Annular pustular psoriasis in an 11-Year-Old boy: Case report

Luu Ngoc Vi*, Nguyen Thi Quynh Trang, Vu Thu Trang, Hoang Quoc Tuan, Nguyen Thi Thuy Quynh, Le Minh Chau, Nguyen Ha Anh, and Phung Thi Lan Huong

108 Military Central Hospital

Summary

Annular pustular psoriasis (APP) is a rare variant of psoriasis, particularly in the pediatric population. This report presents a case of an 11-year-old boy with widespread annular pustular lesions characterized by well-defined erythematous plaques with superficial pustules and scaling. The patient showed excellent response to a topical regimen combining calcipotriol and betamethasone dipropionate, with no recurrence during follow-up. This case highlights the importance of early recognition and the potential effectiveness of non-systemic management for pediatric APP.

Key words: annular pustular psoriasis, pediatric, topical therapy, calcipotriol, betamethasone dipropionate.

I. BACKGROUND

Psoriasis is a chronic, immune-mediated inflammatory skin disease affecting both children and adults [1]. While plaque-type psoriasis is the most common form, pustular variants - especially the annular pustular psoriasis (APP) - are exceedingly rare in pediatric patients, which can pose diagnostic and therapeutic challenges [2]. The development of pustular psoriasis (PP) and psoriatic erythroderma in children is rare compared to adults. The estimated prevalence of PP is about 1.1% of cases of psoriasis during childhood. Mean age at presentation of PP is 6.3 ± 4.9 years with a slight male predominance (54%) [3]. This case report aims to improve clinical awareness of APP in children and emphasize the effective topical treatment, thereby reducing the need for systemic therapy in appropriately selected cases.

***Received**: 23/7/2025, **Accepted**: 28/10/2025*

***Correspondence to**: ngocvi54@gmail.com*

108 Military Central Hospital

II. CASE PRESENTATION

An 11-year-old boy, with no known history of chronic illnesses and an elevated body mass index (BMI) of 24.4, presented with skin lesions that had first appeared six months prior. The initial lesions manifested as erythematous patches with well-demarcated borders and silvery scaling on the trunk, ranging from less than 1 cm to over 10 cm in diameter. The patient remained afebrile and reported mild pruritus. Over the subsequent two months, the lesions progressively extended to the face, trunk, and extremities. Initially, the condition was misdiagnosed as atopic dermatitis or allergic contact dermatitis. He was treated intermittently with moderate-potency topical corticosteroids (betamethasone valerate 0.1% cream), moisturizers, and oral antihistamines, resulting in partial improvement but with recurrent flares. Before being referred to our dermatology department, the patient experienced a sudden flare-up of annular pustular lesions affecting previously involved areas shortly after discontinuing treatment. There was no family history of psoriasis or recent drug exposure.

Physical examination revealed symmetrical distribution of annular erythematous plaques surrounded by superficial, non-follicular pustules and overlying scaling on the trunk, limbs, neck and inguinal folds. Koebner's phenomenon was present and his nails were not affected. Notably, the patient's general condition remained stable; however, he reported discomfort and social embarrassment due to extensive skin involvement.

A skin fungal microscopy test using specimens from the neck and groin areas returned negative results. The skin biopsy revealed psoriasiform epidermal hyperplasia with elongated and regular rete ridges. The stratum corneum showed parakeratosis, with marked thinning or absence of the granular layer. A well-formed subcorneal pustule filled with numerous neutrophils is identified. The superficial dermis contained a perivascular lymphocytic infiltrate with occasional neutrophils and dilated, tortuous capillaries in the papillary dermis. These features were consistent with pustular psoriasis. (Figure 1). Based on clinical and histological findings, a diagnosis of annular pustular psoriasis was confirmed.

The patient was initiated on Daivobet® ointment (calcipotriol 50 µg/g and betamethasone dipropionate 0.5 mg/g), applied once daily from Monday through Friday, and supplemented with Daivonex® ointment (calcipotriol 50 µg/g) on weekends. He used 2 tubes of Daivobet® and 1 tube of Daivonex® weekly, corresponding to about 4.5 mg of calcipotriol per week. Oral bilastine 10 mg once daily and Noreva® moisturizing cream were also prescribed. Significant improvement was noted within one week, with complete clearance of pustular lesions and residual mild scaling. Maintenance therapy continued for two weeks, involved alternating use of calcipotriol on weekdays and combination therapy on weekends. The patient applied 2 tubes of Daivonex® and 1 tube of Daivobet® per week for 2 consecutive weeks, corresponding to approximately 4.5mg of calcipotriol per week. He remained in remission for two weeks; subsequent follow-up data were unavailable. (Figure 2,3).

