Use of Articles in the Pachyonychia Congenita Bibliography

The articles in the PC Bibliography may be restricted by copyright laws. These have been made available to you by PC Project for the exclusive use in teaching, scholarship or research regarding Pachyonychia Congenita.

To the best of our understanding, in supplying this material to you we have followed the guidelines of Sec 107 regarding fair use of copyright materials. That section reads as follows:

Sec. 107. - Limitations on exclusive rights: Fair use
Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include - (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work. The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.

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 Two Cases, with Studies on Therapy

CARROLL S. WRIGHT, M.D.

AND

JACQUES P. QUEQUIERE, M.D.

PHILADELPHIA

PACHYONYCHIA congenita is a rare congenital anomaly, originally described under this name by Jadasohn and Lewandowsky. The literature was thoroughly reviewed in 1934 by Diasio, who reported that Schaffer had previously called attention to the close resemblance between the condition reported by Jadasohn and Lewandowsky and the syndrome described under the caption "congenital dyskeratosis" by Erich Schaffer. Schaffer's observations were based on 1 case of his own and 1 case culled from the literature. In 1935, Schwertweid reported a case under the name "pachyonychia ichthyiformis."

Cromby* in 1943 recognized the title "pachyonychia congenita" and summarized the characteristics as follows:

dystrophic changes in the nails, palms, and soles, hyperkeratosis, anomalies of the hair, ichthyosis follicularis, atrophy of the hair follicles, follicular keratosis of the arm-finger type particularly about the knees and elbows and dyskeratosis of the corners. Various lesions are described as occurring on the lower and upperlimbs, buttocks, legs and ankles. Blisters are common and occur chiefly on the plantar surfaces of the feet. Generalized ichthyosis of variable degree may or may not be present. The affection occurs chiefly with the male sex. In all of the reported cases pachyonychia has been rare. All of the associated symptoms above mentioned have occurred in a single or in part in the various cases recorded.

From the Department of Dermatology and Syphilology, Temple University School of Medicine.

Read at the Sixty-Sixth Annual Meeting of the American Dermatological Association, Hot Springs, Va., June 15, 1946.


An excellent description of the microscopic picture of the skin is given by Andrews:

The striking feature of the specimen was a thickening of the epidermis due to acanthosis and parakeratosis, especially pronounced about the pilosebaceous follicles. The rete pegs were lengthened, and about the follicles the epidermal thickening caused funnel-shaped prolongations extending into the corium. The openings of the follicles were dilated and plugged with imperfectly cornified and somewhat degenerated horny material, and horny plugs were also present in the sweat pores. The basal cell layer was irregular and the cells were swollen. There was granular degeneration in the prickle cells; the nuclei stained deeply, and some were crescentic, being pushed to one side of the cell by hydropic. They resembled the corneous plugs found in cases of Darier's disease. The papillary bodies between the rete pegs were elongated, and in some places the apexes came near the surface of the skin. The blood vessels of the corium were dilated and surrounded by lymphocytes, mast cells, connective tissue cells and an occasional plasma cell; the appearance suggested a mild inflammation from the pressure or irritation of the overlying thickened epidermis. The connective tissue seemed normal.

REPORT OF TWO CASES

CASE 1.—I. L., a white boy, was first admitted to the Temple University Hospital in 1906, at the age of 6. At birth the entire cutaneous envelope was rough, and the thumb nails appeared to be "infected." When he was 2 years old "blister" had formed on the sole, knees and elbows. These ruptured, with the formation of loosely bound crusts. The nails of the hands and feet developed

abnormally, becoming extremely thick. When the patient was examined at the Temple University Hospital in 1936, a diagnosis of "fetal dermal defect" was made and a section of skin submitted to the laboratory. The report on this section was as follows: "Microscopic study revealed small sections of skin showing decided irregularity of the surface with extensive hyperkeratosis. There were small margins of the surface epithelium filled in by horny plugs. The epithelial cells showed dyskeratosis and small areas of parakeratosis. The picture suggested pseudoepitheliomatous hyperplasia of Darier."

Fig. 2.—Thickening of the epidermis due to acanthosis and parakeratosis. Therete pegs are lengthened.

