

# A New Holistic Care Approach Needed for Chronic Plantar-Hyperkeratotic Eczema - A Case Report

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## Abstract

**Background:** Plantar keratodermas are a diverse group of hereditary and acquired keratodermas, characterised by hyperkeratosis of the skin of the soles. Hyperkeratotic eczema of hand/feet, typically chronic and refractory to therapy, is still a poorly understood entity, associated with chronic pain, mobility impairment and functional limitations.

**Case Report:** This case report is on an idiopathic plantar hyperkeratosis in a 55-year-old female with no prior dermatology history. The patient presented to the skin clinic with a recurring left plantar dermatitis, which later, spread to both feet. Laboratory examination initiated for fungal, patch tests and punch knife biopsy for malignancy (over the next three years) but all returned with negative findings. The medication regimes included anti-fungal, antibiotic-steroid cream, keratolytic agent, and oral acitretin tablets with intermittent outpatient wound-care debridement / dressings. Relief was intermittent and unsustainable, with symptoms recurrences impacting quality of life.

**Conclusion:** Chronic cases of plantar-hyperkeratotic eczema call for better holistic approach such as a patient self-management approach to ensure coordinated, comprehensive care to complement the medical management with the non-medical aspects needed in managing such chronic condition. As there may be additional personal-environmental causal factors, collaborative patient self-management to properly engage an informed patient in rehabilitation care, with a supported goal-setting on self-care strategies (targeting at resolution), and with a focus for minimal adverse effects may be the way forward for more effective management.

**Keywords:** Dermatitis; Keratodermas; Wound-care; Patient self-management; Chronic skin condition

## Introduction

Palmoplantar Keratodermas (PPKs) is a cluster of skin disorders characterized by abnormal thickening (hyperkeratosis) of the skin on the palms and soles, and often involves greater than 50 percent of the involved surface areas [1,2]. Broadly classified as either hereditary or acquired, PPK have numerous underlying causes which ranges from either drug related, malnutrition associated, chemically-induced, systemic disease related, keratoderma, dermatoses related, infectious, malignancy associated, and idiopathic, and/or BMI-obesity-related factor [1-4]. It is a somewhat neglected entity, where its hyperkeratotic eczemas are characterized by chronic, scaly, erythematous plaques on the plantar and/or palmar surfaces.

Treatment options for PPK includes topical keratolytic-salicylic acid, repeated scalpel debridement, topical retinoids, topical psoralen plus UVA, and/or topical corticosteroids, with wound care dressings for serious skin breakdowns [2,5,6]. The presence of pain, itch and skin break downs, and frequent clinic visits can lead to considerable psychological distress and poorer

quality of life. Hyperkeratotic eczema of hand/feet, typically chronic and refractory to therapy, may not be a poorly understood entity, but it's often difficult to manage with its unclear aetiologies, and when prolonged can negatively reduce patients' quality of life - since they are associated with pain and functional limitations.

This case study on a Palmoplantar Keratoderma (PPK) highlighted that traditional management of keratosis with a specialist instructing a passive patient to follow instruction on medical treatment for this prolonged, chronic condition is evidently insufficient. A new approach to care with an active involvement of patient in symptom-managements and to approach the management of such chronic conditions holistically is needed, to reduce sufferings (as in this case study) but also to lower healthcare cost. Informed consent was obtained from the patient for publication of this case report and accompanying images.

## Case Presentation

This case report describes a case of simple eczema developing into a chronic plantar keratosis of at least five years' period, **affecting** both sole and impacting walking ability. The purpose is to emphasise the clinical decision-making, and particularly, to highlight the need for a partnership approach to care, with the patient. Careful planning for a collaborative patient self-management care of a chronic plantar hyperkeratotic eczema patient, especially in a traditional medical model hospital setting may reduce a simple case developing into a prolonged case. Quality of life with chronic PPK is dependent not only on effective management of the medical aspects (on the location area and extend of spread, with symptom control where underlying cause is idiopathic) but also on non-medical aspect of roles and relationships, and emotional management, since all chronic conditions affect participation of daily living performance. The report is guided by the CARE Checklist of information to include for case report writing [7].

