Granular parakeratosis – a case report of an uncommon flexural dermatosis

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Abstract

Granular parakeratosis is an uncommon keratotic disorder. It clinically manifests as erythematous to brown hyperkeratotic, scaly papules that coalesce to form plaques. The exact pathogenesis of this entity is still uncertain. It is suspected to result from an error in epidermal differentiation. Characteristic histopathologic features include a thickened stratum corneum, and compact parakeratosis with retention of keratohyalin granules. Our patient, a 16-year-old girl, was presented clinically and histopathologically suggestive of granular parakeratosis after being exposed to benzalkonium chloride containing hygienic washes. She improved well after the cessation of the causative agent and supportive care. Clinicians need to pay attention to this entity and differentiate it from various diseases to avoid misdiagnosis and early recognition.

Keywords: granular parakeratosis, benzalkonium chloride, keratohyalin granules, parakeratosis, epidermal differentiation.

Introduction

Granular parakeratosis is a rare benign acquired disorder of keratinization that presents as erythematous scaly patches and plaques which mainly affects flexures. It is also called hyperkeratotic flexural erythema or flexural pellagroid dermatitis. Granular parakeratosis is diagnosed clinically or histopathologically with a skin biopsy as it has a characteristic pattern in histopathology.

Here we report a case of a 16-year-old girl who presented with painful flexural dermatosis which was diagnosed clinically and histopathologically as granular parakeratosis and treated successfully.

Case report

A 16-year-old school girl from Queensland, Australia was followed up for flexural dermatitis predominantly involving her groin for two years duration which was treated and well-controlled with topical steroids and maintained with topical tacrolimus. She presented to our clinic with a recent onset of a painful scaly rash involving her groins for the past few weeks. Apart from severe discomfort and pain due to skin lesions, she did not have any systemic features. On further questioning regarding dermatitis, which was in remission, she reported that these new lesions appeared initially as small scaly papules and eventually they formed scaly plaques involving her bilateral groin flexures. There was a history of use of canesten washes as antiseptic washes to prevent any fungal infections. No other contact exposures were elucidated in history. She has no past or family history of similar skin conditions. She tried topical methylprednisolone aceponate fatty ointment over the lesions with no response.

On examination, there were mildly tender, erythematous to brown mildly desquamating plaques symmetrically involving both groins. Brown hyperkeratotic papules were scattered along the margin of the plaques. Genital and perianal skins were not involved. No evidence of linear erosions or macerations to suggest Hailey Hailey disease. Due to severe pain and discomfort while walking, the patient was distressed which affected her school attendance and self-esteem.

Although it did appear as granular parakeratosis clinically, due to the acute onset of lesions and significant discomfort, we proceeded with a skin biopsy for histological diagnosis, and we advised her to continue 0.1% tacrolimus in aqueous cream daily over the lesions. During this period, she developed similar lesions involving her submammary, lower abdomen fold and axillary areas within a fewdays with minimal improvement with tacrolimus. She was advised to cease canesten washes as they contain benzalkonium chloride, and she was also prescribed a short course of oral steroids.

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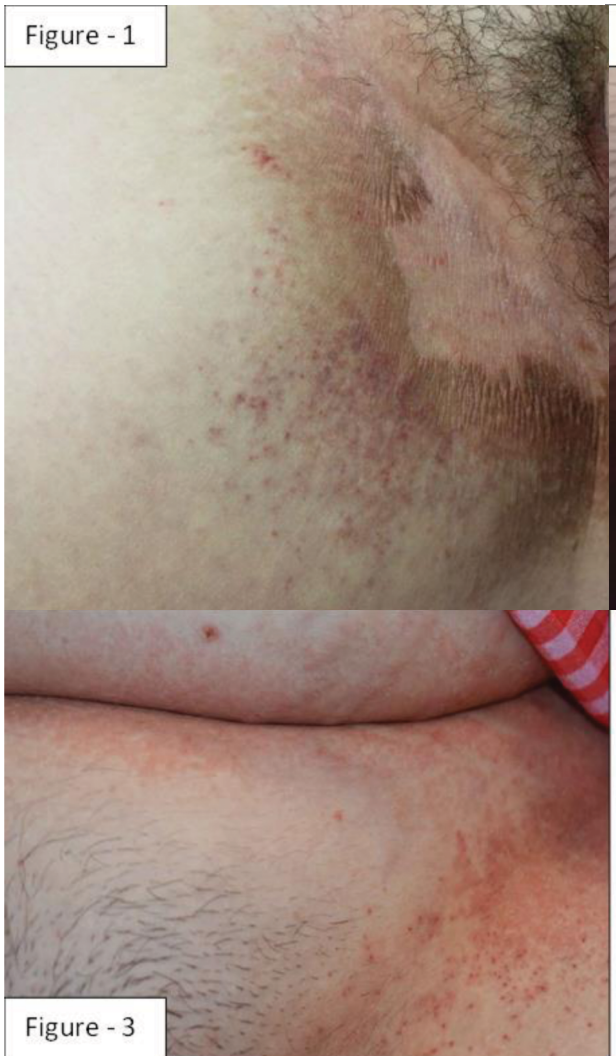

