

## A Case of Atopic Dermatitis Co-existing with Psoriasis Vulgaris

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### Abstract

The coexistence of atopic dermatitis (AD) and psoriasis has been not impossible, because their respective immunological situations involve distinct reactions. Recently, there are some reports of comorbidity of AD and psoriasis. Here we present the case of a patient with AD who developed psoriasis. A 43-year-old female developed AD, and new erythema has increased over 40 years. The results of skin biopsy showed psoriasis-form changes. We started to treat her using cyclosporine, second-generation anti-histamine tablets, steroid ointments, and Dovobet® ointment under a diagnosis of AD with psoriasis. Now we treat her using narrow-band UVB phototherapy and steroid ointments. Her skin condition is under good control. Further investigation is needed on the pathogenesis and immunological situation of the coexistence of AD with psoriasis.

**Keywords** Atopic dermatitis (AD); Psoriasis; Th1; Th2; Co-exist; Comorbidity

### Summary

The coexistence of atopic dermatitis (AD) and psoriasis has been not impossible, because their respective immunological situations involve distinct reactions. Recently, there are some reports of comorbidity of AD and psoriasis. Here we present the case of a patient with AD who developed psoriasis.

A 43-year-old female developed AD, and new erythema has increased over 40 years. The results of skin biopsy showed psoriasis-form changes.

We started to treat her using cyclosporine, second-generation anti-histamine tablets, steroid ointments, and Dovobet® ointment (calcipotriol hydrate and betamethasone dipropionate compounding ointment) under a diagnosis of AD with psoriasis. Now we treat her using narrow-band UVB phototherapy and steroid ointments. Her skin condition is under good control.

Further investigation is needed on the pathogenesis and immunological situation of the coexistence of AD with psoriasis.

### Introduction

Is it true that atopic dermatitis (AD) and psoriasis vulgaris coexist? Many dermatologists say that AD and psoriasis vulgaris do not develop in the same patient because their respective immunological situations involve distinct reactions [1-3]. The immunological situation of AD skin varies depending on the affected areas and the stage of the dermatitis. Immune reactions of AD, especially acute one, are Th2-type reactions [1,2]. Psoriasis skin lesions, on the other hand, show none of the varieties of immunological skin conditions and are characterized by Th1 cell immune reactions [3]. In chronic AD, interferon-gamma production by Th1 cells predominates over interleukin (IL)-4 productions by Th2 cells [4]; this might indicate that the immunological reaction is reversed from Th2 to Th1. We have seen

positive reactions on patch testing in psoriasis patients, suggesting that it is possible for AD and psoriasis to coexist. Additionally, some previous studies have mentioned the coexistence of these diseases [5-8]. Recently, a surprising report found that 24.5% of children with psoriasis are also affected by atopic eczema [9]. The coexistence of AD and psoriasis is thus not impossible, and scientific progress will clarify the immunological skin conditions of dermatoses. Here we present the case of a patient with AD who developed psoriasis.

### Case

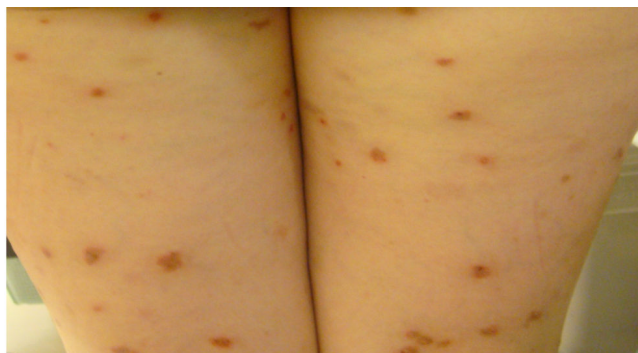
A 43-year-old female developed AD (Figure 1) as a child, and new, round, light erythema with pigmentation, scaling, and itching has increased on her arms, thighs (Figure 2), and legs over 40 years. She has used steroid ointments for her atopic dermatitis, but her new plaque has increased.



Figure 1: Clinical findings of atopic dermatitis on her neck.

The results of skin biopsy in the new affected area showed psoriasis-form changes such as elongated rete ridges, acanthosis, increasing the

number of micro vascular in the dermis, and neutrophilic micro-abscesses (Figure 3).



