Pachyonychia Congenita Affecting Only The Nails: A Case Report

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ABSTRACT

INTRODUCTION: The nails have many functions for daily life including protection of the digits against different kinds of trauma. The nail apparatus is composed of multiple kinds of keratins. Defects in keratin may produce several genodermatoses, which include Pachyonychia congenita. This is a rare genodermatosis that is either automosal dominant or sporadic. The usual involved keratins are KRT6a, KRT6b, KRT6C, K16 and K17. Keratin defects may manifest on the hair, mucosa, skin and nails. Different presentations of each patient depends on the involved mutated keratins, In rare cases, nail dystrophy may be the only manifestation of the keratin defect.

CASE SUMMARY: A 23 –year-old female presented with a 13-year-history of nail thickening on both fingernails and toenails with no other associated symptoms. She denied oral and skin lesions. She had been unsuccessfully treated with both oral and topical antifungals by several dermatologists. No family members have any similar conditions. She admitted to having hoarseness. On physical examination, nails of both hands and feet marked subungual hyperkeratosis, yellowish to brown- gray discoloration and hypercurvature and rough surface of all 20 nails. The histopathology report revealed marked compact hyperkeratosis, hypergranulosis, papillomatosis and acanthosis. Fungal culture and PAS stain revealed no fungal elements. Patient responded well to nail avulsion and good nail regrowth was noted. She plans treatment of all nails with avulsion.

CONCLUSION: Thorough history, physical examination and histology may help confirm the diagnosis of Pachyonychia congenita, which at times may be mistaken for other nail problems. Treatment is based upon the clinical presentation of the patient. Prognosis for life is good but complications such as infections should be properly addressed.

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INTRODUCTION

The nail protects the distal phalanges and contributes to a variety of motor and sensory functions.

The nail plate is a hard, semi-transparent, slightly convex sheet comprised of tightly packed corneocytes termed onychocytes. It contains abundant "hard" hair-type keratins. Multiple types of keratins are expressed in the nail apparatus and they account for 80% of the dry weight of the nail plate. The pattern of keratin expression within the nail unit explains the involvement of this structure in several genodermatoses that are caused by keratin defects.[1]

Pachyonychia congenita (PC) is a rare genodermatosis due to mutation in keratin genes. It is an autosomal dominant disorder caused by mutations in the genes encoding keratins 6a or 16 (PC1) and 6b or 17 (PC2). These keratins are expressed in the nail bed, hair follicle and sebaceous gland as well as palmoplantar, injured and hyperproliferative epidermis.[1]

The International PC Research Registry has identified 907 individuals (as of June 2019) worldwide, with genetically confirmed Pachyonychia Congenita and 4 of them was from the Philippines. About 40% of the genetically confirmed Pachyonychia congenita showed mutation in gene encoding Keratin 6a, 32% for K16, 16% for K17, 9% and 3% for K6b and K6c, respectively.[2]

CASE REPORT

A 23- year old female with a thirteen year history of sudden nail thickening on fingers and toes. No associated skin and oral lesions. Patient reported history of hoarseness for unrecalled number of years. No family members have the same lesions as hers. She consulted few dermatologists in the past and was given oral and topical antifungals with no improvement.

Upon physical examination, there was involvement of the fingernails of both hands (sparing the 5th digit of the left hand S/P nail avulsion) and toenails of both feet; (+) subungual hyperkeratosis, (+) yellowish to brown-gray discoloration; (+) hypercurvature (Figures 1-4).

Fungal culture was requested. Nail avulsion(biopsy) of the 5th digit of the left hand was done. Patient was asked to continue the Amorolfine nail laquer while waiting for the results.

Culture showed no fungal elements. Histopathological report revealed marked compact hyperkeratosis, hypergranulosis, papillomatosis and acanthosis. Within the dermis, there is sparse superficial perivascular lymphocytic infiltrates. No fungal elements are seen on H&E stain.

Patient responded well to nail avulsion and good nail regrowth was noted. She plans treatment of all nails with avulsion.

DISCUSSION

Pachyonychia congenita was a term coined by Jadassohn and Lewandowski in 1906 (Greek: thick nails from birth)[3]. Pathogenic variants in individuals from at least 494 families has been published to date.[2] It has equal sex predilection in both male and female.[4]

A proband or the person being reported on, is usually the first person in the family who is affected with Pachyonychia Congenita and usually caused by *de novo* mutation. If the parents of the proband are clinically unaffected, the risk to the siblings of a proband is low, but greater than that of the general population because of the (theoretic, but unlikely) possibility of germline mosaicism. But when the parents of the proband is affected, the risk of the siblings to have the disorder increases to 50%, same risk applies to the offspring of the affected individual.[4]

Keratins form a cytoskeletal intermediate filament network within all epithelial cells. Epithelia in different body regions utilize a range of different keratins. Keratins associated with Pachyonychia Congenita are constitutively expressed in the nail, palmoplantar skin, oral mucosa, and hair. Thus, mutation of the genes encoding these keratins leads to pathology in these major body sites. [4]

