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We hope that making available the relevant information on Pachyonychia Congenita will be a means of furthering research to find effective therapies and a cure for PC.
Pachyonychia Congenita

Report of a Case

A 23-year-old white male of Swedish ancestry was observed on routine examination to have widespread pigmented changes and deformed nails. He advised that these changes had been present as long as he could remember—at least, during very early childhood. Both parents had died before the patient reached one year of age. His physical and mental growth had been normal; his general health was excellent. No treatment had been sought because the findings had never caused him any discomfort, nor had he noted any progression.

Family history revealed that his mother, who died of carcinoma of the breast in her early forties, had similar changes in the skin and nails. Father died also in his early forties of unknown cause; his skin was, however, said to be normal. One older child, a brother, age 36 years, had skin and nail findings similar to those of the patient and present also since early childhood.

Physical examination of the skin revealed a reticulated pattern of brownish pigmentation encircling the neck (Fig. 1) and waist (Fig. 2). Brown pigment was also observed in both axillae, scrotal region, inner aspect of the thighs, soles of the feet, palms (Fig. 3), and distal dorsal phalanges of both hands (Fig. 4). The fingernails were lusterless and thickened; the toenails showed the same findings but to a lesser extent.

Examination of the mucous membrane of the mouth revealed a dime-sized whitish plaque of...
Fig. 1.—Note brownish pigmentation of neck and axilla.

Fig. 2.—Brownish pigmentation about waist.

Fig. 4.—Note brownish pigmentation, skin of distal dorsal phalanges, and thickened, lusterless nails.

Leukoplakia on the left side. There were deep seated hyperkeratotic margins located at the oral commissure.

Examination of the cornea revealed bilateral faint russet opacities in an unusual pinwheel pattern. These lesions were symmetric.

General physical examination of the chest revealed no abnormalities.

Laboratory Data.—Blood analysis was normal as were the blood chemical studies.
leukoplakia on the left side of the hard palate. There were deep seated fissures with hyperkeratotic margins located at either angle of the oral commissure.

Examination of the cornese with the slit lamp revealed bilateral faint rust-colored superficial opacities in an unusual pinwheel configuration. These lesions were symmetrical in distribution.

General physical examination, including an x-ray of the chest, revealed no additional abnormal findings.

Laboratory Data.—Blood and urine were normal, as were the blood chemical findings. The blood Wassermann reaction was negative. Direct examination of scrapings from the nails with potassium hydroxide gave negative results. Cultures taken from the nail scrapings on Sabouraud’s glucose agar were negative.

Histopathology.—Tissue sections were removed from the axilla and palm. Sections were stained with hematoxylin and eosin and with 1% silver protein.

Histopathologic study of the hematoxylin-and-eosin-stained sections from the axilla (Fig. 5) revealed an irregularly elevated and moderately acanthotic epidermis with spotty follicular plugging.
Many cells in the prickle layer showed a poorly stained or vacuolated cytoplasm with shrunken nuclei.

Yellowish to dark brown pigment-laden macrophages were observed in the papillary bodies and throughout the upper and middle cutis. In the superficial cutis, they were distributed chiefly perivascularly.

Sections from the axilla treated with 1% silver protein (Fig. 6) showed a dense stratum of discrete and clumped dark stained granules about the cells of the basal layer. Throughout the prickle-cell layer, the granular mass became less dense, and the individual granules were dispersed fairly uniformly. At the approximate level of the keratoehyalin layer, the granules again tended to agglomerate and become a more dense stratum. Thereafter, they were observed as discrete particulate material in the loosely laminated corneum.

Histopathologic study of the hematoxylin-and-eosin-stained sections from the palm revealed dark stained masses of granular material in a corneum of normal thickness. The eledin layer was just visible. Keratoehyalin layer appeared normal in size. Many cells in the prickle layer showed a poorly stained or vacuolated cytoplasm with shrunken nuclei.

Yellowish to dark brown pigment-laden macrophages were observed in the papillary bodies and throughout the upper and middle cutis. In the latter situation they were distributed chiefly perivascularly.

One per cent silver-protein-stained sections from the palm (Fig. 7) revealed an accentuated histopathologic detail. The corneum was studded with black clumps of granular material (Fig. 8). Just above the keratoehyalin layer the dark stained granules became particulate but still formed a dense stratum. Throughout the prickle-cell layer the granules took a lighter stain and were fairly uniformly dispersed. In the basal layer the granules took a lighter stain and were relatively sparse. They were observed again in the papillary bodies, where they were distributed chiefly perivascularly.

Comments

Most of the diseases that result from the clinical findings that give a diagnosis of pachyonychia are variants of the basic and occur as an ectodermal defect. They are usually benign acanthosis nigricans or reddish with its variants. Certain diseases, such as Darier's disease, ichthyosiform congenital, ichthyosis bullosa, xeroderma pigmentosum, and others, are also closely related. Other diseases, such as pseudocarcinomatous acanthosis nigricans, reticulated papillomatosis, and acanthosis coli, which may simulate melanomas, may very closely resemble the findings of pachyonychia. Clinically, one disease that should be considered in not being a genodermatosis is pachyonychia nigricans. This is...
in the axilla treated with 1% silver protein showed a dense stratum of discrete dark-stained granules about the cells in layer. Throughout the prickle-cell layer the granules became less dense, and the granules were dispersed fairly uniformly at the approximate level of the keratinocytes. At the granules again tended to be associated and become a more dense stratum. They were observed as discrete particles in the loosely laminated corneum. An ultrastatic study of the hematoxylin-stained sections from the palm revealed dark granules of granular material in a corneum in some instances. The eiderin layer was just as dark in the epidermis layer. The granules were normal in the prickle layer where they showed a slight or vacuolated cytoplasm with the silver-protein-stained sections from the palm (Fig. 8) revealed an accentuated histologic picture.

