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Dermatopathology in Historical Perspective

Pachyonychia Congenita
A Historical Note

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Pachyonychia congenita is an uncommon type of ectodermal dysplasia, characterized by thickened, dystrophic nails and hyperkeratotic skin lesions. In the literature, it has been widely accepted that the first cases of this syndrome were published in the first years of the 20th century. However, a search of the older literature reveals several older cases of definite pachyonychia congenita, some of them from the 17th and 18th centuries. In 1716, the Danish physician Musaeus described a case of the pachyonychia congenita syndrome in some detail, with an excellent plate showing all the major symptoms.

Key Words: Genodermatosis—History of dermatology—Jadassohn-Lewandowsky syndrome—Pachyonychia congenita.

Pachyonychia congenita is an uncommon autosomal dominant genodermatosis affecting the nails and other ectodermal tissues. From 1904 onward, ~250 cases of this syndrome have been reported (1-4). The brief descriptions of this syndrome by Müller (5) and Wilson (6) in 1904-1905, and by Jadassohn and Lewandowsky in 1906 (7), have been extensively quoted as the original ones, but this historical vignette will argue that the characteristics of pachyonychia congenita were well described ~200 years earlier.

A DANISH GIRL WITH “MONSTROUS NAILS”

In 1716, the 26-year-old Danish physician Carl Musaeus defended his doctoral thesis (Fig. 1) at the University of Copenhagen (8). Some time earlier, he had examined a 20-year-old woman from the province of Lolland. When she was 14 years old, her stepfather had cursed her in a domestic dispute, using a terrible oath, solemnly hoping that she would make her mother’s life miserable. This caused the girl much alarm, and she suffered from repeated nightmares. Her sweating was copious, and she felt a terrible itching all over her body. She was tired and felt generally unwell, lying in bed most of the day. Some time later, in her 15th year, thick and horny nails “of an aspect like a ram’s horns” developed in all the fingers and toes (Fig. 2). These nails were outwardly of a darkish gray color, but their insides were whiter, with a soft core in the center. The nails were cut off at regular intervals, but grew to the same size in 3 or 4 months. At the same time as the “monstrous nails,” horny plaques developed bilaterally over the elbows and knees, and also over the second to fifth metacarpophalangeal joints. There were large and painful calluses under both feet, especially at the heels. The disease appeared to be chronic, and although her mental condition improved, the abnormal nails, calluses, and horny plaques were still growing at the same rate in 1716, 5 years after the girl had been taken ill.
"morus corneus" or the 'horns disease'. He also quoted extensively from the "Onychologia curiosa", a well-known 17th century work on the diseases of nails written by Georg Friedrich Franck von Frankenberg, who was the moderator of Malaeus' dissertation. Carl Malaeus concluded that the formation of horny growths in humans was often a "monstrous" event, and beyond the laws of nature, but in some cases, such as this one, it was due to disease and was a perfectly natural process. Such a "morus corneus" could be caused by an abundance of noxious humors in the body, causing deposition of horny material. Malaeus wanted to know the exact composition of the abnormal nails, and two nails were handed over to Mr. J.G. Becker, pharmacist to the King, for chemical analysis. This was a task much beyond the skill of this gentleman, of course, and the result of the investigation was only that the nails consisted of various oily, unctuous, serous, salty, and liquid substances. If Malaeus was some hundred years before his time in initiating this chemical analysis, his discussion of the cause of these "monstrous nails" belonged to the age of superstition. He listed various possible natural causes for this abnormality, and for the sake of completeness also speculated that the disease might instead have had a "supernatural" cause: The stepfather's curse might well have called down the wrath of the Devil on the poor Danish girl.

The only methods of treatment available to Malaeus were to attempt evacuation of the noxious humors causing the disease, by means of energetic purgation and application of emetics. Furthermore, the nails were cut or filed off near the roots. Carl Malaeus later became city physician of Odense, where he resided for many years; the dissertation on "monstrous nails" was his only published writing, with the exception of a pamphlet on the pestilence of cattle (9). The ultimate fate of his patient is unknown, but Malaeus ended the preface of his thesis by hoping that "God grant that this wretched girl, and others afflicted by the same horrible malformations, will have their misery solaced by my writing this thesis."

