Chronic Actinic Dermatitis in Thailand: A Study of Clinicophotobiological Characteristics and Treatment Outcomes Over 13 years

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ABSTRACT:
Background: There have been reported chronic actinic dermatitis (CAD) cases in younger patients of darker skin types, particularly in South Asian. There remains a relative paucity of information of CAD patients in Southeast Asia generally and Thailand specifically.
Objective: Address clinicophotobiological characteristics of CAD patients and outcomes of treatments in Thailand.
Materials and Methods: Medical records of Thai patients who diagnosed CAD and confirmed by phototesting were reviewed retrospectively from a 13-year period at a single center. Clinicophotobiological features, and outcomes of treatments were evaluated.
Results: Of 90 patients, a preponderance of patients were male with a median age at diagnosis of 55.73 ± 12.01 years; 63.3% of the patients had Fitzpatrick skin type IV. All patients presented with eczema on photodistributed areas, only 11 of those patients (12.2%) presented with eczema on both sun-exposed and sun-covered areas. Most patients demonstrated photosensitivities to both UVB and UVA (67.8%). Only 3.5% of patients had a photoallergy to a fragrance mix and balsam of peru. Fifty percent of patients had allergic contact dermatitis with fragrance mix (14.4%), balsam of peru (6.7%), nickel (6.7%), p-phenylenediamine (5.6%), and cobalt (5.6%). Less than 50% of the patients required systemic immunosuppressive treatment. Most patients had a partial response within a median time of 4 months after treatment.
Conclusion: Thai patients with CAD who have higher skin types are predominately observed in males with an earlier age at onset. Most patients exhibit both UVA and UVB photosensitivities. The coexistence of CAD and allergic contact dermatitis is common.
Key words: Chronic actinic dermatitis, Clinical, Photobiological, Phototesting, Photoprovocation testing, Photopatch testing, Patch testing, Outcomes of treatment, Thailand

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Introduction

Chronic actinic dermatitis (CAD) is an immune-mediated photosensitivity, triggered by ultraviolet (UV) and/or visible light. It was first described by Haxthausen in 1933[1]. It is characterized by persistent, itchy, eczematous lichenified plaques, primarily affecting sun-exposed areas. Moreover, lesions may extend into sun-covered areas in severe cases[2, 3]. The type IV hypersensitivity responses to endogenous photoallergens and exogenous allergens have been proposed as the pathogenesis of CAD[4,5]. CAD appears to exist across all races and Fitzpatrick skin types. Classic CAD is more common in elderly white males [4]. There has been reported patients with CAD who have higher Fitzpatrick skin types trend to be a younger age and a preponderance of female. The mean age of patients with Fitzpatrick skin types I-IV and V-VI were 58.1±2.5 and 40.7 ± 3.5 years, respectively. Moreover, the male and female ratio was reversed from 2:1 in lighter Fitzpatrick skin types to 1:2 in darker Fitzpatrick skin types[6].

The coexistence of CAD with other conditions have been reported, including photoaggravated atopic eczema, allergic contact dermatitis, photoallergic contact dermatitis, seborrheic dermatitis, HIV[7,8,9].

The histopathology of CAD typically involves epidermal spongiosis, and lymphohistiocyte infiltration superficial perivascular in the upper dermis to pseudolymphomatous (actinic reticuloid) features, which can be differentiated from other mimic conditions such as cutaneous T-cell lymphoma, and other connective tissue diseases, including dermatomyositis and acute/sub-acute cutaneous lupus[4,10].

Phototesting irradiated with broadband or narrowband (monochromator) UVB/UVA shows reduced minimal erythema dose (MED). Photoprovocation testing with broadband UVB/UVA/visible light wavelengths provokes eczematous response on the tested areas. The most common action spectrums are, in order, a combination of the all UVB/UVA/visible light (65%), UVB plus UVA (22%), UVA alone (5%), UVB alone (5%), and UVB plus visible light (3%)[4]. The least likely action spectrum is with visible light alone[4,6]. CAD patients with lighter and darker skin types have similar UV sensitivities with the classic elderly white male patients.