## Patient Presentation

A 55-year-old woman was presented to a skin clinic, with a 4-weeks history of localised rash on her left plantar (distal half of the sole). Patient is 65 kg, 5 feet 2 inches tall with BMI of 26, has a history of hyper-lipidemia but no history of skin disorders. There were no reports of any recent illnesses or fever, and patient was unsure of any environmental exposure. The patient described the rashes on her plantar as dry, painful, burning and sometimes weeping, with weekly lacerated wounds or skin breakdowns. She was initially diagnosed with contact dermatitis (Actopic Eczema) in June 2014. Home treatments included Epsom salt bath, foot spa and, moisturisers of several types which included squalene oil. The eczema continues with cycles of skin dryness, scaling and weeping rashes around the middle posterior soles and along the lateral borders of the feet. There was at least one skin breakdown with/without bleedings every 1 week to 2 weeks initially. At the end of the second year (from the date of initial diagnosis in June 2014), the eczema had spread to the right feet. In 2016, she was diagnosed as Bilateral-plantar Hyperkeratosis. Physical examination showed both plantar present with scaly, erythematous plaques with excessive skin shedding. The attending dermatologist initiated the keratolytic therapy, supplemented with topical corticosteroid and moisturizers.

At the end of 2016, the eczema plagues were characterised by crusting and occasional scattered pustules and with even more bleeding episodes. She was prescribed a course of oral retinoid therapy to reduce the excessive peelings. Skin breakdowns were slightly less frequent, at once every 1 month to 3 months, only if patient was consistent with her daily self-care feet moisturising routines. Exacerbation and remission with cycles of keratosis and breakdowns with several episodes of infection continues. On the 6<sup>th</sup> years (May 2019) a punch biopsy was performed to check for malignancy but result was negative.

By 2020, bleeding and skin-breakdown was once in 3 months to 6 months. Patient claimed that a regimented moisturising with nightly cling-foil of both feet help control the skin dryness, and skin breakdowns. Her medications regime had always included steroid, antibiotic cream and moisturiser, (and Fucidin cream from the GP for any bleeding episodes). She finds the steroid cream application was more of a 'temporary, fast relief' but seems more difficult to control relapses.

## Investigation

The differential diagnosis for this case includes contact dermatitis, fungal, allergy with occasional secondary bacterial infections. Table 1 presents the skin specialists' consultation notes, and clinical decision makings which included the investigations for fungal test of scrapped skin, a patch test for the diagnosis of allergic contact dermatitis, and punch knife for malignancy checking.

