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CASE REPORT

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A case of porokeratosis with a variety of morphological manifestations

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Key Clinical Message

This case illustrates the clinical heterogeneity of porokeratosis (PK), with a patient presenting with both disseminated superficial actinic PK-like facial lesions and PK of Mibelli-like lesions on the buttocks and lower limbs. Ultraviolet exposure, infection, and immunosuppression may contribute to the manifestation of multiple clinical forms in a single patient. Close monitoring for potential malignant transformation is essential, particularly in elderly patients with long disease duration and a history of oncological conditions.

KEYWORDS

disseminated superficial actinic porokeratosis, immunohistochemistry, mixed-type porokeratosis, porokeratosis of Mibelli

1 | INTRODUCTION

Porokeratosis (PK) is a group of disorders characterized by abnormal keratinization that results in the formation of annular plaques with distinct peripheral ridges.[1] The etiology of PK is multifactorial, with genetic predisposition, ultraviolet radiation, immunosuppression, and advanced age being the major contributing factors.[2] PK exhibits significant clinical heterogeneity with several clinical variants, including porokeratosis of Mibelli (PM), disseminated superficial actinic porokeratosis (DSAP), disseminated superficial porokeratosis (DSP), porokeratosis palmaris et plantaris disseminata, and linear PK.[2] Early recognition and accurate diagnosis of PK is essential, as the condition carries a risk of malignant transformation, particularly in long-standing lesions. This report presents a case of mixed-type PK, highlighting the clinical diversity of the condition and the importance of monitoring for potential malignant progression.

2 | CASE PRESENTATION

A 90-year-old male patient presented with persistent brown facial patches of 10 years' duration and more recent plaques on the buttocks and lower limbs over the past month. Initially, the facial patches appeared without identifiable triggers and caused significant pruritus. Despite the use of various topical treatments, there was minimal improvement. The lesions continued to coalesce into larger areas. One month prior to consultation, the patient had observed several annular patches on his legs. Clinical examination (Figure 1) revealed dense facial patches with raised borders and mild central atrophy. In addition, symmetrical map-like verrucous plaques were observed on the buttocks and legs. These plaques were characterized by a rough texture, adherent scales of a dirty color, and distinct irregular contours with central depressions and raised peripheries. The patient had a history of hypertension, renal cancer, and cerebral infarction. Similar dermatological