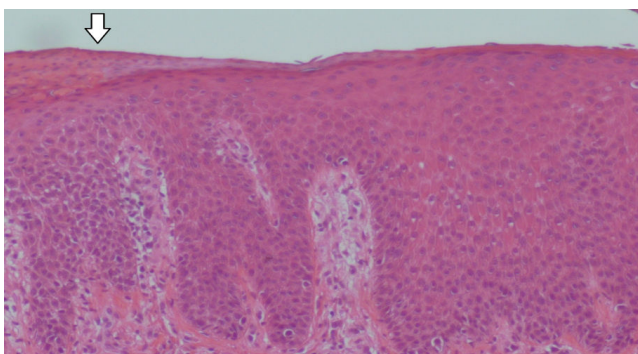
**Figure 2:** Clinical findings of new plaque on her thighs.

Laboratory data were immunoglobulin E (IgE) RIST, 384 IU/ml; eosinophils 2.5% (1-5%); thymus-and activation-regulated chemokine (TARC), 1359; and lactate dehydrogenase (LDH), 192 (120-240) IU/l; and the patient's biochemical data were within normal range. We started to treat her using cyclosporine 200 mg/day, second-generation anti-histamine tablets, steroid ointments, and Dovobet® ointment (calcipotriol hydrate and betamethasone dipropionate compounding ointment) under a diagnosis of AD with psoriasis.

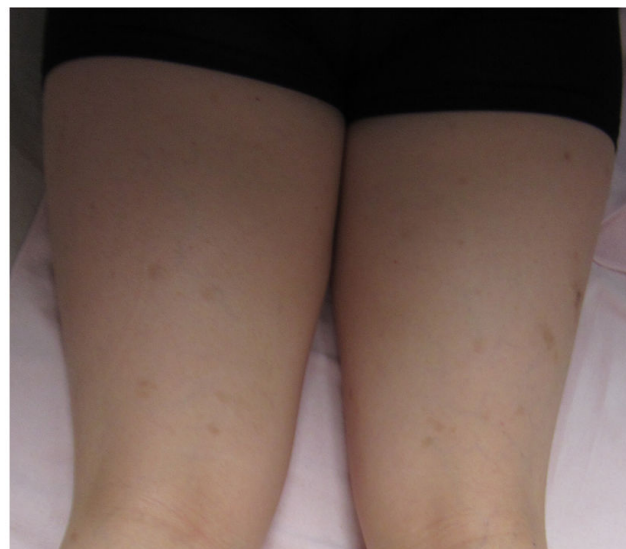
Her skin condition gradually improved, and now we treat her using narrow-band UVB phototherapy and steroid ointments. Her skin condition is under good control (Figure 4).

## Discussion

The present report may provide critical evidence against the mainstream view that AD and psoriasis do not coexist. Although the non-coexistence of AD and psoriasis is theoretically correct, unexpected events may occur in the human body, leading to such a co-existence.



**Figure 3:** Histopathological findings of her new plaque. Arrow indicate neutrophilic micro-abscesses.



**Figure 4:** Clinical findings of her improved skin on the thighs.

Many physicians have investigated the genetic relationships between AD and psoriasis, and genomic imprinting in these two conditions shows different patterns [10]. These dermatoses are not hereditary disorders, but the incidence of children with AD from parents with atopic (allergic) disease are higher than that from parents or one parent without atopic (allergic) disease [11,12]. Stefanie [6] suggests that antigen-specific T-cell subsets determine the pathogenesis of psoriasis and atopic eczema. The immunological status of AD and psoriasis has been previously described. AD is a Th2/Th22-dominant [1] disease, and psoriasis is a Th1 and/or Th17 disease [1,13]. AD causes Th2-dominated immune reactions through the elevation of allergen-specific IgE [2], while psoriasis is characterized by Th1 immune reactions through the elevation of interleukin-17A, -17F and -22 [3]. The results of tumor necrosis factor  $\alpha$  (TNF- $\alpha$ ) antibody injections indicate that blocking with a specifically targeted agent against Th1-mediated and Th17-mediated immune disease may result in a flare of Th2-mediated disease [6]. Stefanie [6] reports that distinct T-cell subpopulations were found to infiltrate the same organ: predominantly Th1 and Th17 cells in psoriasis, and Th2 cells and Th22 cells in atopic eczema. Previous reports have also shown that acute AD has a largely Th2-mediated action, but the chronic phase of AD is more Th1-mediated [4,14,15]. Our speculation is that psoriasis might be a transition of the immunological skin situation due to allergens or irritant reactions, because we confirmed by patch test in psoriasis patients that eczema reactions are positive reactions.