SOME OTHER REMARKABLE CASES

It is peculiar that Carl Malaeus did not compare his case with two other Danish ones that had been described by Bartholin (10) and Jacobaeus (11). In the Royal Kunst-kammer in Copenhagen, two sets of "monstrous nails" were kept, one of which was from a young beggar in Copenhagen who was called "the grandson of Nebucadnezer." This individual seems to have been at large in the 1680s and 1690s.
as a popular public spectacle. On both his hands, all the fingers except the middle one had long, thick, curved nails. When a surgeon cut them off they grew again to the same size (10). Another young beggar, a 13-year-old boy, was examined in 1706. He lived in Præstø in the province of Sjælland, where he was begging for wood together with his mother. Once, his nails had been of normal form, but a hard matter grew from underneath them and the curved nails gradually became a most horrible sight. The longest of them were 10 cm long. The nails were very sore, and he could barely stand them being touched. It is also stated that this youth was much tormented by a scabious itch all over the body with the exception of the head (11). Both these sets of “monstrous nails” were kept in the Royal collection for many years, before being sold at public auction in 1824 when the museum was dissolved.

In 1678, a young man from the province of Brie was taken into the Charité Hospital in Paris for treatment of a peculiar disorder of the skin and nails. He was thoroughly examined there by a visiting Englishman, the philosopher John Locke, who was also a physician and a Fellow of the Royal Society of London; the case was later reported in the Philosophical Transactions (12). The man had long, horny nails of uncommon thickness on all fingers (Fig. 3): That on the middle finger of the right hand was 10 cm long, and he said that one on the thumb had previously been even longer. Similarly, horny nails grew from the three medial toes on each foot. John Locke noticed that there was a general thickening of the affected nails on both hands and feet; they bent forward in their growth, and there were many chaps in the convex part, whereas the concave one was smooth. The fingernails had no sensibility in the horny part, but only where they joined the matrix. The feet were very sore, and the nails were tender to the touch. On the backs of his hands there were also horny excrescences that looked like broad warts but that were much harder to the touch. This young countryman was 19 or 20 years old, and had developed the disease 3 years earlier, after having had smallpox. In the Charité Hospital, he was treated by surgeons who sawed or wrested off the longest nails, and he was also purged twice a week. In his brief case report, the great philosopher unfortunately does not give his opinion on the cause of such a disease, nor does he discuss any similar cases. In one of his letters to Robert Boyle (13), Locke reported that when he went back to see the patient some time later, he had been discharged and supposedly “cured” by a regimen of bathing and purging. A remarkable drawing (Fig. 4) with some notes in French is kept with John Locke’s original manuscript at the Archives of the Royal Society (Classified Papers Cl.P.XIII.5).

Clearly, it does not depict the patient described by Locke but a similar case: a 12-year-old French girl who developed severe thickening and malformation of all 20 nails after a violent fever at the age of 8 years.

Another curious case (14) was reported by Mr. St. George Ash, Fellow of Trinity College and Secretary to the Irish Philosophical Society. Although not a medical man, Mr. Ash was very interested in teratology and natural history, and he communicated several interesting observations to the Royal Society. He had examined a 13- or 14-year-old girl named Ann Jackson, who was exhibited for money in Dublin. Her parents had been healthy. At the ends of all of this girl’s fingers and toes grew curved, horny nails that rose between the finger and the ordinary nail. These abnormal nails were as long as the fingers or toes themselves. Furthermore, there were horny excrescences about the joints and flexures, which resembled warts but were much harder and more horny. They were most noticeable at the knees and elbows. The one at the left elbow was ½ in broad, 4 in long, and twisted like a ram’s horn. Similar excrescences, although smaller, were present over the smaller joints of her fingers and toes. The buttocks also had several of these growths. The hands and feet were particularly callous and horny. The neck later developed the same hard and callous skin. On the armpits and breasts “small hard substances shoot out, much slenderer and whiter than the rest.” The girl seemed to be in good general health, and she ate and drank heartily. Her growth was retarded in a remarkable manner: at the age of 13-14 years she was not taller than a child of 5 years. Ann Jackson was also “very silly.”

FIG. 3. The thick, horny nails of the middle finger (1), forefinger (2), and ring finger (3 and 4) of the young Frenchman examined by John Locke (12).

FIG. 4. A symmetrical production.

and spol voice. I "look ve growing ceive th first bee her app her mot mother": an inval parish. I under th dismaye not be p In 17c Manche posite f. 357, who had that, he fingera length a of at re
was also afflicted, and when Mr. Wroe saw the boy in 1704, all fingers and toes had nails of his character. One of the abnormal nails was given to the Repository of the Royal Society of London (15), but seems to have been lost during the latter part of the 18th century.