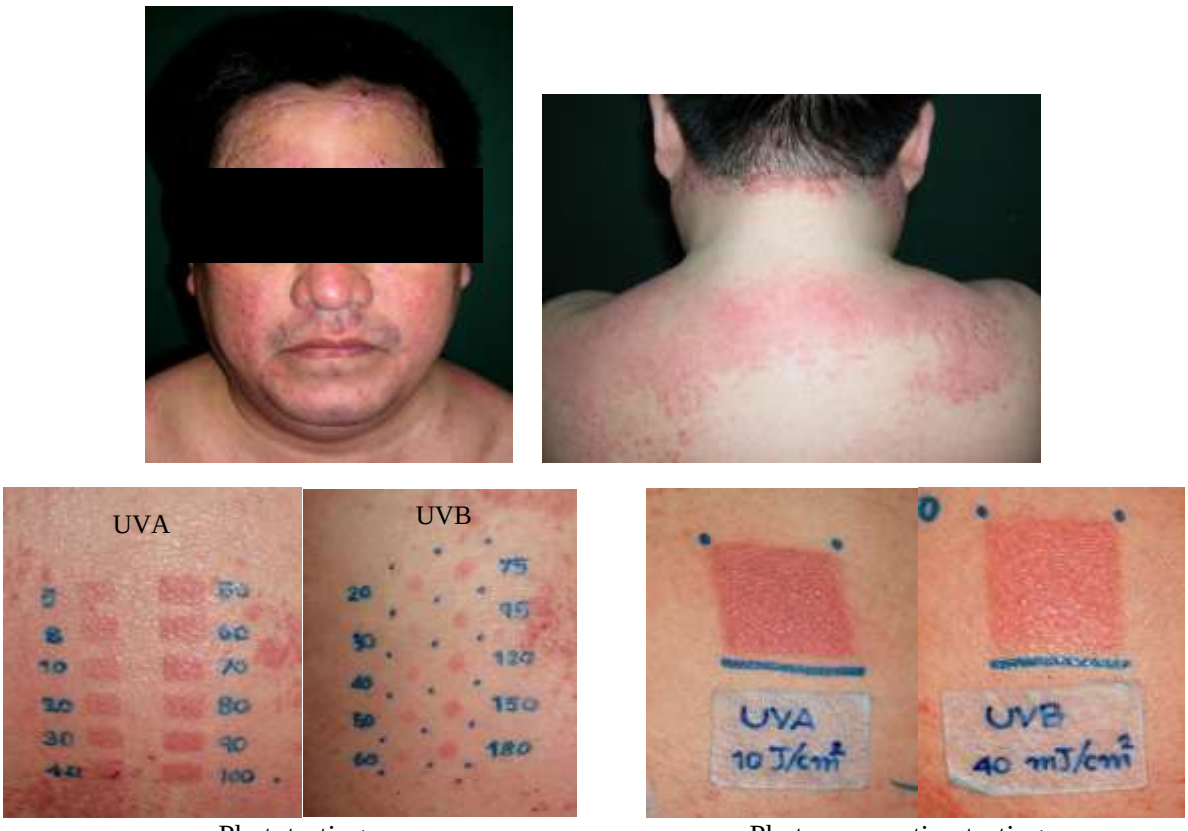
Additionally, photoallergic contact dermatitis and allergic contact dermatitis are linked to CAD[12]. Patients with CAD were more likely than non-CAD patients to have positive photopatch testing to sesquiterpene lactone mix and composites, as well as positive patch testing to fragrance mix I, p-phenylenediamine, tixocortol pivalate, and scesquiterpene lactone mix[2,12]. Photopatch testing with controlled patch testing and standard patch testing should be done as a routine investigation in CAD patients.

Many treatments are available for CAD patients to achieve complete clinical clearance. Patients with CAD are highly encouraged to stay out of direct sunshine, especially when they are outside between 10 a.m. and 4 p.m. Further, the appropriate maximum possible photoprotection should be utilized by CAD patients, including broad-spectrum sunscreen with high UVB/UVA protection factors, the wearing of long sleeves and long pant clothing with deep colors and tight weave fabrics, and also the use of wide brimmed hats. Additionally, the avoidance of relevant causative contact allergens must be monitored.

Topical corticosteroids or topical calcineurin inhibitors are needed for short-term and long-term application in localized photodistributed areas. Several systemic immunosuppressive drugs, either prednisolone or steroid-sparing agents which include azathioprine, ciclosporin, hydroxychloroquine, methotrexate, mycophenolate mofetil, and phototherapy may be required when the disease becomes refractory to treatment and/or widespread[5].

