CASE REPORT

Confluent and Reticulated Papillomatosis: Two Cases in Females of Skin of Color

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Abstract: Confluent and reticulated papillomatosis (CARP) is an acquired ichthyosiform disorder characterized by hyperpigmented papules that coalesce into plaques, often displaying reticulated patterns along the periphery. It typically affects the upper trunk and neck, particularly in adolescents and young adults. Due to its close clinical resemblance, CARP is frequently misdiagnosed as acanthosis nigricans or pityriasis versicolor. Although oral minocycline remains the mainstay of treatment, oral isotretinoin has also shown effectiveness, as evidenced by reductions in scaling and pigmentation of lesions. This case series describes two female Filipino patients with CARP who were successfully treated with low-dose isotretinoin.

Keywords: Confluent and reticulated papillomatosis, Isotretinoin, Acanthosis nigricans

Introduction

Confluent and reticulated papillomatosis (CARP), first described by Gougerot and Carteaud, is characterized by hyperpigmented macules and papules that merge into plaques with a distinctive reticulated pattern at the periphery [1]. Although its exact pathophysiology remains unclear, several hypotheses have been proposed, including keratinization disorders, reactions to *Pityrosporum* species, endocrinopathy-related eruptions, bacterial or ultraviolet-induced responses, variations of amyloidosis, and potential genetic predispositions [2]. Diagnosis is primarily clinical, but a skin biopsy may be performed to exclude other dermatoses.

The strongest evidence supporting the theory that CARP is a keratinization disorder lies in its histopathological findings, which include an increased transitional cell layer, elevated lamellar granules within the stratum granulosum, and heightened involucrin expression [1]. While most cases are asymptomatic, treatment is often pursued for cosmetic reasons and to address the emotional distress associated with this pigmentary disorder [3].

In the Philippines, only 59 cases were reported between 2012 and 2023 [4]. Case reports on CARP involving Asian skin remain limited. Although oral minocycline is the

preferred first-line treatment [1], it is not readily available locally. Consequently, the authors opted to use low-dose isotretinoin, guided by its therapeutic relevance in keratinization disorders [5,6]. Through this case series, the authors aim to raise clinical awareness, present local clinical findings, and highlight potential therapeutic options for CARP.

Case Presentation

Case 1. A 22-year-old Filipino female with Fitzpatrick skin phototype IV and overweight presented with a six-month history of asymptomatic, multiple tan-to-brown reticulated macules coalescing into patches and plaques with fine, adherent scales forming a net-like pattern over the nape **(Figure 1A)**. No lesions were observed on the axillae or groin. An alcohol swab test and skin scraping with 10% potassium hydroxide were negative, ruling out terra firma-forme dermatosis and pityriasis versicolor, respectively. Dermoscopy revealed hyperpigmented dots, ridges, and a pinkish hue **(Figure 1B)**.

The patient had previously self-treated with over-the-counter papaya soap and vitamin C serum, but these were ineffective. Acanthosis nigricans (AN) was initially considered due to the lesion location and hyperpigmentation. However, diabetes mellitus screening, lipid profile, and liver enzyme levels were all within normal limits. A skin punch biopsy of the net-like lesions showed orthokeratosis, papillomatosis, and acanthosis **(Figure 1C)**. The absence of basal layer hyperpigmentation and melanocyte proliferation ruled out AN. As the histopathology findings were nonspecific, the final diagnosis of CARP was made based on the correlation of clinical, histopathologic, and laboratory findings.

The patient was started on oral isotretinoin at 0.1 mg/kg/day for a total treatment duration of 24 weeks. Prior to initiating therapy, she received counseling on the potential teratogenicity of isotretinoin and was advised to use both physical and oral contraceptives. Follow-up visits were scheduled every four weeks, with significant clinical improvement noted at the completion of treatment **(Figure 1D)**. Liver enzyme levels and lipid profiles, repeated at weeks 4 and 8, remained within normal ranges. At a 12-month post-treatment follow-up, there was no evidence of recurrence.