In 1888, the surgeon at the Lincoln County Hospital, Mr. Sympson, saw an 11-year-old schoolgirl with thickened, horny nails on all fingers and toes (Fig. 5), which had been present since birth (16). The claw-like nails grew rapidly, and projected upward and forward from their matrices; when they were cut, a quantity of clear fluid exuded, and they became particularly sore. There were abrasions and corns on the feet and toes, and some diffuse redness with thickening and cracking of the skin over each olecranon. Otherwise, no cutaneous manifestations could be detected except for a few warts on the right shoulder. The teeth were normal and had been cut in due time. The girl did not appear to be very intelligent. Mr. Sympson could not trace this "congenital deformity of the nails" to her parents or any of her six siblings, who were all perfectly healthy.

DISCUSSION

From the description and illustrations offered by Musaeus (8), it is evident that the unfortunate 20-year-old Danish girl had symmetrical thickening and malformation of all 20 nails, as well as hyperhidrosis and plantar hyperkeratosis with severe callosus formation. There were also large, horny verruciform hyperkeratoses on the elbows, knees, and backs of the hands. All these lesions are strongly suggestive of pachyonychia congenita. The horny excrescences on the knees and elbows seem uncommonly large, and it is possible that they were exaggerated in the drawing. However, extensive verruciform hyperkeratoses have certainly been described in pachyonychia congenita, and the localization on the elbows and knees is typical (1,2). The lesions on the backs of the hands are also more extensive than usually seen, but are fully consistent with the syndrome. Musaeus does not mention any marked palmar hyperkeratosis, nor formation of bullae, hoarseness of voice, or hair abnormalities. No oral manifestations or dental anomalies are mentioned. The case of Locke (12) has several similarities to that of Musaeus, although only 16 nails were affected, the two lateral toenails on each foot being spared. There was no mention of plantar hyperkeratosis or horny skin lesions, except on the backs of the hands. It is probable that this individual also had pachyonychia congenita. It is remarkable that in both of these cases, the individuals de-
veloped the syndrome in their teens. Although the typical nail and skin changes of pachyonychia congenita usually develop in early infancy, it has been recognized (17) that a subset of individuals have a later onset, usually in the teenage period. The heredity of this pachyonychia congenita tarda subtype also appears to be autosomal dominant. No family history of the disease could be established in any of these two cases, however.

In the two older Danish cases described by Bartholin (10) and Jacobaeus (11), the description is too incomplete to allow for a definitive diagnosis being made, although drawings of the nails reproduced by these authors are suggestive of pachyonychia congenita or hereditary onychogryphosis. In Wroe's case (15), the individual developed the horny, curved, and thickened nails at the age of 8 years; like the boy described by John Locke, it happened after his having had smallpox. As in Musaeus' case, pruritus of great intensity precluded the nail deformity. Nothing is mentioned of any associated skin abnormalities in Wroe's case; although the boy is stated to have a “leprosie” of the skin, this is not explained further. In the absence of a figure, no definitive diagnosis can be made.

The case of Sympson (16) reflects the early-onset type of pachyonychia congenita: The typical changes on all 20 nails were developed at a very early age. There was also plantar hyperkeratosis, and possibly slight follicular hyperkeratosis over each olecranon. No oral or dental changes were noted.

The case of Ash (14) is in many particulars the most interesting of those listed here. It is most unfortunate that the showman-owner of the unfortunate girl refused to have her figure taken. Although it was written by a clergyman and scientific amateur, Mr. Ash's account is very clear and to the point. The diagnosis of some systemic dyskeratosis seems certain, probably pachyonychia congenita with some unusual features. All 20 nails were malformed in the typical manner of this syndrome, and plantar and palmar hyperkeratoses were present. The verruciform hyperkeratoses of the elbows and knees were of uncommon size, even exceeding those in the case of Musaeus. Similar hyperkeratoses, although of smaller size, were situated on the buttocks and over the finger and toe joints. The small, hard, white lesions on the breasts and armpits might have been epidermal cysts. The girl also had a marked hoarseness that might well have been due to leukokeratosis of the larynx, which is a recognized feature of pachyonychia congenita (1,18). The description of her eye disorder is suggestive of corneal dyskeratosis, which has been described only rarely in pachyonychia congenita (1,18-20). She was also mentally retarded, which is another rare feature of this syndrome (18). A case resembling that of Ash in many particulars was reported in 1925 by Brünauer (20). A 9-year-old boy had on
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