Recently, there was a successful treatment of a recalcitrant and severe CAD case utilizing dupilumab, tofacitinib, and baricitinib from a case report and small case series[13,14,15].

The majority of patients typically improve after the appropriate avoidance of both UV/visible light and relevant photocontact/contact allergens. Across the study, 20%, 25%, and 35% of the CAD patients had complete resolution at 5, 10, and 15 years respectively, or within a mean of 5.6 years (from 1 to 14 years). Further, 70% of the CAD patients, along with 80% and 90% also had partial improvement at 5, 10, and 15 years respectively, or within a mean of 3.8 years (with a range of 0-14 years). Five percent (5%) of the patients suffered no change nor worsening of their photosensitivities[16]. Predictors of worse prognoses are severe UVB photosensitivity and a multiple of 2 (or more) of contact allergies. Most CAD patients may completely recover from abnormal photosensitivity, while some may continue to have allergic contact dermatitis[17].



Phototesting Photoprovocation testing

Figure 1 A 60-year-old Thai male presents with a persistent eczematous rash, as depicted in the figure. Phototesting has confirmed an extremely low MED to both UVA and UVB. Additionally, papular lesions were distinctly observed in both the UVA and UVB tested areas from photoprovocation testing

CAD has been described in many ethnicities worldwide. The incidence of CAD is almost certainly lower than the actual number of cases. This is because there are inevitably undiagnosed CAD cases worldwide due to limited access to dermatologists and the

unavailability of diagnostic photo testing in some regions resulting in CAD cases being under or unreported in many areas. Classic CAD predominates in elderly white Caucasian men. There have been recently reported cases in younger patients of darker skin types, particularly South Asian[6].

Questions Addressed

Characteristics of CAD patients in Thailand and Southeast Asia, which are in the same geographical region and involve the same ethnicities, are inconclusive. Thai patients with CAD from a single referral center, the Institute of Dermatology in Bangkok, Thailand will be evaluated their clinical, photobiological characteristics, and outcome of the treatments. We also aim to review CAD patients in the Southeast Asia region from the literature.

Materials and Methods:

Study Design and Population

The present study was a retrospective analysis of patients with CAD who presenting with persistent dermatitis accompanied by lichenification in sun-exposed areas lasting more than three months. The diagnosis was confirmed through positive phototesting, which involved various combinations of UVB, UVA, and visible light, as well as the absence of any other more likely cause of photodermatitis. The patients were diagnosed with CAD between the periods of January 2008 – December 2020 at the Photodermatology Clinic, Institute of Dermatology, Bangkok, Thailand. Data was retrospectively reviewed from the hospital medical records and documented without patient identification. The study protocol was approved by the Institute of Dermatology Review Board's Ethics Committee (IRB 001/2565). A waiver of informed consent was also approved and obtained.

Data collection

A patient's demographic data included their age at time of diagnosis, gender, and Fitzpatrick skin type; a detailed history including their duration of the disease, UV exposure, concomitant diseases, causative contact allergens; clinical including morphology and distribution of skin lesions; histopathology; photobiological characteristics, including results of photo testing, photoprovocation testing, and photopatch testing; any treatment modalities; along with outcome to treatments, which classified as complete response, partial response, no response, and no change were evaluated from the hospital medical records[16,17,22]. CAD patients with no photodiagnostic findings were initially excluded.

Phototesting, Photoprovocation testing, Patch testing, and Photopatch testing

Phototesting was performed by the UVA-1 phototherapy system SL3000 using a halide lamp as the light source (Daavlin, Bryan, OH, USA) with wavelengths of 340–440 nm, a peak at 375 nm, and an irradiation dose of 5-100 J/cm2. Additionally, UV 802L testing using a fluorescent lamp (Herbert Waldmann GmbH & Co. KG, Villingen-Schwenningen, Germany) with wavelengths of 280–360 nm, a peak at 320 nm, and an irradiation dose of 30-300 mJ/cm2. Finally, a Kodak EKTALITE 1000 Slide Projector (Kodak AG, Stuttgart, Germany) with only visible light wavelength and an exposure time of 20 minutes was utilized on the patient's back. The Minimal Erythema Dose (MED) was the lowest UV dose which produced a perceptible erythema reading at 24 hours after UVA and UVB irradiation. If the MED-UVA < 30 J/cm2 it was interpreted as having UVA photosensitivity, and, accordingly, if the MED-UVB < 50 mJ/cm2, the interpretation was having UVB photosensitivity.

