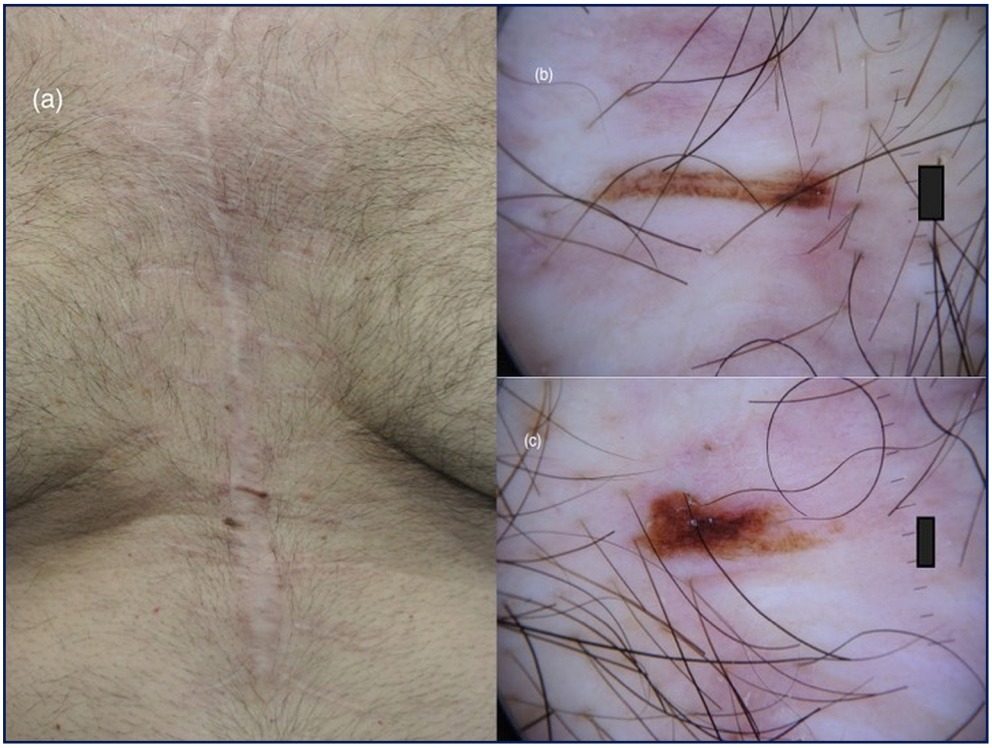

Figure 1

(a) *Two macular pigmented lesions extending perpendicularly within a mid-thoracotomy scar.* ***(b)*** *Parallel, dark brown, pigmented lines within light-brown linear pigmentation, surrounded by whitish, scar-like pigmentation.* ***(c)*** *Irregular pigment network on the left pole of the lesion combined with parallel, dark brown lines on the right pole.*