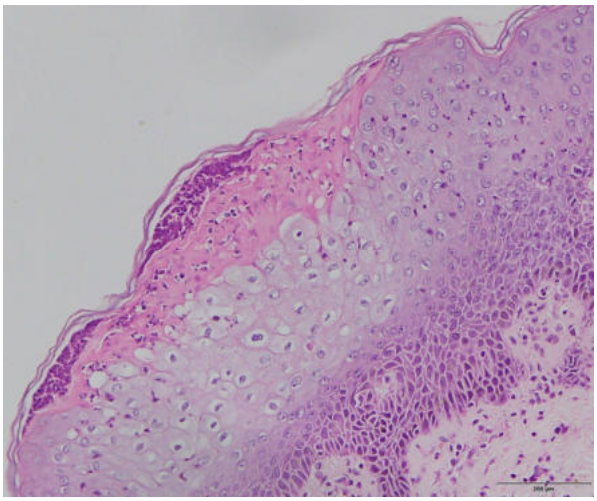

Figure 1. Histopathological examination revealed a subcorneal pustule within the epidermis, accompanied by focal parakeratosis, acanthosis, and club-shaped rete ridges.

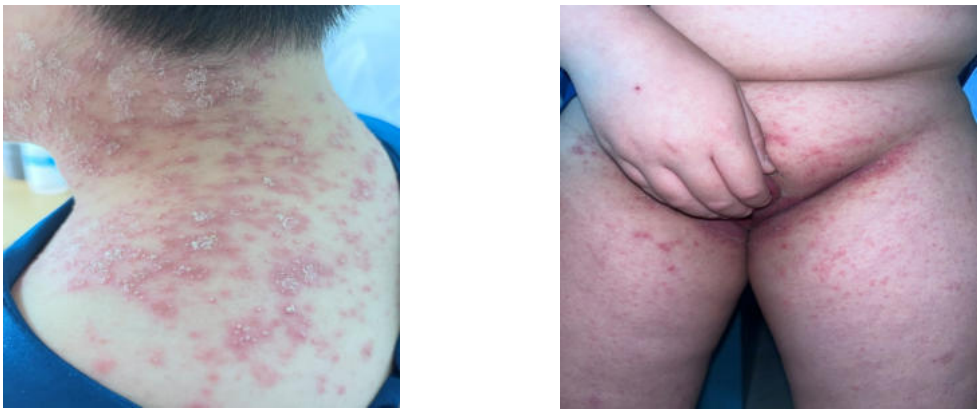

Figure 2. Well-defined annular erythematous plaques surrounded by a rim of few mm size pustules present in neck and inguinal folds

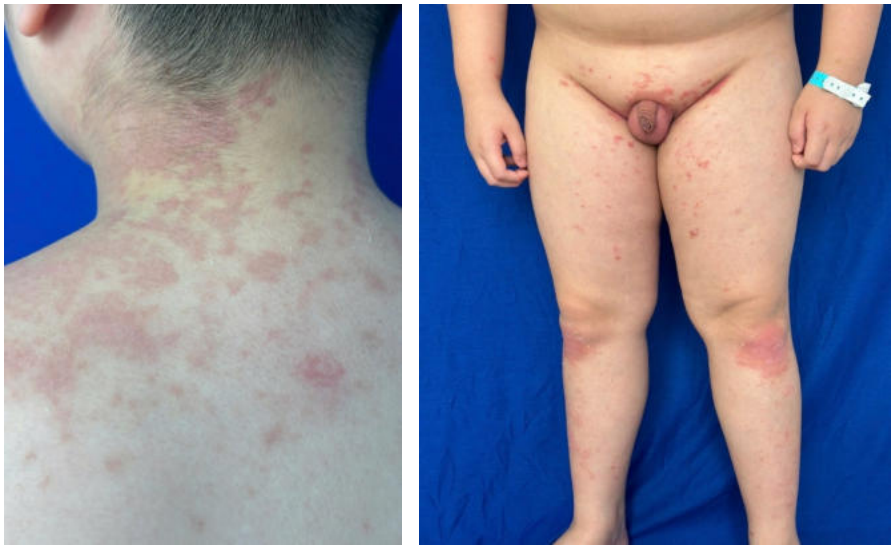

Figure 3. Clinical image showing resolution of pustular lesions in neck and inguinal folds.

III. DISCUSSION

Annular pustular psoriasis (APP) is rare in pediatrics and characterized by annular erythematous plaques with sterile pustules at the periphery. Its course is often relapsing but generally benign. In children, APP is often triggered by factors such as infections (particularly streptococcal pharyngitis), psychological stress, skin trauma (Koebner phenomenon), and abrupt withdrawal of oral corticosteroids [4]. However, no clear trigger was identified in this case.