Previous studies on chemokines and these dermatoses have shown that C-C motif chemokine ligand 1 (CCL1) is associated with AD, and that both CCL1 and CCL18 may play important roles in the initiation and progression of atopic skin inflammation [16]. Additionally, C-C motif chemokine receptor 4 (CCR4) and CXCR3 were found to be preferentially expressed on CD4+ T cells from AD and psoriasis vulgaris, respectively [17]. Uchida [17] showed that CCR4 and CXCR3 expression on peripheral blood CD4+ and CD8+ T cells in adult AD is greater than that in patients with psoriasis vulgaris and healthy controls.

Th2 cells selectively express CCR3, CCR4, and CCR8, while Th1 cells selectively express CXCR3 and CCR5 on their surface [18-21]. The chemokine receptor predominantly expressed on Th1 cells is CCR5 [21]. Uchida [17] demonstrated that the expression of CCR5+ cells increases in the affected areas of AD and psoriasis patients, but psoriasis patients possess cells that express CCR5 rather than CCR4. Not all chemokines can be completely classified based on Th1 or Th2 reactions, and each chemokine overlaps with Th1 and Th2 cells in affected areas.

Generally, dry skin (xerosis cutis) is more likely to lead to contact dermatitis than normal skin. Psoriasis areas show a lot of scale, and it may therefore be easy for allergic contact dermatitis (ACD) to arise via psoriasis affected areas. Our impression is that the number of people with psoriasis and ACD is smaller than that of those with AD and ACD, and that this may depend not only on Langerhans and other dendritic cells in AD and psoriasis and other immune skin conditions, but also on Th balance and chemokines.

The ligand of Th2-type CCR (CCR4) is TARC [22]. TARC are produced by skin cells in AD, and CCR-4 expressed cells are attracted to the AD lesions. Serum TARC levels are markedly elevated and epidermal keratinocytes strongly express TARC in AD [23]. These previous reports indicate that TARC level could be reflected as inflammation levels (markers) of AD. In the present study, our patients' TARC levels were not high, but our findings show a transition from acute to chronic stage as TARC and IgE RIST increase. These findings support the diagnosis of AD.

The pathogenesis of AD and psoriasis expressed in terms of Th cells remains to be fully confirmed, and additional clarification is required regarding unexpected immunological events that could develop in the human body. Further investigation is needed on the immunological situation of the coexistence of AD with psoriasis.

## Conclusion

We reported a case of AD coexisting with psoriasis vulgaris in adult female. The pathogenesis and immunopathology of comorbidity in adult with AD and psoriasis are not classified completely. It needs further investigations.