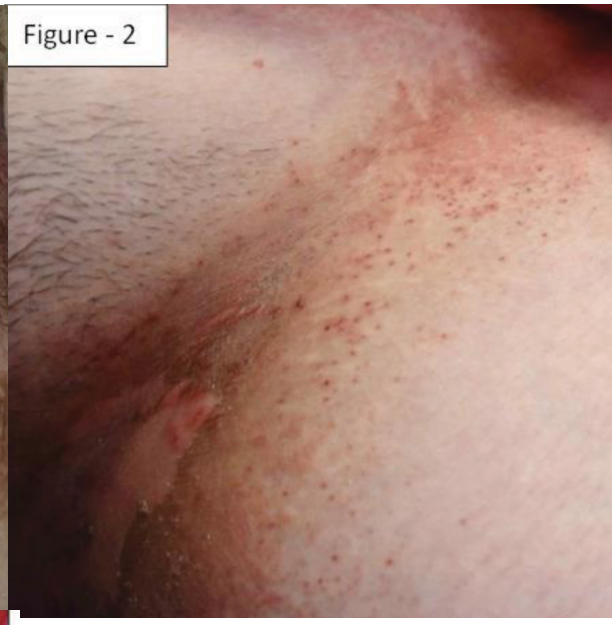

Figure 1 & 2. *Brown – erythematous ill-defined desquamating plaques symmetrically involving both groins along with scattered brown hyperkeratotic plaques at the margins.*

Figure 3. *New onset of lesions extending beyond the groins and involing lower abdomen fold.*

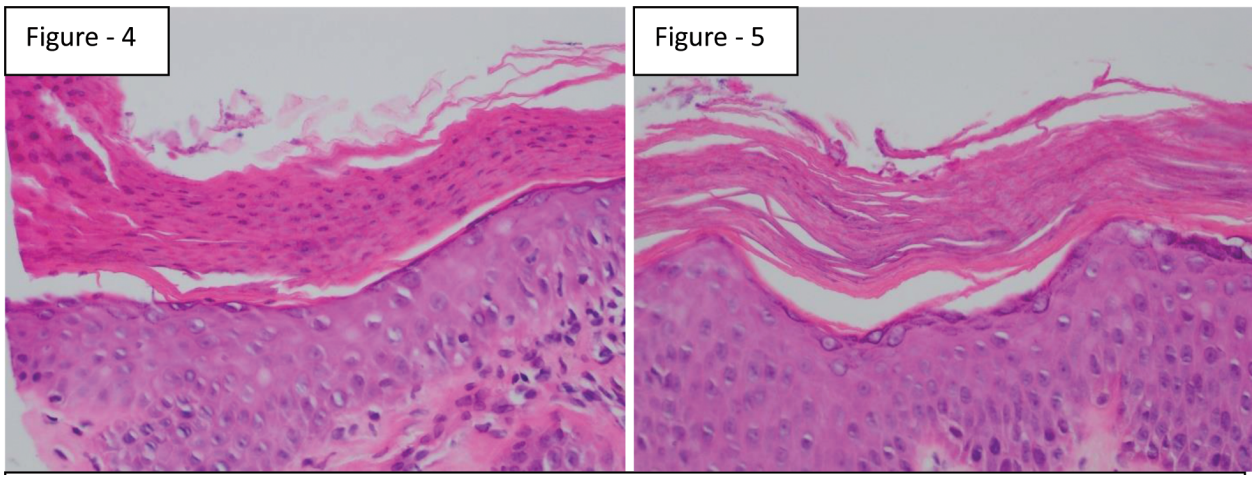

Figure 4. *(H&E magnification × 400) – Compact hyperkeratosis with confluent parakeratosis.*

Figure 5. *(Intact granular layer with retention of keratohyalin granules.*

Histopathology of the groin lesion revealed irregular epidermal acanthosis with overlying compact hyperkeratosis containing relatively confluent parakeratosis with retention of keratohyalin granules. The granular layer was intact with a mild superficial perivascular lymphocytic infiltration. PAS stain for fungal elements appeared negative. Classic histopathological features were suggestive of granular parakeratosis.