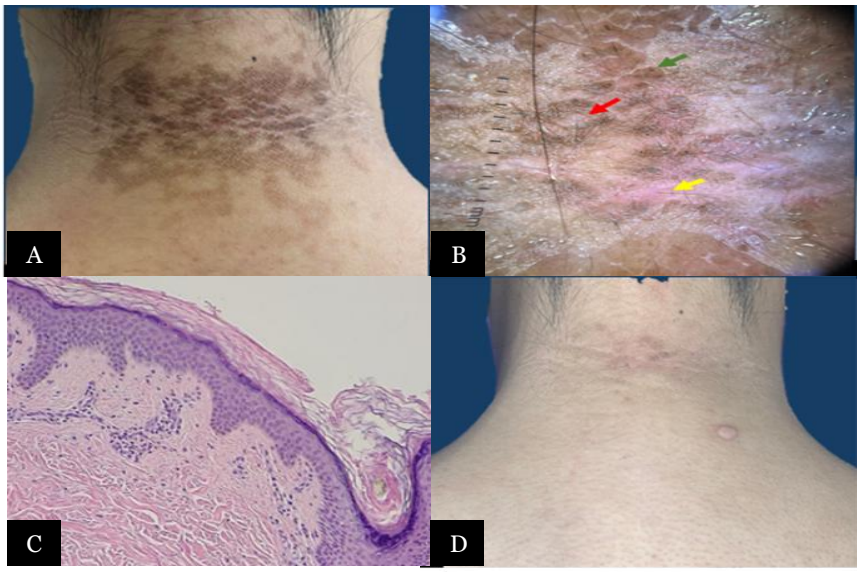

Figure 1. (A) The patient presented with tan-to-brown reticulated, net-like patches and plaques on the nape; **(B)** Dermoscopic examination revealed hyperpigmented dots (green arrow), ridges (red arrow), and a pinkish hue (yellow arrow); **(C)** Histopathology demonstrated orthokeratosis, papillomatosis, and acanthosis (hematoxylin and eosin [H&E], ×10); **(D)** Marked clinical improvement was observed 12 months after completion of low-dose isotretinoin therapy.

Case 2. A 15-year-old Filipino female with Fitzpatrick skin phototype IV and a normal BMI presented with a one-year history of multiple tan-to-brown reticulated macules coalescing into patches and plaques, accompanied by thin, fine scales over the chest, nape, and neck **(Figure 2A to 2C)**. To exclude terra firma-forme dermatosis, an alcohol swab test was performed, which yielded negative results. The grattage maneuver and 10% potassium hydroxide skin scraping were also negative, effectively ruling out pityriasis versicolor.

The patient had attempted self-medication using whitening agents, but these were ineffective. Dermoscopy revealed hyperpigmented dots and ridges **(Figure 3A)**. Histopathological examination demonstrated orthokeratosis, hypergranulosis, papillomatosis, and acanthosis, along with mild superficial perivascular lymphocytic infiltrates **(Figure 3B)**. Screening for diabetes mellitus, liver enzyme levels, and lipid profiles yielded normal findings. Based on the clinical, histopathological, and laboratory results, a diagnosis of CARP was made.

As the patient was a minor, therapeutic options and potential adverse effects were thoroughly discussed with her guardian. She was started on oral isotretinoin at 0.1 mg/kg/day for 24 weeks. Follow-up visits were conducted every four weeks, with progressive improvement noted, including a marked reduction in hyperpigmented lesions on the affected areas **(Figure 4A, 4B)**. Liver enzymes and lipid profiles were reassessed at the 4th and 8th weeks of treatment, showing no abnormalities. At the 12-month post-treatment follow-up, no recurrence of lesions was observed.

Figure 2. Patient presenting with coalescing tan-to-brown, reticulated patches and plaques on the chest **(A)**, nape **(B)**, and sides of the neck **(C)**.