Clinical manifestations of Pachyonychia Congenita include hypertrophic nail dystrophy, painful palmoplantar keratoderma and blistering, oral leukokeratosis, pilosebaceous cysts (including

steatocystoma and vellus hair cysts), palmoplantar hyperhydrosis, follicular keratoses on the trunk and extremities, axillary and inguinal cyst formation, excessive production of waxy material in the ear, severe and unexplained ear pain, hoarseness, angular cheilitis and paronychia with pronounced edema.[4]

Pachyonychia congenita tarda (PCT) may represent a delayed form of PC type 1 and underlying cause may also be mutation on Type I Keratin 6a/16 pair. It can be familial or sporadic in nature and the onset of nail changes occurs during the second or third decade of life. Some cases of PCT may also present with palmoplantar keratoderma, leukokeratosis, and cutaneous cysts, while others are only limited to the nails. The reasons behind the late onset of PC in some patients as well as the exclusive involvement of the nails in others are not yet understood. [5]

There can also be variation in clinical severity between mutations in the same gene and even between individuals with the same mutation. Polymorphisms, copy number variation, environmental factors, lifestyle, and patient care are some of the factors for these variations. PC can be considered as a spectrum of phenotypes ranging from very mild to more severe.[6]

The most common presenting sign of Pachyonychia Congenita is plantar pain with plantar keratoderma (including callus with underlying blisters). For patients with genetically confirmed PC, it was reported that 97% presented with the diagnostic triad of toenail thickening, plantar keratoderma, and plantar pain by the age of ten.[4]

The diagnosis of PC is confirmed by identifying the heterozygous pathogenic variant in one of the five genes encoding keratin. It can through serial single gene molecular genetic testing or by multi- gene panel.[4]

Treatment modalities differ from one person to another which depends on the manifestations and more for the symptomatic relief of pain experience by the patient. It varies from mechanical approach to surgical procedures, from topical therapies to oral medications. Some may even involve lifestyle modifications.[7] Patients can also be referred to other specialties as needed, hoarseness in a patient with PC should also be referred to an Otolaryngologist for proper assessment and to exclude other laryngeal pathologies.[8]

Prognosis for Pachyonychia Congenita is usually good. Complications like infections should be addressed immediately and continous care in all aspects should be observed.[9]

CONCLUSION

Pachyonychia Congenita manifestations differ from one affected person to another. It can affect only the nails just like in our case and may look like other nail disorders. Indeed, proper history taking, examination and laboratory tests should be done to for an accurate diagnosis thus right management can be provided to the patient. Genetic tests can if available, can be done for confirmation of mutated involved keratin and genetic counselling may be added for the family education and care.

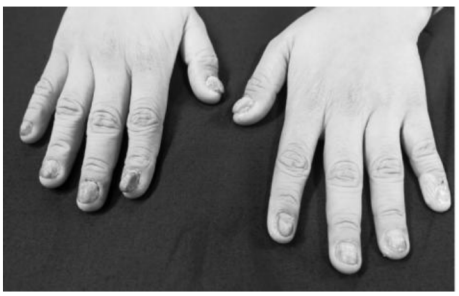

Figure 1

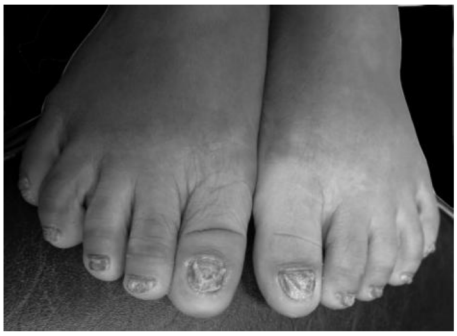

Figure 2

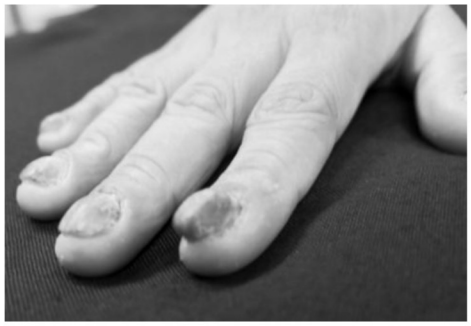

Figure 3

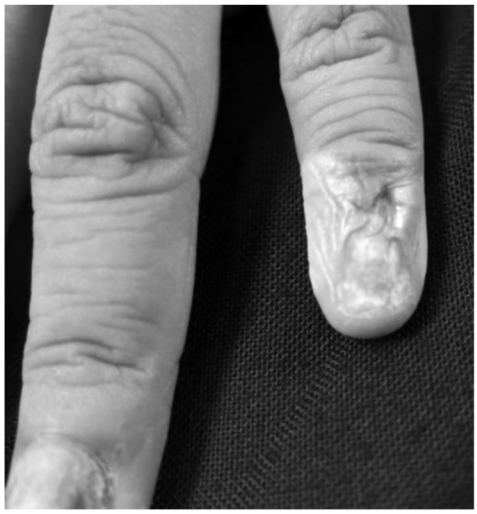

Figure 4

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