In 1939 the boy was admitted to the Harriet Lane Home for Invalid Children at Johns Hopkins Hospital, with a diagnosis of "chronic meacona secondarily infected, producing an impetiginous picture." The infected lesions were treated with compresses of chloroform, potassium permanganate and gentian violet medicated, after which they healed for a period of six months. New erosive and infected lesions then appeared, and they persisted until the patient was readmitted to Johns Hopkins Hospital in April 1940. In addition to the open lesions the skin at that time was generally rough, and the tongue, pharynx and buccal mucosa...
revealed "a diffuse, superficial, leukocytoclastic involvement." The diagnosis made was "enigmatic eczematous lichenoid of as yet unclassified type with secondary infection." At that time the laboratory findings were as follows: hemoglobin content 100 per cent; white blood cells 10,000; differential count normal; urine normal; serum protein content 5.9 Gm. per hundred cubic centimeters; albumino-globulin ratio 1.3; serum cholesterol level 161 mg.; results of roentgenologic examination of the gastrointestinal tract normal; scrapings of the skin negative for fungi; blood Wassermann reaction negative, and tuberculin reaction (to 0.1 mg.) negative.

In June 1942 the boy was admitted to the Temple University Hospital for further study, and between that date and June 1944 there was a total of six admissions, varying in length from a few days to several weeks. Observations at examination in 1944 were as follows: "The skin was generally dry and thickly covered with many elevated lesions resembling keratotic plugs, particularly over the shoulders, elbows and knees. The feet and hands, covered patches extending from the palms up the medial and lateral aspects. Removal of the crusts revealed reddened bases having a shiny or somewhat glazed appearance. The hair was dry and unresponsive. The brown macula and tongue showed patches suggestive of leukocytoclastic. Most striking were the changes in the nails. The nails of the hands and feet were greatly thickened, some to a depth of 3.6 inches (1.2 cm.). The growth of the nail appeared to be away from the nail matrix rather than from the nail root." The boy and his parents were chiefly interested in therapy for the crusted inflammatory patches and the nails. Because of the overgrowth of the nail plate he was able to make any use of his fingers. Wet dressings of buffered...
cystine hydrochloride, as described by Goldberg,2 were continuously applied to
the crusted areas, and within ten days all lesions were healed. (It is worthy
in note that during subsequent recurrent outbreaks of these inflammatory crusted
lesions various other applications were tried, but invariably it was necessary to
use the buffered cystine hydrochloride to bring about healing.)

A consultation with a member of the surgical staff, Dr. George Rosemond, was
requested, and the decision was reached to remove the nail plates completely
with the patient under general anesthesia. This was done Nov. 17, 1942 and
the patient went home. In June 1943 the patient returned, showing only a partial
return of the thickening of the nail plates but with recurrent erosive and crusted
lesions on the feet. These again cleared completely with wet dressings of buffered
cystine hydrochloride solution.

In October 1944 the patient returned, showing regrowth of all the nails to
about one half of their original thickness. As it was realized that the only
method of completely stopping the growth of the nail would mean complete
removal of the matrix, which in the condition is apparently the root from which

---

Fig. 4.—One of the removed finger tips, showing the upward growth of the
nail.

the nail grows, it was decided in consultation with Dr. Rosemond to remove
completely the tip of one finger as a trial method of therapy. Obviously such
a procedure would result in a finger completely lacking a nail.

The next admission to the hospital was in February 1945, and this time the
boy requested that the same procedure of removing the distal phalanx be used
for all the fingers and the thumb of the right hand, as he had had no discomfort
in the one finger and could use it for the first time in his life. The operation
was performed with the patient under general anesthesia. In June 1945 the same
procedure was followed with the left hand, the operation having been almost
completely succeeded on the right hand. Apparently a small amount of matrix was
not removed from the middle finger, and it resulted in a slight regrowth of the
nail. The final result of the operations may be seen in figure 5. Microscopic
study of the distal phalanges, including the structure of the nails, was impossible.

6. Goldberg, L. C.: Repeated Erosive Lesions in Pachyonychia Congenita of
Jadassohn: Treatment with Buffered Cystine Hydrochloride, Arch. Dermat. &
because of lack of a satisfactory method of removing the nail sufficiently to permit cutting with the microtome.