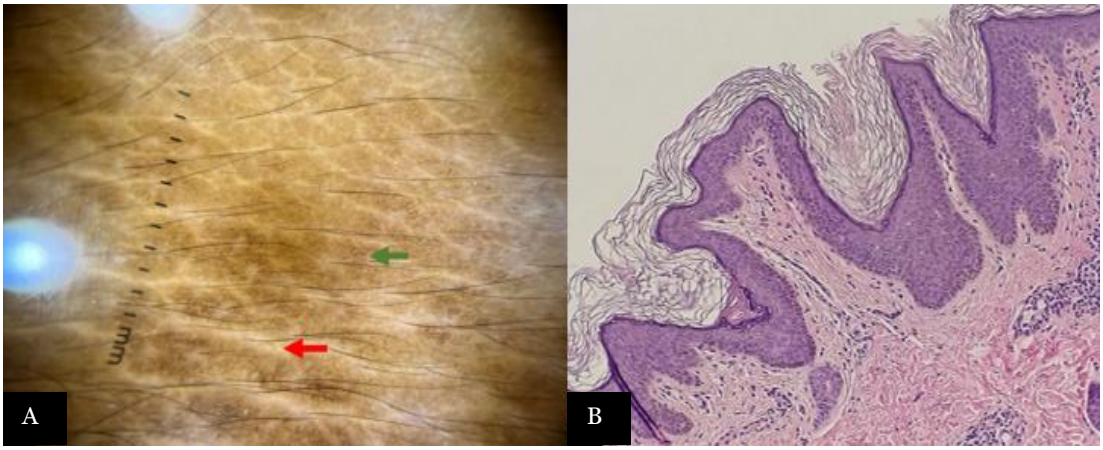

Figure 3. (A) Hyperpigmented dots (green arrow) and ridges (red arrow) were seen on dermoscopy; **(B)** Histopathology showing orthokeratosis, hypergranulosis, papillomatosis, and acanthosis (hematoxylin and eosin [H&E], 10x).

Figure 4. Patient showing decreased hyperpigmented lesions after treatment with low-dose isotretinoin (after 12 months post-treatment) on the chest **(A)**, nape **(B)**, and sides of the neck **(C)**.

Discussion

CARP is an uncommon dermatological condition that occurs more frequently in young Caucasian males [7]. In Southeast Asia, it shows a male-to-female ratio of 2.6:1 with a mean age of 29.1 years [8]. Similarly, in the Philippines, there is a reported male predominance of 1.5:1 [4]. According to the study by Huang et al. [8], CARP typically presents as confluent brown papules or plaques, most commonly affecting the upper trunk. The exact pathophysiology of CARP remains unclear, although one proposed hypothesis suggests a keratinization disorder [1]. Since CARP can be misdiagnosed as a fungal infection or pigmentary disorder, Jo et al. proposed a modified diagnostic criterion [3]:

a. Clinical presentation of scaly brown macules and patches, some reticulated and papillomatous.
b. Involvement of the upper trunk, neck, or flexural areas.
c. Negative fungal staining of scales or lack of response to antifungal treatment.
d. An excellent response to antibiotic therapy.

In our cases, the first three criteria were all fulfilled.

AN is one of the primary differential diagnoses for CARP. In a study by Park et al. (2015), obesity was found to be the only clinical feature significantly more common in the AN group than in the CARP group [9]. Although minor histopathological differences between CARP and AN have been observed, these differences are insufficient for definitive differentiation; therefore, clinicopathologic correlation remains essential [9]. Several studies also suggest that CARP and AN can co-exist, with some patients showing insulin resistance and obesity; however, this association has not been clearly established [10,11]. In our first case, although the patient's clinical presentation resembled AN, the net-like reticulated pattern, absence of obesity or endocrine disorders, and consistent clinical-histopathological findings, along with the diagnostic criteria by Jo et al. [3], supported a diagnosis of CARP.

The second case clinically resembled pityriasis versicolor, a superficial yeast infection caused by Malassezia, which commonly presents as hyperpigmented patches and plaques on the chest. Typically, a positive evoked scale sign, positive potassium hydroxide test, and the presence of hyphal elements would favor pityriasis versicolor [12]. However, as all these findings were negative in our patient, the condition was ultimately ruled out. In a case report by Ankad et al. [13], dermoscopic findings showed ridges corresponding to the confluent and reticulated nature of the papules and plaques, which was consistent with our observations.

Histopathology also contributes significantly to the diagnosis of CARP. A study by Tamraz et al. [14] in Lebanon reported epidermal changes such as hyperkeratosis, papillomatosis, and acanthosis in patients with CARP, findings that were also seen in our patient. Interestingly, the study further noted follicular plugging and anastomosis of the rete ridges in some patients, which may serve as useful distinguishing features from AN [14]. Correlating these histopathological findings with clinical and dermoscopic evidence is essential for establishing an accurate diagnosis. Dermatologists, with their expertise in combining clinical, dermoscopic, and histopathologic evaluations, play a pivotal role in both diagnosing and managing CARP.