## References

1. Carretero M, Guerrero-Aspizua S, Illera N, Galvez V, Navarro M, et al. (2016) Differential features between chronic skin inflammatory diseases revealed in skin-humanized psoriasis and atopic dermatitis mouse models. *J Invest Dermatol* 136: 136-145.
2. Bieber T (2008) Atopic dermatitis. *N Engl J Med* 358:1483-1494.
3. Nestle FO, Kaplan DH, Barker J (2009) Psoriasis. *N Engl J Med* 361: 496-509.
4. Thepen T, Langeveld-Wildschut EG, Bihari IC, van Wichen DF, van Reijssen FC, et al. (1996) Biphasic response against aeroallergen in atopic dermatitis showing a switch from an initial TH2 response to a TH1 response in situ: an immunocytochemical study. *J Allergy Clin Immunol* 97: 828-837.
5. Kamer B, Rotsztein H, Kulig A, Raczynska J, Piotrowicz M, et al. (2005) The coexistence of atopic dermatitis and psoriasis in a 12 months-old girl. *Pol Merkuri Lekarski* 19: 542-544.
6. Stefanie Eyerich, Anna T Onken, Stephan Weidinger, Andre Franke, Francesca Nasorri, et al. (2011) Mutual antagonism of T cells causing psoriasis and atopic eczema. *N Engl J Med* 365:231-238.
7. Willsmann-Theis D, Hagemann T, Jordan J, Bieber T, Novak N (2008) Facing psoriasis and atopic dermatitis: are there more similarities or more differences? *Eur J Dermatol* 18: 172-180.
8. Kapila S, Hong E, Fischer G (2012) A comparative study of childhood psoriasis and atopic dermatitis and greater understanding of the overlapping condition, psoriasis-dermatitis. *Australas J Dermatol* 53: 98-105.
9. Augustin M, Radtke MA, Glaeske G, Reich K, Christophers E, et al. (2015) Epidemiology and comorbidity in children with psoriasis and atopic eczema. *Dermatology* 231: 35-40.
10. Nguyen CM, Liao W (2015) Genomic imprinting in psoriasis and atopic dermatitis: A review. *J Dermatol Sci* 80: 89-93.
11. Uehara M, Kimura C (1993) Descendant family history of atopic dermatitis. *Acta Derm Venereol* 73: 62-63.
12. Kjellman NI (1977) Atopic disease in seven-year-old children. Incidence in relation to family history. *Acta Paediatr Scand* 66: 465-471.
13. Fujita H, Shemer A, Suárez-Fariñas M, Johnson-Huang LM, Tintle S, et al. (2011) Lesional dendritic cells in patients with chronic atopic dermatitis and psoriasis exhibit parallel ability to activate T-cell subsets. *J Allergy Clin Immunol* 128: 574-82.e1-12.
14. Grewe M, Walther S, Gyufko K, Czech W, Schöpf E, et al. (1995) Analysis of the cytokine pattern expressed in situ in inhalant allergen patch test reactions of atopic dermatitis patients. *J Invest Dermatol* 105: 407-410.
15. Haapakoski R, Karisola P, Fyhrquist N, Savinko T, Lehtimäki S, et al. (2013) Toll-like receptor activation during cutaneous allergen sensitization blocks development of asthma through IFN- $\gamma$ -dependent mechanisms. *J Invest Dermatol* 133: 964-972.
16. Kim HO, Cho SI, Chung BY, Ahn HK, Park CW, et al. (2012) Expression of CCL1 and CCL18 in atopic dermatitis and psoriasis. *Clin Exp Dermatol* 37: 521-526.
17. Uchida T, Suto H, Ra C, Ogawa H, Kobata T, et al. (2002) Preferential expression of T(h)2-type chemokine and its receptor in atopic dermatitis. *Int Immunol* 14: 1431-8.
18. Sallusto F, Mackay CR, Lanzavecchia A (1997) Selective expression of the eotaxin receptor CCR3 by human T helper 2 cells. *Science* 277: 2005-2007.
19. Bonecchi R, Bianchi G, Bordignon PP, D'Ambrosio D, Lang R, et al. (1998) Differential expression of chemokine receptors and chemotactic responsiveness of type 1 T helper cells (Th1s) and Th2s. *J Exp Med* 187: 129-134.
20. D'Ambrosio D, Iellem A, Bonecchi R, Mazzeo D, Sozzani S, et al. (1998) Selective up-regulation of chemokine receptors CCR4 and CCR8 upon activation of polarized human type 2 Th cells. *J Immunol* 161: 5111-5115.
21. Zingoni A, Soto H, Hedrick J, Stoppacciaro A, Storlazzi C, et al. (1998) The chemokine receptor CCR8 is preferentially expressed in Th2 but not Th1 cells. *J Immunol* 161: 547-551.
22. Campbell JJ, Haraldsen G, Pan J, Rottman J, Qin S, et al. (1999) The chemokine receptor CCR4 in vascular recognition by cutaneous but not intestinal memory T cells. *Nature* 400: 776-780.
23. Kakinuma T, Nakamura K, Wakugawa M, Mitsui H, Tada Y, et al. (2001) Thymus and activation-regulated chemokine in atopic dermatitis: serum thymus and activation-regulated chemokine level is closely related with disease activity. *J Allergy Clin Immunol* 107: 535-541.