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Case report

Superficial shaving combined with photodynamic therapy for treating disseminated superficial actinic porokeratosis: A case report

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1. Introduction

Disseminated superficial actinic porokeratosis (DSAP), the most common of the clinical variants of porokeratosis, is an autosomal dominant cutaneous disorder of keratinization [1]. Treatment of DSAP is poorly standardized, especially when the skin lesions are generalized. Photodynamic therapy (PDT), has been used to treat a variety of dermatologic conditions, including some refractory skin diseases. According to the literatures on DSAP, the effectiveness of PDT for treatment of porokeratosis is controversial. However, successful cases of combined therapy have been reported [2]. Here, we report a rare case of DASP characterized by generalized lesions and severe itching, which highlights the therapeutic value of superficial shaving combined with PDT. According to clinical manifestations and pathology, we diagnosed it as DSAP.

2. Case report

A 52-year-old man was admitted to our department with over ten years of pruritic maculae on his upper limbs and trunk. The patient complained of itching so severe that he could not work or sleep well. Previous treatments, including acitretin capsules, tretinoin creams, 5-Fluorouracil cream, and antihistamines, etc., showed no improvement and the lesions continued to expand. Under examination, we found out that he had disseminated superficial actinic porokeratosis (DSAP) and pruritic papules on his trunk and limbs (Fig.1a, c, d, g, h). Biopsy of the edge of a typical lesion was performed and the specimen showed the classic features of a keratin-filled epidermal invagination with an angulated, parakeratotic mound and epithelium deep to the mound was vacuolated and devoid of a granular cell layer.

After signing an informed consent, the patient was treated by combined therapy on his left abdomen and right upper arm and PDT alone on his right abdomen and left upper arm for his first treatment. (a)Superficial shaving: after topical lidocaine cream for one hour and routine skin prep was performed with a sterilized razor blade (brand: Gillette) to remove the superficial lesions *in situ* with minimal bleeding. The shaving depth was to the superficial dermal layer. (b)PDT: 10% 5-aminolaevulinic acid cream (Shanghai Fudan-Zhangjiang Bio-Pharmaceutical Co. Ltd, Shanghai, China) was applied for the lesion immediately thereafter dark incubated for 3 h. The lesions then were irradiated with 633 nm red-light at 80 mW/cm^2 for 20 min. Generally, the distance between the lamp and the skin was 20 cm, which was adjusted according to the degree of pain.

After the first treatment, the pruritus was relieved more markedly on the areas treated by combined therapy than the PDT only sites. It was decided to shave the lesions on the right abdomen and left upper