Moreover, if the phototesting was normal, the photoprovocation testing to provoke skin lesions with a double dose of MED-UVA (must be less than 100J/ cm2), a double dose of MED-UVB, and a 20- minutes of visible light

irradiated over 3 more consecutive days was then carried out. The photoprovocation testing results were evaluated at 24, 48, and 72 hours after irradiation. Any skin lesions that developed on the tested area were determined to be a positive reaction.

A photopatch testing and control patch testing were performed using mainly allergens of UV filters, fragrances, preservatives, and antiseptic allergens. The photopatch test side was irradiated with a fixed dose of UVA 10 J/cm2. The interpretation using the International Contact Dermatitis Research Group (ICDRG) grading were then read after 48 and 96 hours[18].

Statistical analysis

All variables and results were analyzed with descriptive statistics. Categorical variables, including gender, Fitzpatrick skin type, UV exposure, concomitant diseases, clinical and photodiagnostic findings, therapies, and responsiveness to treatments were presented as frequencies and percentages. Whereas continuous variables, including age, duration of disease, percentage of body surface area (BSA) involvement, and time to response were described as a mean with a standard deviation (SD) and a median with an interquartile range (IQR). All statistical analysis were carried out with SPSS version 18.0 (SPSS Inc., Chicago, USA).

Results

A total of 90 definite CAD patients were collected and analyzed. Their demographics were described in **Table 1.** There were seventy-nine males (87.8%) and eleven females (12.2%) in the study, with a mean age at diagnosis of 55.73 (12.01) years and a median duration of disease of 12 (6, 48) months. Most patients were of lighter Fitzpatrick skin types (Type III 10%; Type IV 63.3%), and a minority were of a darker skin type (Type V 26.7%). Fifty-six patients (62.2%) had a history of UV exposure due to daily life activities, and 34 patients (37.8%) due to their careers involving outdoor work. Nearly half of the patients, 41patients (45.6%) had concomitant diseases, which were hypertension in 26 patients (28.9%), diabetes mellitus in 12 patients (13.3%), and dyslipidemia in 10 patients (11.1%). Only three patients (3.3%) had atopic dermatitis coexist with CAD. Additionally, none of the patients had any prior known history of contact allergens.

All CAD patients were tested using broadband phototesting and photoprovocation testing. Most patients (53.3%) had a normal MED to UVA and UVB. Of the remaining, 27 (30%), 9 (10%), and 6 (6.7%) of patients had a reduced MED to UVB, UVA, and both UVA/UVB, respectively. While all 90 patients had positive photoprovocation testing, with a majority of 67.8% to both UVA and UVB, another 23.3% to UVB alone, and the remaining 8.9% to UVA alone. None of the patients had any abnormal visible light sensitivities in our study. All photobiological findings of patients were consistent with their clinicals of CAD.

Table 1 Demographics of CAD patients

Demographics	n	(%)
Gender		
Male	79	(87.8)
Female	11	(12.2)
Age at diagnostic (years), Mean ± SD	55.73 ± 12.01	
Duration of disease (months), Median, (IQR25-IQR75)	12	(6, 48)
Fitzpatrick skin type		
III	9	(10.0)
IV	57	(63.3)
V	24	(26.7)
UV exposure		
Daily life	56	(62.2)
Job	34	(37.8)
Concomitant diseases	41	(45.6)
Hypertension	26	(28.9)
Diabetes mellitus	12	(13.3)
Dyslipidemia	10	(11.1)
Allergic dermatitis	3	(3.3)
Others	12	(13.3)
Phototoxic/Photoallergic agent	0	(0.0)

Table 2 Clinicophotobiological characteristics, Treatment, and Outcomes of Treatments of CAD patients