**Table 1:** Clinical decision-making and Patient self-management

	<b>Skin specialists' clinical decision making</b>	<b>Patient self -management</b>
30-06-2014	Underlying dyslipidaemia with no known allergies or family history of atopy Peeling skin over left heels x 2/12, not itchy Seen a GP in March 2014, and given injection (antibiotics), betamethasone cream, Johnson baby oil. No change in footwear, Using cream from Body Shop x 1 week. Xerotic, thickened skin, with skin peeling over heels ++ Imp – Heel Eczema - Rx urea cream	Body Shop spa Salt water bath
28-11-2014	Cracked left heel, scaling, desquamation x 3/12 Skin scraping sent (- negative result). Rx: 10% urea cream. Left heel -scaling, desquamation x 3/12.	
19-12-2014	Scaling and erythematous patches over left sole No Fungal element seen. Rx: aqueous cream and miconazole 2% cream	
17-11-2015	No palmar involvement, no oesophageal motility problems No weight loss/night sweats/fever. [Dx: Left Plantar hyperkeratosis] Rx: Emulsifying ointment, mupirocin 2% ointment, clobetasol propionate 0.05% ointment at night to red areas	Change in footwear – soft shoes and clean sock daily at work.
03-06-2016	Left and right plantar presented with well demarcated erythema involving instep, with complaints of itch over bilateral plantar, on-off over past 2 years. [Imp: Tinea Pedis and Plantar Eczema] Rx: Aqueous cream, hydrocortisone 1% cream, cetirizine 10 mg OD, itraconazole 200mg OD x 2/52, ketoconazole 2% cream, KMnO4 1:10 000 soaks	KMnO4 soak daily Daily moisturising both feet
06-09-2016	Bilateral scaly feet with moccasin-like pattern and with Hyperkeratosis Previous scraping was tested negative for fungal infection. Patch test done – no significant results. [Dx: Hyperkeratosis of feet >6/12 +/- secondary Fungal infection] Rx: Repeat itraconazole 200 mg OD x 2/52, miconazole 2% cream LA BD, Review in 2 weeks KIV acitretin	Fucidin Cream/ointment, antibiotic from GP
01-11-2016	Improved subjectively with softened skin; [Dx: Plantar Hyperkeratosis] Rx: acitretin 25 mg 3x/week reduced (to reduce S/E dryness of lips)	Soft Shoe, clean sock daily to work; slipper at home
13-12-2016	Desquamation on feet – better than before Rx: acitretin 25 mg 3x/week, Vaseline to lips, emulsifying ointment to soles	
07-02-2017	Acitretin 25 mg 2x/week to reduce peeling of plantar skin Salicylic acid 10% at night	Continuous wearing slippers at home. Avoid irritants
07-03-2017	Emulsifying ointment, acitretin 25 mg 2x/week, salicylic acid 10% at night	Nightly cling-foiled (wrapped) both feet with moisturiser
23-11-2017	Stopped acitretin a year ago, after some improvement, then recurred, desquamation ++, some pain 2/7 ago, Plantar hyperkeratosis with cracks Rx: betamethasone dipropionate 0.05% salicylic acid 3% (beprosalic) ointment twice daily, emulsifying ointment twice daily, fobancort/ fucicort cream twice daily to cracked areas. Dx: plantar hyperkeratosis? eczema	Nightly cling-foiled (wrapped) both feet with moisturiser till morning
17-05-2019	Plaques with cracks; Rx: Aqueous cream, emulsifying oil, beprosalic, cryo LN2 2x10s; Dx: plantar hyperkeratosis, wart	Soft padded shoe, Prevent skin breakdown
04-07-2019	Punch biopsy performed. (result - negative)	frequent skin debridement
06-08-2019	Reducing scaly plaques on soles; Rx: emulsifying, beprosalic, betamethasone dipropionate 0.05% ointment, fucicort cream LA BD to cracks. Dx: eczema TRO allergic contact dermatitis	Home remedy regime (with squalene oil from GP)
01-08-2020	Moisturizer cream? repeat Punch biopsy	Nightly cling-foiled (wrapped) Self -debridement

On initial examination, contact dermatitis was considered because the rash was localised and well demarcated, but the rashes did not resolve with prescription of antihistamines, emollients and topical steroids. Therefore, on her subsequent visits, a fungal infection was considered (as recommended by Engin and colleagues (2017), based on the typically asymmetric presentation on the left foot [8], and she was prescribed a course of antifungal. However, the antifungal drugs did not resolve the symptoms. A punch knife biopsy did not confirm any malignancy. Clinical examination showed well demarcated erythematous scaly and hyperkeratotic plaques with scattered pustular lesions on bilateral plantar (mainly on the posterior part of sole and along the lateral borders) and with darker skin colour changes on affected region of both feet. Her last diagnosis was, Hyperkeratotic Xerosis, and she was prescribed medications consisting of steroid cream, antibiotic, and moisturiser, with follow-up appointments at 6 monthly intervals. The hyperkeratosis-skin breakdown cycles of symptoms persist until today.

### Follow-up and Management

The PPK persisted with cycles of exacerbations and remissions with episodes of erythroderma, hyperkeratosis, skin peeling and pustules which coalesce to resolve in the next few days, but appearing as brown macules and fissures, and occasionally with burning pain affecting activities of daily living (especially walking). When hyperkeratosis becomes obvious, the patient was treated with oral retinoids (25 mg daily Acitrecin over 4 weeks to 8 weeks) and keratolytics (salicylate acids cream) for application over a few months. On many occasions, the open skin lesions have resulted in several secondary bacterial infections with patients reporting visits to GPs with symptoms of fever, purulence for a bacterial complication, rather than bacterial origins. Over the years, the patient was given MC to rest and a course of antibiotic with Fucidin cream and moisturiser from the GPs whenever skin breakdowns were severe and affected walking.