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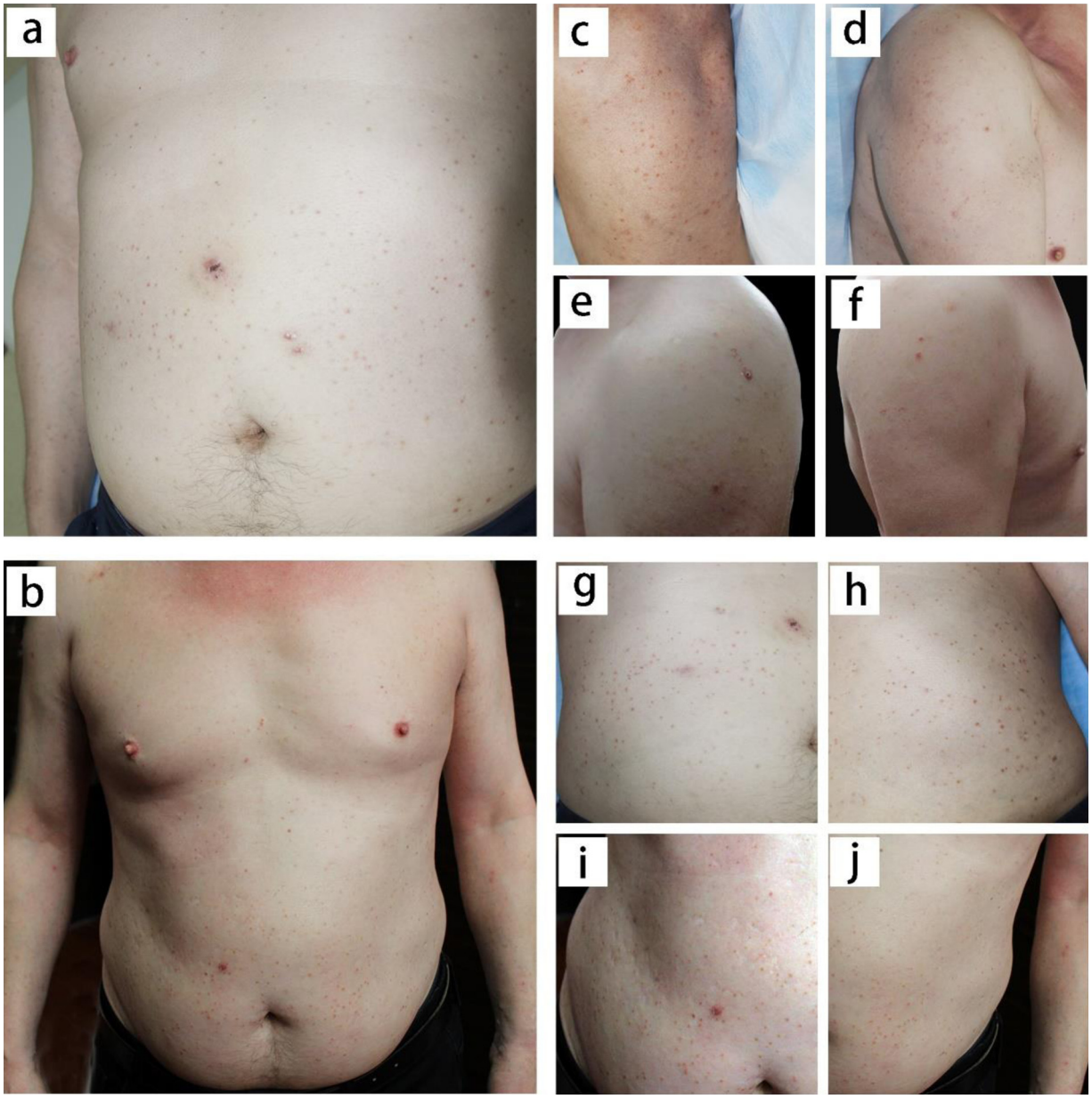

Fig. 1. The clinical pictures of pre- and post- treatment. (a,c,d,g,h) Presentations pre-treatment. Multiple small, 5–10 mm diameter, brown, red, or skin-colored, hyperkeratotic papules and circular plaques with central atrophy and a peripheral keratotic raised rim, appeared symmetrically on the upper extremitie and turnk. (b,e,f,i,j) Presentations after 1 months of superficial shaving and 3 times of PDT.

arm before PDT in the following treatment. Lesions were shaved once and three sessions of PDT were performed with one week apart. No discomfort was described by the patient. Erythromycin ointment was applied for two to three days after the shaving. Although mild post-inflammatory hyperpigmentation of surrounding skin was present, overall there was notable improvement in the appearance of the lesions which became flat. The upper limbs had the best response with most of the skin lesions disappearing after an one-month post-treatment. (Fig.1b, e, f, i, j). Most importantly, the symptoms of itching were completely relieved. Meanwhile, th Dermatology Life Quality Index assessment, average of 16 pre-treatment dropped to an average of 7 post-treatment. No progression was observed during the follow-up which lasted more than 18 months.