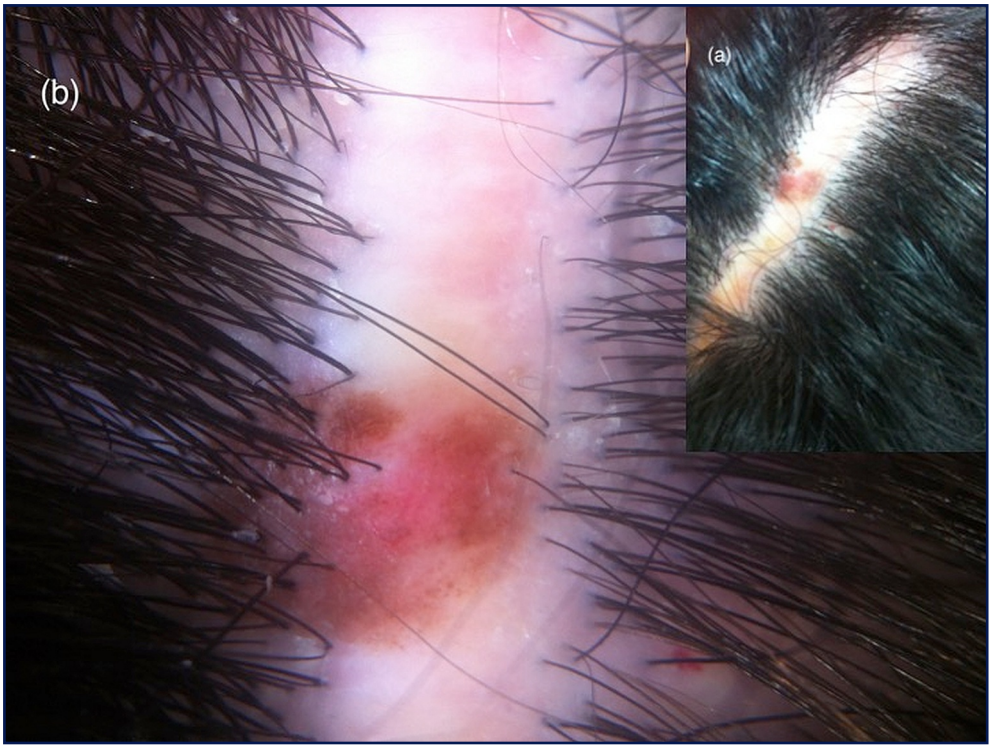

Figure 2

(a) *An ovoid brownish, pigmented lesion developing within a surgical excision scar of the scalp.* ***(b)*** *Homogeneous brown pigmentation with foci of dots and globules on the lower part of the lesion, and parallel lines on the upper part, surrounded by a scar-like depigmentation.*

occipital area of the scalp, which he had noticed recently. The lesion was situated within a surgical scar resulting from the excision of a trichillemmal cyst of the scalp, two years before. On clinical examination, an ovoid, light brown, macular lesion was evident inside a linear scar, extending perpendicularly to the direction of the scar and not exceeding the scar borders (Fig. 2a). Dermoscopic examination revealed a homogenous brown pigmentation with few brown dots and globules, surrounded by a scar-like depigmentation (Fig. 2b). Histopathologic examination showed findings indicative of a compound melanocytic nevus.

Discussion

Melanocytes seem to derive from the neural crest. They mature acquiring pigment producing capabilities upon migration to the skin.[1] This migration follows thereby an intradermal, intraepithelial, and intrafollicular progression.[5] Current models of nevogenesis propose that melanocytic neoplasms result from an arrest in this migration, and that they arise from a single cell of origin.[6] However, neither the differentiation state of this progenitor cell, nor its exact location (in the dermis, epidermis, or both) has been clearly established. One possibility is that an immature melanocytic stem cell that most likely resides in the dermis, serves as the nevus progenitor cell. In this model, this immature cell remains in a quiescent state in the skin, until environmental signals activate the cell to produce melanocytes.[7] Furthermore, UV radiation exposure or other mutagenic processes can cause genetic alterations, leading to an abnormal proliferation of melanocytes. The specific underlying mutation, along with local environmental conditions influence both the daughter cells' differentiation and the migratory pathway in a characteristic manner, so as, the resulting nevus to assume a discrete phenotypic pattern.[7,8] This model may explain also the development of EMN, as well as, the development of the trauma-induced nevi, including surgical trauma, as in our cases.

It has been hypothesized for eruptive nevi that repeated disruption of the dermo-epidermal junction, as occurs in hereditary epidermolysis bullosa, may be followed by proliferation of pigment cells during re-epithelization.[9,10] Alternatively, trauma, possibly in the context of an isomorphic reaction (Koebner), may cause incipient nevus nests in the epidermis, or in the follicular epithelium, to expand.[9,10] In our cases, surgical trauma, especially suturing (as the localization of the nevi along the suturing lines suggests) may have triggered the proliferation of quiescent immature melanocytes residing in the skin. A question that needs to be answered is why these suturing-induced nevi do not appear more often. Probably, there are other genetic or environmental factors that serve as prerequisites for this type of EMN to develop. In addition, we believe that this condition remains under-recognized and under-reported.

Our observation may be significant also because such cases should be differentiated clinically and dermoscopically with other situations characterized by newly developing pigmentation within a scar. According to Moscarella *et al*.,[11] such a differentiation should include recurrent nevus, recurrent melanoma, and melanotic reactive pigmentation. Recurrent nevus is characterized by rapid development that is confined within the scar, and, dermoscopically, by irregular network, globules or streaks.[12] Reactive pigmentation exhibits a regular pigment network and thin parallel streaks. Recurrent melanoma tends to recur months if not years after excision at the edges of the scar in the normal skin. Specific melanoma dermoscopic features may be absent, displaying only a heterogeneous, structureless pigmentation.[13] Diagnostic clues for the differentiation of surgical suturing-induced nevi may include: absence of a melanocytic nevus at the site; history of surgical operation for other reason; localization along the suturing lines and within the scar; and dermoscopic features of an acquired melanocytic nevus.

Conclusion

In conclusion and according to our observations, surgical suturing should be added to the triggers for EMN, and surgical suturing-induced nevi should be considered in the dermoscopic differential diagnosis of pigmentation in a scar.

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