The patient had a BMI of 24.4, which is categorized as obese for his age. Adipose tissue in obese individuals acts as an active endocrine organ, releasing pro-inflammatory cytokines such as TNF-α, IL-6, and leptin, which contribute to systemic inflammation and may trigger or exacerbate psoriatic pathways. Leptin promotes Th1 and Th17 responses, while adiponectin - an anti-inflammatory adipokine - is reduced in obesity, further enhancing immune dysregulation [5, 6]. Several studies have shown that overweight and obesity often precede psoriasis onset in children and are associated with increased disease severity [7]. These findings highlight the importance of early weight management as part of a holistic approach in pediatric psoriasis care.

In pediatric populations, APP originating from psoriasis vulgaris can be easily misdiagnosed due to overlapping clinical features with other dermatoses, particularly atopic dermatitis, tinea corporis, or seborrheic dermatitis. In this case, the patient was initially treated for atopic dermatitis, delaying the correct diagnosis. Early lesions in children often present with finer scaling and less well-demarcated borders compared to adults, further complicating differentiation. However, the development of annular plaques with peripheral pustules and poor response to conventional treatment raised clinical suspicion for annular pustular psoriasis. Histopathological examination remains the gold standard for diagnosis, although it is not always feasible in pediatric patients due to its invasiveness [8].

There is no consensus on the optimal treatment for pediatric APP, management is largely based on case reports and expert opinion [9, 10]. While systemic treatments such as methotrexate, cyclosporine, acitretin, and biologics are reserved for diffuse lesions or refractory cases, topical therapy such as emollients, keratolytics, humectants, coal tar, dithranol, corticosteroids, vitamin D analogs, calcineurin inhibitors and retinoids remains the mainstay for localized disease [2].

In a non-controlled study of 66 children aged 2-14 years, twice-daily calcipotriol ointment (50µg/g) up to 45 g/week/m ^{2} for 8 weeks was found to be effective without altering serum calcium. Irritation

and facial rashes were no more frequent than in adults [11].

The combination of calcipotriol and betamethasone dipropionate provides synergistic benefits: calcipotriol regulates keratinocyte differentiation, while betamethasone ensures potent anti-inflammatory effects. In our case, an initial phase with 4.5 mg/week of calcipotriol (2 Daivobet® + 1 Daivonex®) achieved rapid clearance, followed by a two-week maintenance phase using the same weekly calcipotriol dose (2 Daivonex® + 1 Daivobet®) to sustain remission. This alternating regimen balanced efficacy and safety, offering intensive anti-inflammatory control during treatment initiation phase while sustaining long-term epidermal regulation with reduced corticosteroid exposure in maintenance.

This case supports existing evidence that combination topical therapy can be an effective and well-tolerated first-line treatment for pediatric APP. Emollients also play a critical role as adjunctive therapy to reduce pruritus, scaling, and prevent Koebner phenomenon.

IV. CONCLUSION

This case highlights the diagnostic and therapeutic challenges associated with APP in pediatric patients. Early recognition is essential to prevent misdiagnosis and unnecessary systemic treatment. The marked improvement with a topical combination of calcipotriol and betamethasone dipropionate supports its role as an effective, non-systemic first-line therapy in selected pediatric cases. Continued follow-up and further studies are needed to establish standardized treatment protocols and assess long-term safety and efficacy of topical regimens in children with APP.

REFERENCES

1. Augustin M et al (2010) *Epidemiology and comorbidity of psoriasis in children*. Br J Dermatol 162(3): 633-636.
2. Dogra S and Kaur I (2010) Childhood psoriasis. Indian J Dermatol Venereol Leprol 76(4): 357-65.
3. Morris A et al (2001) *Childhood psoriasis: a clinical review of 1262 cases.* Pediatr Dermatol 18(3): 188-98.
4. Raychaudhuri SP and Gross J (2000) *A comparative study of pediatric onset psoriasis with adult onset psoriasis.* Pediatr Dermatol 17(3): 174-178.
5. Hwang J et al (2021) *The Role of Leptin in the Association between Obesity and Psoriasis.* Biomol Ther (Seoul) 29(1): 11-21.
6. Kiełbowski K et al (2023) *The Role of Adipokines in the Pathogenesis of Psoriasis.* Int J Mol Sci 24(7).
7. Becker L et al (2014) *Excess adiposity preceding pediatric psoriasis.* JAMA Dermatol 150(5): 573-574.
8. Napolitano M et al (2022) *Children atopic dermatitis: Diagnosis, mimics, overlaps, and therapeutic implication.* Dermatol Ther 35(12): e15901.
9. Chang, L., Ubriani, R., and Yan, A. C. (2008), "Picture of the month--quiz case. Pustular psoriasis, annular type", *Arch Pediatr Adolesc Med*. 162(10), pp. 989-90.
10. Liao PB et al (2002) *Annular pustular psoriasis--most common form of pustular psoriasis in children: Report of three cases and review of the literature.* Pediatr Dermatol 19(1): 19-25.
11. Darley CR et al (1996) *Safety and efficacy of calcipotriol ointment (Dovonex) in treating children with psoriasis vulgaris.* Br J Dermatol 135(3): 390-393.