We encouraged her to avoid benzalkonium-containing antiseptic wash, cosmetics and laundry products and advised frequent washing of her clothing to get rid of the remaining benzalkonium chloride. She was treated with a paraffin mix to repair the impaired epidermal barrier topically. After 3 to 4 weeks of ceasing benzalkonium wash and supportive care with paraffin mix patient improved gradually with marked improvement of her skin lesions while topical steroids and tacrolimus were minimally helpful in alleviating her symptoms.

Discussion

Granular parakeratosis is a unique acquired disorder of abnormal keratinization with characteristic pathological features. Its exact etiology is uncertain which is proposed to be due to a defect in processing of profillagrin to fillagrin. Fillagrin is an essential protein for normal keratinization and epidermal barrier integrity which is normally present in upper epidermis and maintains the adhesion matrix of the keratohyalin granules in the stratum corneum during cornification[1]. Fillagrin is the main protein involved in the pathogenesis of ichthyosis vulgaris and is one of the factors involved in atopic dermatitis. In granular parakeratosis, there is a lack of degradation of keratohyalin granules due to impaired fillagrin production which results in aggregation of keratin filaments. This is reflected in the characteristic histology of granular parakeratosis with thickened stratum corneum that retains nuclei (parakeratosis) and keratohyalin granules as well as in the clinical finding of desquamating plaques, the superficial layer of which peels off easily.

Benzalkonium chloride is a quaternary ammonium cationic detergent present in several household products like laundry detergents, cosmetic products, and antiseptic washes. It can act as a major skin irritant. Benzalkonium chloride is a biocidal agent and inactivates various enzymes. As a result of these properties, it has activity against bacteria fungi, some viruses, and protozoa[2]. It also acts as a surfactant and is made to disrupt cellular lipid membrane which in turn results in activation of the cascade of pathology of granular parakeratosis. Aaron J Robinson *et al,* postulated that in genetically susceptible individuals' exposure to benzalkonium chloride may result in disruption of epidermal lipids which results in granular parakeratosis[2]. It was based on observation they made that despite all family members who were presumably also exposed to benzalkonium chloride only a few developed granular parakeratosis.

Benzalkonium chloride is a widely used agent worldwide and antiseptic washes containing benzalkonium chloride are available over the counter and its use dramatically increased after COVID-19 pandemic. Only a small subset of patients who were exposed to benzalkonium have potentially developed granular parakeratosis. Another agent reported to cause a similar lesion is sodium lauryl sulfate (SLS) which is present in soap-free cleansers.

Regarding the treatment of granular parakeratosis, it may be self-resolving after the removal of the causative agent it may take several weeks to settle down. Other treatment options are topical steroids, topical retinoids, and keratolytic agents such as lactic acid, calcipotriol have shown effectiveness in various case reports[1-6]. Walace *et al,* reported in their case report, triamcinolone 0.1% in silvadene in 1:1 mix cleared their patient's lesion[1]. Mauren Gaul *et al,* reported clearance of the lesion with 10% glycolic acid and 0.05% tretinoin topical therapy[4]. Topical calcitriol was used successfully to treat granular parakeratosis in Urfi Patel *et al*'s case report[5]. Aron J Robinson *et al,* presented a case series of 6 children affected by granular parakeratosis after exposure to benzalkonium chloride in which they observed patients' eruption resolved after cessation of exposure and supportive care with emollients[2].

Supportive care with emollients to maintain epidermal integrity and proper patient education is mandatory as it takes weeks to settle down to recover from abnormal keratinization caused by external agents.

Granular parakeratosis is one of the most commonly encountered skin conditions in dermatology practice Australia but is one of the rarely manifesting conditions in Sri Lanka. COVID anxiety might have fueled the rise of granular parakeratosis in the Western world. With the increased prevalence of cutaneous fungal infections, availability, and the

wide usage of antiseptic washes, we might come across more granular parakeratosis patients in the future. Hence, we decided to report this case in order to increase the perception and attention to granular parakeratosis.

References

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