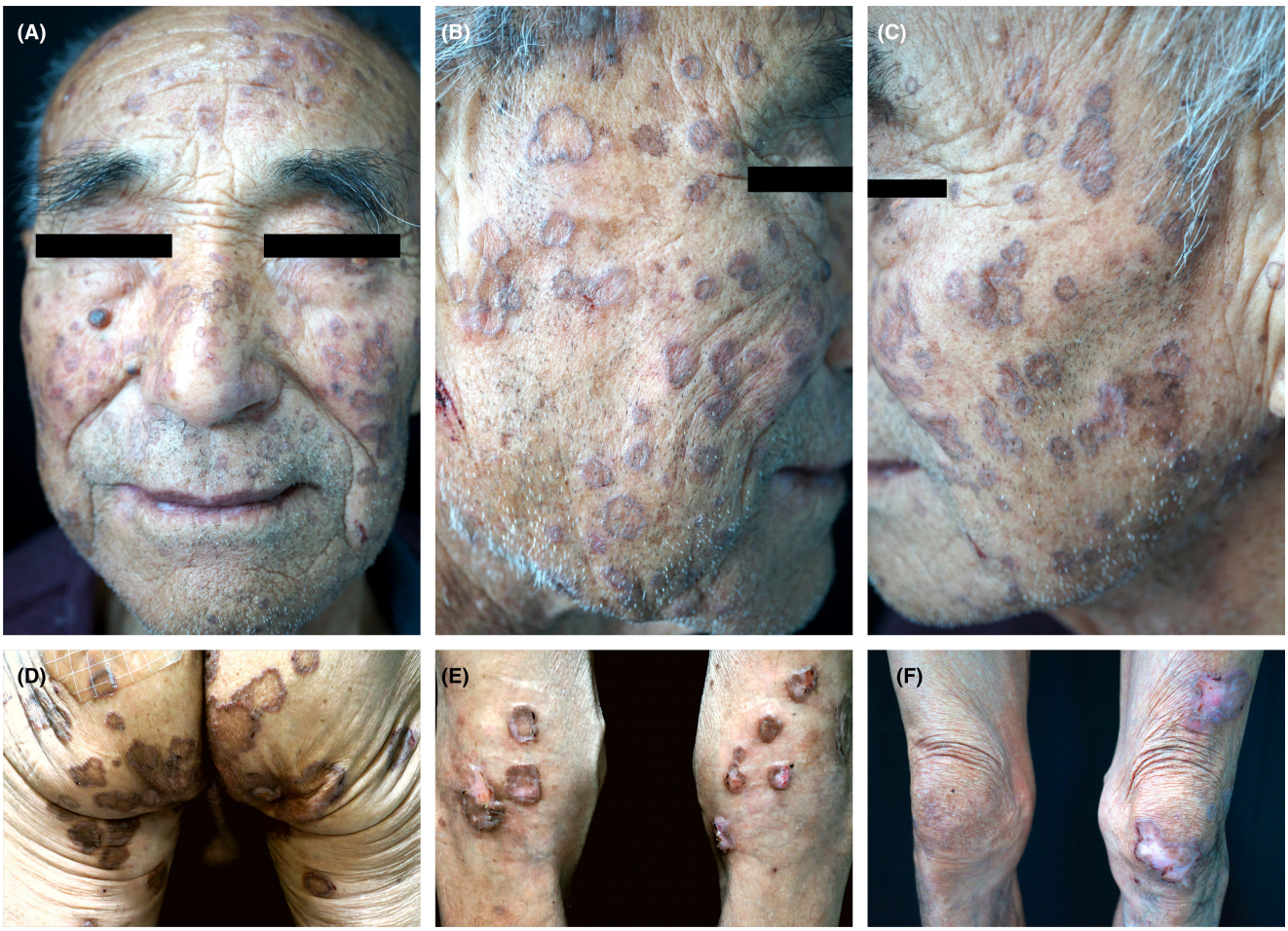

FIGURE 1 Clinical manifestations of the skin lesions. (A) Dense brown patches on the face with prominent borders and mild central atrophy; (B, C) detailed facial photographs showing annular erythema of variable sizes with clear, raised borders, and mild central atrophy; (D, E) symmetrical, geographic, wart-like plaques on the buttocks and both lower limbs characterized by a central depression and dike-like raised borders; (F) wart-like plaques characterized by a central depression and raised filamentous borders on the extensor side of the right lower limb.

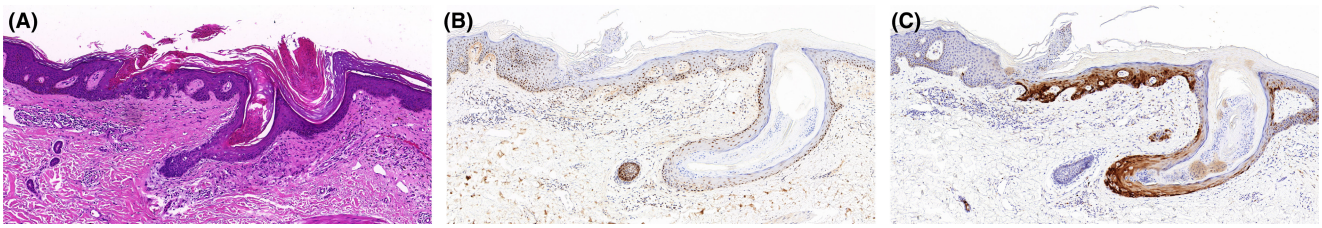

FIGURE 2 Histopathological and immunohistochemical findings. (A) Dyskeratotic cells beneath a column of compact parakeratosis (HE×100); (B) upregulated expression of p53 in the epidermis (×100); (C) region-specific down-regulation of p16 within the epidermal layers (×100).

manifestations were noted in the patient's father, brother and son, suggesting familial pattern.

3 | METHODS AND RESULTS

A biopsy specimen from the left buttock (Figure 2) showed hyperkeratosis of the epidermis. Parakeratotic corneocytes were intermittently present in the stratum corneum. This was overlying a subtle depression of the underlying epidermis and a marked absence of the granular cell layer. A superficial perivascular lymphocytic infiltrate was observed in the dermis. Immunohistochemical analysis showed increased p53 expression and consistent p16 expression in the epidermis, with a marked loss of expression in certain regions.