Characteristics	n	(%)
Clinicals		
Subacute eczema	2	(2.2)
Chronic eczema	88	(97.8)
Patchy lesion	41	(45.6)
Confluent lesion	77	(85.6)
Itchiness	90	(100)
Location		
% BSA involvement, Median (IQR25,IQR75)	30	(20, 40)
Sun-exposed area	90	(100)
Sun-covered area	11	(12.2)
Histopathology	45	(50.0)
Non-specific dermatitis	41	(91.1)
Lichen simplex chronicus	4	(8.9)
Phototesting		
MED UVA		
Normal	81	(90.0)
Low	9	(10.0)
MED UVB		
Normal	63	(70.0)
Low	27	(30.0)
Both MED UVA and UVB		
Normal	63	(70.0)
Low	6	(6.7)
Photoprovocation testing		
UVA		

Table 2 Clinicophotobiological characteristics, Treatment, and Outcomes of Treatments of CAD patients

Negative	82	(91.1)
Positive	8	(8.9)
UVB		
Negative	69	(76.7)
Positive	21	(23.3)
Both UVA and UVB		
Negative	29	(32.2)
Positive	61	(67.8)
Visible light		
Negative	90	(100)
Photopatch testing	57	(63.3)
Positive	2	(3.5)
Patch testing	62	(68.9)
Positive	31	(50.0)
Treatments		
Sunscreen	85	(94.4)
Avoid sunlight	66	(73.3)
Clothes		
Long-sleeve shirt	83	(92.2)
Short-sleeve shirt	7	(7.8)
Long pants	81	(90.0)
Short pants	9	(10)
Topical corticosteroids	90	(100)
Topical Emollients	87	(96.7)
Oral therapies		
Antihistamine	90	(100)
Immunomodulator		
Corticosteroids	36	(40.0)
Azathioprine	6	(6.7)
Hydroxychloroquine	3	(3.3)
Phototherapy hardening	3	(3.3)
Type of phototherapy		
PUVA	2	(2.2)
UVA1	1	(1.1)
Outcomes of treatments[†]		
Complete response	0	(0)
Partial response	64	(71.1)
No response	25	(27.8)
No change	1	(1.1)
Worsened	0	(0)
Time to response (month), Median (IQR25, IQR75)	4	(3, 6)

[†] Outcomes of Treatments[16, 17, 22:]
Complete response - 100% improvement in clinical features, current available clinical records reported resolution of CAD; Partial response - 25-99% improvement in clinical features, current available clinical records reported marked improvement of CAD; No response - less than 25% improvement in clinical feature,s current available clinical records reported only a slight improvement of CAD; No change - current available clinical records reported no change in the improvement of CAD; Worsened conditions - current available clinical records reported a worsening of CAD.

Clinical and photobiological characteristics of CAD patients were shown in **Table 2.** Chronic eczema (97.8%) was the most common clinical feature, while some showed subacute eczema (2.2%). All patients suffered from itching. The skin rashes were confluent (85.6%) and patchy (45.6%) pattern involving a median of BSA 30% (20, 40). The rashes were distributed at the sun-exposed areas (100%) and some rashes extended into sun-covered areas (12.2%). Forty-five patients had skin biopsies performed indicating non- specific dermatitis (91.1%) and lichen simplex chronicus (8.9%). There was no evidence of cutaneous T-cell lymphoma.

All CAD patients were tested using broadband phototesting and photoprovocation testing. Most patients (53.3%) had a normal MED to UVA and UVB. Of the remaining, 27 (30%), 9 (10%), and 6 (6.7%) of patients had a reduced MED to UVB, UVA, and both UVA/UVB, respectively. While all 90 patients had positive photoprovocation testing, with a majority of 67.8% to both UVA and UVB, another 23.3% to UVB alone, and the remaining 8.9% to UVA alone. None of the patients had any abnormal visible light sensitivities in our study. All photobiological findings of patients were consistent with their clinicals of CAD.

Fifty-seven of the patients underwent photopatch testing with control patch testing. Separately, sixty-two patients underwent standard patch testing. Only two patients (3.5%) had a positive photopatch with fragrance mix and balsam of Peru. Also 31 patients (50%) had a positive patch test. The predominant contact allergens were fragrance mix (14.4%), followed by balsam of Peru (6.7%), nickel (6.7%), p-phenylenediamine (5.6%), and cobalt (5.6%).

