Davener’s dermatosis: A variant of friction hypermelanosis

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Background: As part of our clinical experience we encountered a group of patients from a specific population with a similar peculiar pigmentation over the lower dorsal spine.

Objective: We investigated these patients to see whether we could determine a common origin.

Methods: Patients meeting the inclusion criteria underwent detailed history and complete physical examination; biopsy specimens from 3 patients were studied.

Results: All 13 patients were full-time male students at Orthodox Jewish Talmudic seminaries (Yeshivas). The lesion consisted of an elongated, vertical, midline, hyperpigmented patch with indistinct borders, which was distributed along the skin overlying the bony protuberances of the inferior thoracic and lumbar vertebrae. It was often unrecognized by the patients. Mean body mass index was lower than that for the general population. Histologic study showed a marked diffuse hyperkeratosis and hyperplastic epidermis with diffuse hyperpigmentation. We attributed the phenomenon to friction from the rigid backrests against the cutaneous surface of the lower back generated by the characteristic swaying activity that traditionally accompanies Torah study or “davening” (praying) and termed it Davener’s dermatosis.

Conclusion: We believe this phenomenon represents a new form of benign friction hypermelanosis. This report highlights the importance of a thorough history in patients presenting with pigmented lesions. (J Am Acad Dermatol 2000;42:442-5.)

Pigmentation disorders have a variety of causes, ranging from systemic endocrinologic to focal, localized mechanical factors.1,2 This study describes a population with an extraordinary, previously unknown pattern of hyperpigmentation. Because all 13 subjects involved shared a similar background, a common origin was sought. The history and clinical findings resembled those reported for friction hypermelanosis in young Japanese women.3,5 The lesion was characterized by an unexplained brownish pigmentation distributed on the skin surfaces overlying bony prominences of the body. On the basis of the routine behavioral pattern of the subjects, we attributed the finding to constant friction against a rigid backrest of a chair. The presence of the common denominator of established mechanical forces applied over involved areas, either by towel, backscratcher, or in this case, a chair, supports the assumption that they are instrumental in lesion formation.7,9

The main purpose of describing this phenomenon in this subset of patients is to reassure both clinician and patient of its benign nature and to further understanding of the pathogenesis of similar findings.

PATIENTS AND METHODS

All patients in the study were seen over a 2-year period in a single community clinic serving a predominantly Jewish Israeli population, including a large proportion of orthodox families. Two Talmudic seminaries (yeshivas or rabbinical colleges) with both local and dormitory students are located in the catchment area. The inclusion criterion for the study was the presence of an area of hyperpigmentation on the lower back. All patients were identified during
routine skin surface inspection on medical examination for various other reasons. In two instances, subjects led us to a family member or acquaintance with a similar finding.

A full and complete history was taken, with specific emphasis on endocrinologic aspects, ethnic origin, skin type, physical activity, awareness of the existence of the lesion, and symptomatology. Use of medication, creams, lotions, or cosmetics was recorded, as were age and body dimensions: body mass index (BMI) (kilogram per squared height [in meters]) was calculated for comparison. Patients were also questioned about lifestyle and current or recent yeshiva attendance. If the patient conceded to a biopsy, the specimen was processed for routine light microscopic examination with hematoxylin and eosin, Fontana-Masson, and periodic acid-Schiff (PAS) stains, and for polarized microscopic examination with Congo red. The lesions were described, measured, and photographed for peer review.

RESULTS

Thirteen subjects met the study criterion. All were male, 15 to 43 years of age (mean, 21 years). Three were consecutive siblings of a prominent family in the community (Fig 1). None of the others were related in any way. All were native Israelis of North African or European origin. Diversity of skin type was the rule, with skin types II and III predominating.

Physical examination

In all cases, a longitudinal hyperpigmented lesion extended over the spinous processes of the lower spine, overlying the lower thoracic and upper lumbar vertebrae. The length of the lesion ranged between 3 and 13 cm (average, 7.57 cm). Two forms were distinguished morphologically and clinically. The first, which we termed the mild or "cobblestone" form (Fig 2) featured a lesser degree of hyperpigmentation and consisted essentially of discrete "islands" of darker skin with blurred borders, marking especially the most prominent aspects of the bony protuberances. These individual patches were oriented vertically and appeared to form one uniform lesion. The second, a more severe or "continu-
ous" form, was characterized by a darker shade of pigment and presented as a confluent, well-circumscribed plaque without any gaps between the vertebral; the cutaneous surface was mildly indurated (Fig 3). This form was observed in only two patients.