A biopsy of tissue from one of the crusted inflammatory demoded patches resulted in the following report: "The tissue consists of an outer thick layer of keratin material which has a laminated appearance. It contains numerous pycnomic nuclei. Below this is a layer of crumbled squamous epithelium which is moderately acanthotic. It has a pseudopapillary arrangement. Its rete pegs are disorderly. The epidermis shows thorny thickening and dyskeratotic hyperplasia. The histologic picture could be that of a callus or pachyderma."

The second case has not been studied as intensively, nor has it been possible to keep the patient under as close observation as the patient in case 1, but it is included chiefly because of the extreme early age at which the patient was first seen.

![Image of hands and nails]

Fig. 5.—Appearance of the hands one year after removal of digital phalanges.

Case 2.—T. K., a 5-month-old infant girl, was seen in consultation in February 1943. The entire skin was dry, with more papular accentuation of the folliciles, particularly on the extensor aspect. On the trunk were two small irregular hemorrhagic of the strawberry mark type. The nails were all greatly thickened, with the excessive growth away from the nail matrix rather than away from the tip of the nail plate. The mucous membranes showed several superficial white patches, which had been diagnosed and treated by a pediatrician as "thrush."

The case was presented to the Philadelphia Dermatological Society as a typical case of pachyonychia congenita. Treatment consisted in (1) application of solid carbon dioxide to the neck, (2) administration of massive doses of vitamin A and (3) local application of a mild emollient.

COMMENT

In addition to adding 2 cases of this rare congenital anomaly to the literature, our interest was directed to the question of therapy. There are three phases of pachyonychia congenita that distress the affected
person: (1) the dry hyperkeratotic skin with accentuated follicular keratoses; (2) the bullous and crusted lesions that appear from time to time, chiefly on the feet, and (3) the greatly thickened nails.

We found that the dry skin could be kept in a comfortable state by massive doses (100,000 units daily or more) of vitamin A, infrequent bathing and the use of an emollient.

At the Harriet Lane Hospital for Invalid Children (Johns Hopkins Hospital) the bullous and crusted lesions in case 1 were reported to have healed after treatment with compresses of chloroform, potassium permanganate dressings and gentian violet medicinal. It was not made clear which of these agents had proved most effective. At the Temple University Hospital various local applications were employed, including boric acid solution, wet dressings and a modified ichthammol ointment, but until wet dressings of a buffered solution of cysteine hydrochloride, as suggested by Goldberg, were employed the results were discouraging. As described in case 1 the latter solution invariably healed the open lesions in from ten days to two weeks. Recurrence within a few weeks after application of the cysteine hydrochloride dressings was stopped was invariably the rule.

The cause of the greatest discomfort to the boy described in case 1 was the dystrophic finger nails, which rendered his fingers virtually useless. Removal of the nail plates proved ineffective, as regrowth was rapid. This is similar to Andrew's experience, for in a case reported by him removal of the nails by a surgeon was followed by "regrowth in a distorted fashion."

Careful study of the growth of the nails in pachyonychia congenita indicates that growth is away from the matrix of the nail rather than from the root of the nail. Thus the only successful therapy consists in complete removal not only of the plate but of the matrix as well, which in these cases is identical with the root or origin of growth. Complete removal of the distal phalanges of the fingers and thumbs in 1 of our cases resulted in giving the patient useful fingers. This is forcibly illustrated by the fact that he is now taking piano lessons and has free use of the fingers in spite of the radical surgical procedure.

SUMMARY

1. Two cases of pachyonychia congenita are reported with clinical and laboratory findings.

2. Studies of therapy indicate that (a) the dry keratoic skin may be improved by massive doses of vitamin A and emollients; (b) the use of wet dressings of buffered cysteine hydrochloride, as suggested by Goldberg, will temporarily heal the bullous and crusted lesions, and (c) removal of the distal phalanges of the digits is the only way to free the fingers of the distorted dystrophic nails and make them useful.
ABSTRACT OF DISCUSSION