3. Discussion

Porokeratosis is an autosomal dominant inherited diseases with variable penetrance, which is commonly treatment-resistant, and the size and quantity of lesions vary greatly [3]. Although, different therapeutic options have been used, including cryotherapy, topical 5-fluorouracil and tacalcitol etc., none of them has shown either good efficacy nor long-term remission [4].

PDT has been used to treat porokeratosis with variable outcomes (Table 1). However, based on the prior cases, the different types of porokeratosis may show varied responses to treatment. Linear porokeratosis and porokeratosis ptychotropica appear more responsive than DSAP. The efficacy of solo PDT without other therapies is not always durable, and some researchers suggest that PDT would not be suitable for DSAP, though CO_2 laser ablation pre-PDT may improve outcomes. Our study and literature review leads us to believe that pre-PDT shaving of lesions to the superficial dermis shows enhanced efficacy (Table 1). The permeation of ALA is highly limited by the cornified barrier which is easily disrupted with either CO_2 laser or shaving which effectively increases the depth of the tissue being treated and the

Table 1
Examples of porokeratosis cases, which were applied by PDT, reported in present literatures.

Reference	Age	Sex	Location	Itching complained	PDT/PDT combined therapy	Curative effect	Itching relief
Curkova et al. [6]	16	F	Right arm	–	Superficial PDT (16% MLA, 37J/cm^2, 3 sessions)	Satisfactory cosmetic and clinical response without progression.	–
Kim et al. [7]	61	F	Distal part of the upper limb Face	–	PDT (16% MLA, 37J/cm^2, 3 sessions) following CO_2 laser ablation	Marked clinical improvement with slight residual hyperpigmentation.	–
	62	F	Lower legs Arms Face	–	PDT (16% MLA, 37J/cm^2, 4 sessions) following CO_2 laser ablation	A majority of the lesions disappeared but the underlying melasma aggravated.	–
Carrido et al. [8]	12	F	Left breast	No	Superficial PDT (16% MLA, 37J/cm^2, 2 sessions)	A slightly erythematous few lesions remained	–
Nayeemuddin Et al. [9]	42	F	Lower leg Arms Hands	–	PDT (20% ALA, 100 J/cm^2, 2 sessions) combined with a curette (removing surface scale)	The disorder was cleared following the first treatment but was not sustained.	–
	59	F	Lower legs	–	PDT (20% ALA, 100 J/cm^2, 2 sessions) combined with a curette (removing surface scale)	No response	–
	49	F	Legs Arms	–	PDT (20% ALA, 100 J/cm^2, 1 session) combined with a curette (only removing surface scale)	Hyperpigmentation	–
Fustà et al. [10]	53	M	Buttocks Perianal	Yes	Superficial PDT	Partial clearance and symptomatic relief	Yes
	50	M	Buttocks	Yes	Superficial PDT	Symptomatic relief and reduction of hyperkeratosis	Yes

production of protoporphyrin IX which contributes to the outcome. The concentration of photosensitizer ALA is 20% in most cases [1], which can be reduced to 10% by a superficial shave as we have describe above. Among all the pretreatments, superficial shaving is the least expensive and simplest to perform without obvious side effects.

Our patient was distressed by unbearable itching. Pruritus is a common but troubling symptom associated with many diseases, and the many treatments are often tried with variable benefit. Idiopathic pruritus can be difficult or impossible to relieve through traditional treatments. Our case proposes that PDT may be an option for relief, as shown previously [8], possibly by reducing the quantity of nerve fibers activated by calcitonin gene-related peptide (CGRP) in the peripheral nervous system and may also control inflammation [5].

In summary, our case suggests that superficial shaving combined with PDT is an effective and safe treatment which can be applied for pruritus associated with DSAP and the lesions themselves. Pretreatment via shaving or laser can enhance PDT efficacy. Future double blinded randomized trails would be valuable in documenting and confirming this approach to the treatment for DSAP.

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Conflict of interest

None of the authors has any conflict of interest to be disclosed.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.pdpdt.2019.04.032.

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