The treatments and responsiveness to treatment were reviewed retrospectively. Eighty-five of the patients (94.4%) applied sunscreen. Sixty-six of the patients (73.3%) verbally agreed to avoid UV exposure during the hours of 10:00 am – 16:00 pm in their daily activities. Most of the patients dressed with long-sleeve shirts and long pants. Other treatment modalities included all patients receiving topical steroids, topical emollients, and oral antihistamines. A mixture of patients, 40%, 6.7%, and 3.3% respectively, were treated with systemic corticosteroid, azathioprine, and hydroxychloroquine that were used as immunosuppressants in severe or refractory CAD cases. Only a small number of patients received phototherapy for hardening. The responsiveness to treatment was that 71.1% of the patients achieved a partial response, 27.8% of the patients had no response, and 1.1% had no change during a median follow-up period of 12 (6, 48) months. The median response time was 4 (3, 6) months in this study.

Discussion

The present study retrospectively reviewed the characteristics of Thai patients with CAD over a period of 13 years. A preponderance of these patients were male, Fitzpatrick skin type IV-V, with a mean age of 55.73 (12.01) years at diagnosis, and a median disease duration of 12 (6, 48) months. We observed the early onset of CAD in a Thai patient with a higher skin type, differing from classic presentations of CAD. Almost 50% of these CAD patients had either hypertension, diabetes mellitus, or dyslipidemia as concomitant diseases. These patients had chronic eczematous lesions on their sun-exposed skin, with one-fourth of the cases having lesions extending into sun-covered areas. Despite this, a low MED to UVA and/or UVB is one of diagnostic criteria of CAD[3]. The majority of patients in our study exhibited normal MED to UVA or UVB or both UVA and UVB by photo testing. However, those patients nevertheless demonstrated both UVA and UVB photosensitivities with positive results in photoprovocation testing. Our finding was consistent with a previous study that showed normal MED with a positive result in photoprovocation testing from 18.2% out of 488

Chinese CAD patients[19]. The clinical-photobiological characteristics of all our 90 cases were consistent with CAD.

Contact and photocontact allergens may be a part of the pathogenesis of CAD. Our photoallergens in photopatch panels included sunscreen filters, preservatives, antiseptics, fragrances, plants, and medication. Only 2 out of 57 patients had a photoallergy to fragrance mix and balsam of Peru, while almost half of our patients had a contact allergy to fragrance mix, balsam of Peru, nickel, p-phenylenediamine, and cobalt. We demonstrated a decline in sesquiterpene lactone mix allergy to p-phenylenediamine allergy in CAD patients. Benzophenone-3 is a theoretically well-known sunscreen filter that causes a photoallergy/contact allergy in patients with all skin types[6]. None of our cases had photoallergy to any tested sunscreen filters. Moreover, allergic contact dermatitis was common in our study.

There was no suspected case of photo-aggravated atopic dermatitis (PAD) in the present study. PAD is a well- recognized subtype of atopic dermatitis that predominantly affects adult females with a median age of 45. The condition manifests as photodistributed eczema in patients who have previously been diagnosed with typical atopic dermatitis (AD). PAD showed abnormal UV/visible light photosensitivities, mostly in the mid UVA wavelength, and positive 1 (or more) photopatch allergens[20, 21].

All CAD patients were instructed to use absolute photoprotection. Less than half of our patients required systemic immunosuppressive treatment. Most patients achieved a partial response within a median time of 4 months after treatment.

The clinical and photobiological characteristics, as well as treatment outcomes, of our CAD patients in this study are consistent with previous studies conducted in Thailand and Singapore. Thailand and Singapore are in the same geographical region as well as similar ethnicities of the Southeast Asia region generally as shown in **Table 3.**