The corneum was studded with granular material (Fig. 8). Just below the granular layer the dark stained granular material was particulate but still formed a dense stratum throughout the prickle-cell layer and were fairly uniform in size. In the basal layer the granules were larger and were relatively sparse. They were observed again in the papillary bodies and cutis where they were distributed chiefly perivascularly.

Comment

Most of the diseases to be considered from the clinical findings in differential diagnosis of pachyonychia cong. nita are variants of the basic anomaly—congenital ectodermal defect. They may be listed as benign acanthosis nigricans and ichthiosis with its variants. Certain other conditions such as Darier's disease, erythroderma, ichthyosis, congenital epidermolysis bullosa, xeroderma pigmentosum, and others are also closely related. Other diseases such as pseudoacanthosis nigricans, confluent and reticulated papillomatosis, and pseudoacanthoderma coll, which may or may not be phenocopies, may very closely simulate some of the findings of pachyonychia observed clinically. One disease that stands by itself in not being a genodermatoses is malignant acanthosis nigricans. This latter condition and all others mentioned above were ruled out by the history and by the clinical, laboratory, and histopathologic findings.

In considering ectodermal defects from the clinical point of view, the fault derives from improper functioning of the cellular building material of the epidermis. The defect may involve the epidermal cells proper; basal cells, prickle cells, and their derivatives. It may involve the epithelial lining of the hair follicles and sweat ducts. It may involve the melanocytes. It may be expected as well that certain of these defects will overlap. This is obvious from our case where the defect involves the melanocytes, the epidermal cells proper, and the nails. The eye findings presenting unusual pigmentation may be reasonably expected because the involved structures of the eye are derived from ectoderm.

Cases of congenital ectodermal defect, therefore, at the one extreme, may involve
only one cell or structure; at the other extreme, all basic epidermal cellular building material may be involved and complex clinical entities produced.

The presently popular genetic theory to explain these defects may be summarized as follows:

First, cellular metabolism proceeds in a stepwise orderly sequence. Certain compounds are converted into other compounds in a definite pattern.

Second, orderly conversion is controlled by specific genes.

Third, mutation of a gene controlling a specific conversion results in a different compound being produced along the normal path of metabolism.

Fourth, the consequences of such a disturbance may lead to the accumulation of precursor materials normally subject to conversion into other compounds in a stepwise sequence, or it may result in the inability to produce normal metabolites.

Comparison of the histopathologic detail of the sections removed from the axilla and palm revealed the same basic dyskeratotic process readily noted in the prickle-cell layer. In sections taken from the axilla and stained with 1% silver protein, there was some increase in melanin production observed in the basal layer to account for the pigmentation noted clinically. Such was not the case in sections removed from the palm. Here the remarkable finding was the apparent retention of masses of agglomerated melanin granules in a corneum of normal thickness. This type of reaction is akin to that seen in ichthyosis vulgaris where a thick (retained) corneum is found to overlay a normal granular layer.

It is not possible for one to speculate precisely as to just how heat, friction, pressure, or minor trauma should play such an important role in localizing this particular genetic defect. However, the localization of the pigmentedary lesions to the neck, axillae, belt line, palms, soles, and distal dorsal phalanges points to these mechanical effects. In addition to the pigmentary lesions, both the leukoplakic changes in the mucous membranes of the mouth and the nail disturbance suggest further the aforementioned elements in localizing lesions. Clinically, in ichthyosis vulgaris we observe a similar localization of lesions to the external surfaces of the body.

Treatment of this defect is only palliative at this time. However, with the rapid strides being made in enzyme chemistry, it is possible that in the future chemical intervention to correct enzyme deficiency or malfunction will become a routine procedure.

Summary

A case of pachyonychia congenita, one of the uncommon variants of congenital ectodermal defect, is presented. The unusual pigmenetary findings in the corneae and the retention of agglomerated granules of melanin pigment in the stratum corneum of the palm are reported. One of the presently accepted genetic theories to explain such defects is summarized. The mechanical factors which tend to localize lesions are pointed out.

We are indebted to Dr. Chauncey F. Levy for his ophthalmologic observations in this case.

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REFERENCES


PACHYONYCHIA CONGENITA

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Medical writing is growing so documented and tedious that we wonder if a writer might not defeat his purpose by scaring off his readers.

It is commendable $ for the journalist to comfort his public by assuring them that he has actually read the references himself. However, a certain vertigo must be induced in the cerebrums of innocent subscribers by the whirring visions of never-ending little figures looking like flyspecks on his eyeglasses.

May we suggest that less of these references would greatly facilitate the reading.

*+*+* An ungrammatical term by which the author means to convey writing confined to subjects dealing with medicine. See previous articles by author.

† If any.

§ The author takes no responsibility for this statement.

∥ A relative, not absolute, designation as shown by the equation $3 \sqrt{K-9-\frac{6}{4}}$.

∥ Really, a rather careless choice of adjectives.

# Presuming that he (or she) wears them.

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