Minocycline remains the first-line treatment for CARP [1]. However, due to the rising prevalence of antibiotic resistance in the Philippines, the authors aimed to practice antimicrobial stewardship [15]. Furthermore, considering the difficulty in obtaining the drug of choice, oral isotretinoin was selected as an alternative therapy. Several published studies have reported successful outcomes with isotretinoin in CARP patients, supporting its efficacy **(Table 1)**.

Table 1. Summary of reported cases of confluent and reticulated papillomatosis treated with oral isotretinoin.

Author(s) (Year)	Age/Sex	Ethnicity	Location	Treatment Regimen	Response	Comments
Hodge et al. [16]	20 / M	Black	Face, chest, back	Isotretinoin 40 mg/day for 2 months	Complete clearance at 2 months; slight recurrence at 4 months	Biopsy specimen from chest resembled AN, but overall findings consistent with CARP
Lee et al. [17]	18 / M	Black	Neck, back, chest	Isotretinoin 2 mg/kg/day for 3 months, then tapered to 1.14 mg/kg/day	No recurrence	No histopathologic distinction noted between AN and CARP
Solomon et al. [18]	14 / F	Black	Chest, back	Isotretinoin 1 mg/kg/day for 14 weeks + 10% lactic acid lotion thereafter	Lesions remained clear even at 18 months	No response to prior Minocycline treatment
Solomon et al. [18]	17 / F	Not reported	Chest, back	Isotretinoin for 18 weeks + 10% lactic acid lotion thereafter	Complete response at 18 weeks; lesions remained clear at 19 months	No response to prior Minocycline treatment
Erkek et al. [6]	48 / F	European	Intermammary, interscapular, abdomen, buttocks	Isotretinoin 0.25 mg/kg/day on alternate days	Resolved after 2 months	Treatment discontinued at 2 months
Matanguihan et al. [19]	25 / F	Filipino	Trunk, nape, flexural areas	Isotretinoin 0.2 mg/kg/day for 6 months	Resolved within 2 weeks	Endocrine disorders ruled out before treatment

M: male; F: female

Isotretinoin is known to inhibit keratinization and reduce sebaceous gland activity; however, its use requires caution in females due to its teratogenic potential [20]. A systematic review reported that 4 out of 6 CARP cases treated with oral isotretinoin demonstrated

favorable outcomes after an average treatment duration of 150 days [21]. Despite these findings, there are no established guidelines regarding the optimal dosing or duration of therapy. Reported regimens vary widely, ranging from 0.2 to 2.0 mg/kg/day for periods of 2 to 6 months. A similar case involving a Filipino patient treated with a low dose of isotretinoin (0.2 mg/kg/day) for 6 months reported excellent clinical improvement without adverse events [19]. In the present case series, the authors initiated treatment with oral isotretinoin at 0.1 mg/kg/day, consistent with their clinical approach of starting at a lower dose before titrating upward. Both the authors and patients were satisfied with the treatment response, with significant clinical improvement observed by 24 weeks.

This case series adds to the growing body of evidence supporting oral isotretinoin as an effective treatment option for CARP. Notably, there remains a paucity of published reports involving Filipino female patients, making these findings an important contribution to the literature.

Conclusion

CARP is a distinct clinical entity characterized by hyperpigmented, reticulated patches and plaques, commonly affecting the nape, upper trunk, and intertriginous areas. Diagnosis can be challenging due to its clinical similarity to other hyperpigmented dermatoses, particularly AN. Histopathologic features alone are often insufficient for differentiation, so clinicpathologic correlation that integrates patient history, physical examination, histological findings, and relevant laboratory investigations is essential.

With growing concerns over antibiotic resistance, there is an increasing need for alternative therapies. Findings from this case series suggest that low-dose oral isotretinoin is a safe and effective treatment option for CARP, producing favorable clinical outcomes without significant adverse effects. To the best of the authors' knowledge, this represents one of the most recent documented reports of CARP successfully treated with isotretinoin in persons of color, particularly Filipino female patients.

Acknowledgement

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Potential Conflict of Interest

The authors declare no potential conflicts of interest.

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