Conservative daily self-care intervention seems effective at controlling the period and frequency of remissions. The ritualistic daily self-care regime for avoidant of dryness, avoidant of irritants, maintenance of hygiene (daily use of slipper at home and soft comfortable shoes at work) and frequent use of skin emollients have reduced the episodes of 'bleeding'/open wounds. Patient had step-up this self-care regime of

- I. Nightly cling-foil wrapped up of moisturised feet,
- II. Fucidin cream (whenever weeping rashes occurs),
- III. Trimming off excessive hardened skin-peels, and
- IV. Home remedy of mild garlic pastes with squalene oil over both feet especially when the feet are especially dry.

### Outcomes

The patient was prescribed both keratolytic and Acitrecin therapy which did showed improvement in terms of less flare-up of symptoms (skin breakdowns, bleeding and pain, and affected mobility) especially in the initial first few months, but it did not improve the quality of life because the Acitrecin had some adverse effects not well-tolerated by the patient, who experienced dry mouth/lips/tongue affecting her communication. Although, she was assured that the use of retinoids over long term appears to be safe, but she was still anxious and her dosage was lowered from (10 mg) daily to 3 × a week. Clinical and laboratory monitoring (serum lipid and hepatic profiles) were ordered to detect any significant elevation in lipids or liver enzymes but no abnormalities were observed. After 6 months, the patient asked to stop the Acitrecin, and was placed back on the usual steroidal cream (with Fucidine cream from the GP, whenever there were skin break-downs to avoid infection). A prescription of betamethasone dipropionate 0.05% salicylic acid 3% (Beprosalic) ointment twice daily, emulsifying ointment twice daily, Fobancort/ Fucicort cream twice daily to the cracked areas were her latest prescription from the skin specialist. However, the cling-foil method of both feet with moisturizer, throughout the night seems most effective at keeping the feet well-moisturised even in the air-conditioned bedroom, resulting in patient reporting having much less episodes of skin breakdowns (from weekly to

fortnightly, and now from once in a month or in several months).

## Discussion

This case of idiopathic eczema, initially presented to the skin clinic with only a small red spot (2 inches by 1 inch) on the left posterior plantar, had progressed into a chronic condition. Patient received few diagnoses from ‘contact dermatitis’ (on June 2014), eczema of unknown origin (2016) and bilateral plantar hyperkeratosis (2019). A fungal test, patch test and punch biopsy were performed at various time points, all returned with negative findings. The exact cause of plantar hyperkeratosis has been reported as multifactorial- from genetic and environmental factors, or obesity-related inflammation and/or inflammatory cytokines interleukin, playing some roles in the pathogenesis of skin disorders [3, 9-11].

Treatment options for PPK have been documented as varying from topical to systemic therapy with topical corticosteroids and wound care dressings, oral retinoids (25 mg daily Acitrecin over 1-2 months), and keratolytics (salicylate acids) as the first-line therapy [10]. Systemic retinoid therapy has also been recommended for chronic hyperkeratotic palmoplantar dermatitis, with antibiotic drugs and with oral acitretin for treatment of chronic hyperkeratotic eczema, and with one study reporting results superior to topical corticosteroid and keratolytic therapy [12]. Hyperkeratosis has been treated effectively with keratolytic therapy, although Acitrecin was proven superior to topical corticosteroid and keratolytic therapy [12, 13]. Acitrecin over long term usage was also reported to be safe [12]. Apart from scalpel debridement, systemic retinoid, and use of salicylic acid; a newer non conservative modality using split-thickness skin graft have all been associated with successful, treated plantar (corn) hyperkeratosis and, within shorter recovery time [11-14].

Additionally, in many traditional skin clinics, medical care has been the predominant, if not the sole focus. Literatures are highlighting that the non-medical care aspects may need to be considered for effective management of chronic conditions. Obesity and other environmental factors have been reported as causal factors of many inflammatory skin diseases, and reported as significant triggers [3,15]. Factors like donning proper, clean shoe, and self-managing obesity-related inflammatory skin diseases which incorporate weight-management to maintain healthy BMI status, may help manage the condition more effectively [16]. Thus, these triggers require complex behavioural changes, not just a reliance on medical-drug prescriptions-which calls for a partnership approach to care.

It’s also important to remember that an antibiotic prescription of more than 6 months merely controls (and does not cure) the chronic condition, and, poor usage of antibiotics also causes relapses, and overall treatment often becomes life-long [17]. With such long duration, patient involvement must be considered and optimized with a chronic disease self-management approach to care. Patient self-management in the context of chronic disease management is a matured science with good evidence of improvement in quality of life [18].