Table 3 Results of the Literature Review and the present study

References	Wong and Khoo. 2005[24]	Tan et al. 2011[25]	Sombatmaithai et al. 2018 [23]	This present study
Study design	Retrospective, descriptive study	Retrospective, descriptive study	Retrospective, descriptive study	Retrospective, descriptive study
Number of cases	19	58	45	90
Study period (Years)	2 (2000-2001)	5 (2005-2009)	17 (1997 - 2013)	13 (2008-2020)
Country	Singapore	Singapore	Thailand	Thailand
Ethnicities	Chinese, Malay, Indian, Eurasian, Asian, Caucasian	Chinese, Malay, Indian, Eurasian	Thai	Thai
Mean age (years)	Mean age 59 (45 - 80)	Mean age at diagnosis62 (35-83)	Mean age of onset 57.5 (28 - 84)	Mean age at diagnosis 55.7 (24 - 82)
Duration of disease	NA	NA	NA	12 (6, 48) months
Male:Female ratio	3.1:1	4.3:1	6.5:1	5.5:1
Fitzpatrick skin phototype	NA	IV- 84.5% V - 15.5%	III - 13% IV - 60% V - 27%	III - 10% IV - 63.3% V - 26.7%
Concomitant diseases	HIV	HIV	HIV	Hypertension, diabetes mellitus, dyslipidemia
Extensive skin involvement into the sun-covered area	NA	NA	24.4%	12.2%

Table 3 Results of the Literature Review and the present study

Photodiagnostic testing, n (%)				
UVA	1 (5.3%)	3 (5.1%)	4 (9.0%)	8 (8.8%)
UVB	2 (10.5%)	23 (39.7%)	18 (40.0%)	21 (23.3%)
VL	NA	NA	NA	0 (0%)
UVA/UVB	16 (84.2%)	32(55.2%)	23(51.0%)	61 (67.8%)
UVA/UVB/VL	NA	NA	NA	0 (0%)
Photopatch testing, n (%)	0/7 (0%)	0/1(0%)	0/5(0%)	2/57(3.5%): fragrance mix, balsam of peru
Patch testing, n (%)	NA	NA	4/8 (50.0%): fragrance mix I, coal tar dye, p-phenylenediamine, potassium dichromate	31/62 (50.0%): fragrance mix (14.4%), balsam of peru (6.7%), nickel (6.7%), p-phenylenediamine (5.6%), cobalt (5.6%)
Treatments	NA	100% Photoprotection, 100% Topicals 31.0% systemic corticosteroids 13.8% azathioprine	100% Photoprotection, 100% Topicals 40% systemic corticosteroids 38.8%: azathioprine (5), ciclosporin (1), chloroquine (1)	94.4% Photoprotection, 100% Topicals 40% systemic corticosteroids 6.7% azathioprine 3.3%hydroxychloroquine
Outcomes to treatment	NA	0% achieved complete response, 100% achieved partial response	6 (17%) achieved complete response, 29 (83%) achieved partial response	0% achieved complete response, 64 (71.1%) achieved partial response,
Mean of follow - up period (months)	NA	16.8	24.5 (1 -72)	12 (6, 48)

The retrospective nature of our study was its main limitation, even though we assessed only CAD patients who fit both clinical and objective photobiological features. The frequency of CAD in the present study is almost certainly lower than actual cases due to limited access to see dermatologists and the unavailability of photodiagonostic testing in some parts of Thailand. The frequencies of allergic contact / photoallergic contact dermatitis in the present study and in the Southeast Asia region were lower than previous studies in different regions. The routine photopatch and control patch testing with only possible photoallergens performed in patients with suspected CAD might also be a limitation. Standard patch testing should be considered in all suspected CAD patients to identify possible contact allergens which may be a pathogenesis of CAD or coexisting disease. Moreover, we could not identify complete treatment responses after the treatment due, in some cases, to a short followed-up period in the medical records.

Conclusion

The CAD patients in Thailand and Southeast Asia, primarily with higher skin types, were mainly observed in males who had an earlier age of onset, which differs from the classic presentation of CAD. In our study, the majority of patients exhibited persistent eczematous lesions in areas exposed to sunlight, with approximately one-fourth of the cases having lesions extending into sun-covered areas. The

majority of patients demonstrated both UVA and UVB photosensitivities. These patients also coexisted with conditions of allergic contact dermatitis. Less than half of the patients required systemic immunosuppressive treatments. Most patients achieved either partial or complete remission after undergoing treatment.

Data Availability Statement

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

Ethical statement

The study protocol was approved by the Institute of Dermatology Review Board's Ethics Committee (IRB 001/2565).

Conflict of Interest

The authors declare that they have no conflicts of interest regarding the publication of this article.

Author contribution statement

Bensachee Pattamadilok conceptualized the study, developed methodology, administrated project, supervised the study, analysed data, and wrote the manuscript.

Arada Ovattrakul collected and analysed data.

All authors have read and approved the final version of the manuscript.

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