On physical examination, all but one of the men had a thin, asthenic body type. Average BMI was 20.0 compared with 22.5 for the general population.\textsuperscript{10}

**Behavioral patterns**

The lesion caused no symptoms whatsoever; indeed, half the patients were unaware of it. This finding, together with the lesion’s probably indolent onset, precluded the verification of its duration. All subjects appeared healthy with no history of systemic diseases or abnormalities on laboratory tests. None reported applying a foreign material over the involved area, or unusual skin exposure.

All subjects were full-time (8 hours a day) yeshiva students, except one who had left the yeshiva several months before examination to join the army. The duration of attendance was 2 to 14 years, with an average of 7.2 years. The unique character of the lengthy learning sessions in Talmudic seminars is of great relevance to this study. Students (male only) sit in a large auditorium, usually in pairs. They read texts from the scripture or Talmud and follow this with a discussion or heated debate, often for up to 4 hours at a time. Most of this activity is performed in the sitting position and is traditionally accompanied by a constant rhythmic or rocking motion of the upper torso, which scholars believe induces concentration and diligence and which symbolizes the flickering of a flame, a paradigm of the spirit.\textsuperscript{11} Because of their low budget, these institutions are furnished with bare wooden or metal chairs and benches. This, together with the swaying, exposes the cutaneous surface of the back to constant friction.

**Histopathologic findings**

Three punch biopsy specimens from 3 patients were available for study. The lesions were characterized by marked diffuse hyperkeratosis, partly compact and partly "basket-weave" orthokeratosis. The epidermis was markedly hyperplastic, with clubbing and fusion of the rete ridges (Fig 4). Diffuse hyperpigmentation was present at the base of the epidermis and was remarkably prominent in all 3 biopsy specimens. In the papillary dermis, mild perivascular mononuclear inflammatory cell infiltrates were noted, but no melanophages were seen. No evidence of melanocytic hyperplasia was present at the base of the epidermis. S-100 protein and HMB-45 immunostains demonstrated regular morphology and quantity of melanocytes. PAS staining, performed in all 3 cases, was negative for parasites. No amyloid deposits were observed. Findings for Congo red stain were negative.

**DISCUSSION**

Several noteworthy aspects of the peculiar pigmentation are described in this study. First, it seems to afflict young males of a very specific subgroup (ie, Jewish orthodox Israeli Talmudic students). The manner of yeshiva study combined with the anatomic location of the lesions (directly overlying the protruberant spinous processes of the back) led us to consider physical trauma as the major cause. This was supported by the histopathologic findings. Furthermore, the commonly concealed and relatively remote position of this process made other mechanical or environmental factors unlikely. Apparently, the repeated rubbing of the lower back against a rigid backrest in subjects with a lean body type induces changes that promote hyperpigmentation. This hypothesis is supported by established data that melanoderma is caused by prolonged exposure to physical stress such as pressure, friction, heat, rubbing, or scratching.\textsuperscript{12,14} Second, this series involved a set of siblings, although in general this finding was unusual among the many yeshiva students that visit our clinics. This points to the possible involvement of additional genetic or familial factors that act in unison with the environmental one to encourage lesion formation.

We assume that the cobblestone and the continuous forms of this dermatosis together represent a single clinical spectrum of lesions of various degrees of severity. Only long-term follow-up of affected sub-
jects who continue to engage in the described activity can confirm this assumption.

Previous reports of pigmented lesions associated with mechanical factors have focused on an array of activities that lead to a common outcome. In the studies of Mario et al. and Wong et al., the affected skin regions were subjected to prolonged mechanical friction, pressure, and chronic irritation. We agree with these authors that friction melanosis should be considered a distinct pigmented disorder. Although in some of the previous patients with friction hyperpigmentation macular amyloidosis was seen in histologic examination, no deposits of amylloid were noted in our patients. In our series, the hyperpigmentation was a consequence of a precise ritual performed regularly within a religious context. Pigmentary changes of the skin in association with religious rituals or ceremonies have also been reported by others. In marked resemblance to our observation is the documented formation of "prayer nodules" in Moslem men over areas sustaining repeated trauma from kneeling during worship.

The involvement of the lumbosacral or buttock skin in a hyperpigmentation process is well recognized in neonates. The indistinct blue-black macular Mongolian spots, known as congenital dermal melanocytosis, seldom persist into later life (<3%). Likewise, Metzker and Shamir described a group of youngsters with vascular nevi overlying the sacral spine that spontaneously disappeared. In the adult, dermal pigmentation phenomena over the lower back are rare, but they have been observed in the context of more serious disease. Herein we are dealing with a benign, though potentially worrying, ailment.

In conclusion, this report describes a unique hyperpigmentation that is probably the result of mechanical trauma exerted during lengthy Talmudic study sessions. Although a wide differential diagnosis should be considered with pigmented lesions, in specific populations, a thorough history may disclose the underlying factor(s). Further study is needed to determine how to predict subjects who are susceptible to such pigmentary changes.

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REFERENCES