This approach targets long-term adherence for therapeutic regimens (prescribed medication, changes in dietary and exercise practices for weight and overall health too) which also improve functional status and health outcomes [19]. This care approach must be considered in managing chronic skin symptoms, to reduce sufferings and to improve the quality of life over longer periods of time. It calls for a paradigm shift from the traditional didactic, ‘provider-patient’ relationship to a view that consider individuals with chronic conditions as ‘expert living with the condition’, to be supported and informed so that they can play a key role in partnership with health-care providers, and with family members for better symptom management, as the way forward [19-21]. The theoretical essentials of patient self-management approach emphasised Corbin and Strauss’s three core tasks related to the work of living with a chronic illness. These are

- a) Medical management of the condition,
- b) Emotional management and

c) Behaviour (role and relationship) management. Proponents of patient self-management like Lorig and colleagues from Stanford University have expanded on the five core self-management processes (i.e. problem solving, decision-making, resource utilization, partnerships with health care providers, and taking action). These processes call for health provider-patient's close collaborations to effectively manage a chronic condition [22].

### **Patient Self-Management for Chronic PKKJ Conditions**

With chronic and systemic condition, patient self-management with good evidence of effectiveness should be pursued in management of complex PKK cases. For clinical-economic reasons, the number of persons living with chronic PPK conditions may represent a new significant public health agenda, and a registry may be timely to provide data for research into this area to inform care and intervention. Linking in patient-responsibility early with patient self-management approach may present a promising strategy for chronic skin conditions.

Healthcare must move beyond the traditional patient-education, to engage individuals through various self-management processes to build up their self-efficacy, so that there can be health-behaviour improvement, better functional health status, improve quality of life and also improve psychological well-being [23, 7, 24]. In fact, recent studies also show that obesity is a major risk factor for the development of inflammatory skin diseases, like eczema and atopic dermatitis [3,4,12]. Higher BMI percentiles have been found associated with higher odds of eczema compared with lower BMI, suggesting weight management in patients with eczema [4]. One study even suggests that older people with hyperkeratosis are linked with poor footwear and low foot health checks [16]. Therefore, more holistic treatment perspective is needed to ensure effective care management and effective symptom management to reduce the associated pain, mobility impairment and impact on quality of life.

### **Patient Perspectives**

Patient experienced negative painful consequences from the prescribed keratolytic drugs (Figure 1-3). It had caused the epithelial walls to be dilated (thinning) with excessive skin peelings, and, demanded a daily routine of time-consuming self-care debridement to prevent infections from open-wounds. Additionally, the use of steroid without proper tapering off was observed as contributing to frequent early relapses, and a logbook for meticulous monitoring the dosage/application to be tapered off should be utilised as a patient self-management support aid. A ritual of cling-foiled wrapping of feet with moisturiser appears to be the best self-management strategy in controlling the hyperkeratosis, but it was also highly time consuming. The patient also experienced that certain food intake like red-meat seems to exacerbate her symptoms and should be supported to monitor these potential non-medical causal factors. Self-management processes of the chronic condition may require more than just following prescription from the physician, it calls for a new care approach that

- 1) Focus on individual's illness needs,
- 2) Activates care resources, and
- 3) Trains effective living with chronic illness [24].



**Figure 1:** Keratonised squamous epithelium.



**Figure 2:** Excessing skin peeling after salicylate cream (keratolytic regime).



**Figure 3:** Dilated thin wall, after salicylate cream (keratolytic regime).

## Conclusion

As conservative management of the patient's hyperkeratosis eczema produces intermittent and unsustainable relief, a stepped-up strategy with patient self-management approach is strongly indicated. This new approach of care may ensure a better, comprehensive means of symptom management with minimal adverse effects aiming at near-complete resolution (of diffuse scarring, crusting, skin breakdown recurrences, and bleeding), with longer interval of recurrences. Consideration of other potential personal-environmental triggers should be monitored too. Hyperkeratotic eczema of feet, typically chronic and refractory to therapy, is still a poorly managed entity, and associated with chronic pain, prolonged mobility impairment with functional limitations, and may benefit from a chronic disease management perspective. More research on how to incorporate better 'patient self-management' approach to manage chronic hyperkeratosis is needed.

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