4 | DISCUSSION

PK exhibits considerable clinical heterogeneity, with lesions ranging from small keratotic papules to large wart-like growths. First described by Vittorio Mibelli in 1893, recent advances in the genetics and classification of PK have provided greater insight into its pathophysiology.[3] Genetic studies have identified mutations in several genes, including MVK, PMVK, MVD, and FDPS, which are involved in the mevalonate pathway.[4] These findings have significant implications for understanding disease mechanisms and potential therapeutic targets. Although there was a family history of similar dermatological manifestations in this patient, no genetic analysis was performed to identify variations in the mevalonate pathway.

The clinical presentation of PM is characterized by annular dry plaques surrounded by a raised fine keratotic wall and occasionally a groove. Clinically, the lesions may be psoriasiform or verrucous.[5] Histological examination revealed varying degrees of hyperkeratosis and a peripheral stepped column of parakeratosis. The lesions found on the patient's buttocks and lower limbs were consistent with those of PM, as confirmed by histological findings.

DSAP is the most common form of PK and is inherited in families in an autosomal dominant pattern with an earlier onset. However, sporadic DSAP is also common and is characterized by later onset and the absence of a familial history.[5] It is widely accepted that ultraviolet radiation is the primary cause of DSAP, with lesions typically appearing on sun-exposed areas.[5] The distinction between DSAP and DSP is crucial due to their different clinical presentations. DSAP lesions are primarily located on sun-exposed areas such as the face, neck, chest and distal extremities, with worsening after sun exposure. In contrast, DSP lesions are distributed throughout the body and are minimally affected by sunlight.

In this case, the patient presented with a decade-long history of pruritic facial patches aggravated by sunlight, more consistent with DSAP than DSP. This presentation is particularly interesting in the context of ethnic variations in the manifestation of DSAP. A review of 52 studies in Chinese literature found that 74.2% documented facial lesions, indicating a higher prevalence of facial DSAP in the Chinese population compared to studies conducted outside of China. This variation may be due to differences in ethnicity, lifestyle, and environmental factors.

The patient's case is unique because of the presence of DSAP-typical facial lesions, combined with Mibelli-type PK lesions on the buttocks and lower limbs. Based on clinical observations and histopathological findings, a diagnosis of mixed-type PK is suggested. Environmental factors such as ultraviolet radiation, infectious agents, and immunosuppressive states may contribute to the presence of multiple clinical forms in a single patient. In addition, certain drugs have been implicated as potential triggers for the development of PK.[6] These factors can cause cellular mutations, resulting in the loss of the wild-type allele and the subsequent emergence of heterozygosity for the mutated gene.

PK malignant transformation was first described by Vignein in 1942. It is estimated to occur in approximately 7% of patients with the disease. The most common associated malignancy is squamous cell carcinoma, with documented associations with Bowen's disease and basal cell carcinoma.[7] The oncogenic potential of PK may be due to increased p53 protein expression in keratinocytes adjacent to the cornified lamella. In this case, immunohistochemical analyses showed overexpression of p53 and downregulation of p16, suggesting that chronic inflammation and genomic instability may contribute to the development of PK-associated cancer.[8] Due to the patient's advanced age of 90 years, chronic disease course and history of oncological conditions, it is necessary to maintain vigilant surveillance for disease progression and the increased risk of malignant transformation associated with impaired immune function.

It is important to note that there is currently no cure for PK. Management of PK primarily focuses primarily on symptomatic relief. This is achieved by oral administration of retinoic acid and its derivatives, as well as traditional Chinese medicinal formulations. Adjunctive treatments such as laser therapy and cryotherapy using liquid nitrogen are also used.[2] The patient used topical hydroxychloroquine sulfate, retinoic acid capsules, and calcipotriol ointment, twice daily. The pruritus subsided after 2 weeks, but there was no significant improvement in the skin lesions. The patient's condition was monitored during the follow-up.

5 | CONCLUSION

Mixed-type PK should be considered in the differential diagnosis of PK, especially in patients with multiple clinical manifestations. This case highlights the importance of histopathological and immunohistochemical studies for accurate diagnosis. It is therefore imperative that clinicians are aware of the clinical heterogeneity of this condition and closely monitor the risk of malignant transformation. Early detection, accurate diagnosis, and individualized symptomatic management are crucial to improve patient outcomes.

AUTHOR CONTRIBUTIONS

Xiang Zhang: data curation; writing—original draft; editing. **Weiwei Shi:** writing—original draft; editing. **Jun**

Wang: writing—original draft; editing. **Ruzhi Zhang:** supervision; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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