Dr. Hames Cox, Cleveland: The patient in the original case of Jadassohn and Levszolovsky was a girl 15 years old, and she had a brother aged 4. Her nails were thick and folded longitudinally and assumed a concave surface, such as is shown in these pictures, while the great toe nails assumed somewhat the character of onychogryphosis, which is well brought out in this box. The girl had hyperhidrosis of the feet, and there were patches of reddish papules on the nose with fine watery blisters. In the summer the girl had hoover lesions on the soles, just exactly the same as this patient had, while both she and her brother had over the knuckles and shown mildly seed-sized papules, capped with a horny center, which on removal left a bleeding spot; this showed up well on this patient. The patient also had lesions over the knuckles on the anterior and posterior axillary folds that were similar to this. The tongue of the girl showed extensive leukokeratosis but no leukoplakia. The fuses were really piled up. There is a distinction.

Kerror and Leo's (N.Y. State J. Med. 1926) attempted to assemble some of these related dermatoses. In one form there was a symmetric volar dermatitis with follicular keratoses of the body; in the second, there were keratoses of the hands or feet or both with leukokeratosis of the mouth and even of the vocal cords, i.e., the so-called Riedel type, and third, there were the aforementioned changes along with the corneal ulceration. The process is dominant and in heredity. Some of the patients have the loss of hair, hyperhidrosis, formation of bullae and squamous papules.

The condition in the male patient seen by Radermacher, Tomney and Cole (Arch. Dermat. & Syph. 1927) and a counterpart more recently removed by Fred Wise's service by Gehr and Rubin differed from pachyonychia congenita in that there was a dystrophy of the nails. In our case the patient has a true leukokeratosis in the mouth but no involvement of the larynx.

I was much interested in this report, and these cases certainly are extremely similar, outside of the dystrophy of the nails in the one instance as compared with the pachyonychia congenita that Jadassohn names in the other condition.

Dr. F. Wise, New York: Two brothers with pachyonychia congenita treated by Dr. Gehr at the Skin and Cancer Unit of the New York Post-Graduate Medical School Hospital with treatment papulonecrosis showed considerable improvement. One of the brothers suffered from advanced leukokeratosis of the tongue and buccal mucosa, dysphagia of the nails, alopecia and hyperpigmentation of the neck and face, together with signs of hormonal deficiencies. The leukokeratosis responded favorably but showed a tendency toward recurrence when the medication was discontinued. Cures in weight and improvement of the general health of the patient were not possible while the treatment was administered regularly.

Dr. Hamilton, Boston, Mass.: Dr. Coxsey and I have had difficulty in trying to group clearly some of these congenital ectodermal and mesodermal defects and, in connection with the cases that Dr. Cole mentioned that he reported, I should like to call attention to an article by Dr. Thomsen on "Werner's Syndrome (Propria of the Adult) and Rothmund's Syndrome: Two Types of Clinically Related Hereditary Atonic Dermatoses with Juvenile Cataracts and Reverberant Features" (Am. Int. Med. 23:599-636, 1945). I believe that there are too many names for varying diseases that are related and I hope that some one will straighten out this subject. It is true that there are typical cases of pachyonychia congenita, and I do not question the diagnosis as presented.
Dr. John G. Downes, Boston: Dr. Wise's remarks prompted me to describe a patient whom I saw June 24, 1944, a boy aged 16 years with a more or less generalized cutaneous disturbance. He had keratotic papules on his arms, legs, and body, with bulbous lesions on the hands and feet. There were paronychial lesions on most of the fingers, with changes in the nails consisting of ridges and subungual hyperkeratosis. I thought that he had a vitamin A deficiency, but he showed little improvement with large doses of vitamin A. He was later seen by an endocrinologist, who prescribed androgens 25 mg, a total of 17-keto steroids per twenty-four hours, and cortisone 3.6 mg, a total of 17-keto steroids per twenty-four hours. Under this therapy his cutaneous lesions were relieved, and at the last report, three months ago, he was still well.

Dr. Carroll S. Wright, Philadelphia: I appreciate the discussions. I really do not think that there is anything more that I can add. I agree that there is a great deal of confusion about this subject, but, if any one takes the trouble to look up the reported cases of pachyonychia congenita with which there are photogaphs, it will be seen that they all look just like this case; I think that this is a distinct type of congenital defect which probably deserves the term that it has been given.