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Rapid improvement of guttate psoriasis following inadequate response to prior systemic therapy using 311 nm narrowband ultraviolet B (NB-UVB) phototherapy

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ABSTRACT

Guttate psoriasis (GP) is a variant of psoriasis commonly affecting children and young adults, often triggered by infection. Although most cases respond to topical therapy, some patients show inadequate response to prior treatment. Narrowband ultraviolet B (NB-UVB) phototherapy is considered a safe and effective therapeutic option in such cases. A 12-year-old boy presented with multiple erythematous papules with fine scales distributed over the trunk and extremities. Laboratory findings revealed elevated antistreptolysin-O titers. Based on the clinical and histopathology features, the patient was diagnosed with GP. The patient had previously received low-dose methotrexate therapy (2.5 mg/week) for approximately six months with inadequate clinical response. NB-UVB phototherapy was initiated three times weekly with gradual dose escalation. Marked clinical improvement was observed after 18 sessions, achieving PASI90. NB-UVB phototherapy exerts therapeutic effects through immunomodulation and reduction of keratinocyte proliferation. The rapid response observed in this case may be related to lesion characteristics and the appropriate selection of therapy following subtherapeutic methotrexate dosing. Based on this case, it can be concluded that NB-UVB phototherapy may be an effective and well-tolerated treatment option for GP with inadequate response to prior therapy, particularly in pediatric patients.

ABSTRAK

Guttate psoriasis (GP) adalah varian psoriasis yang umum menyerang anak-anak dan dewasa muda, sering dipicu oleh infeksi. Meskipun sebagian besar kasus merespons terapi topikal, beberapa pasien menunjukkan respons yang tidak memadai terhadap pengobatan sebelumnya. Fototerapi *narrowband ultraviolet B* (NB-UVB) dianggap sebagai pilihan terapi yang aman dan efektif dalam kasus tersebut. Seorang anak laki-laki berusia 12 tahun datang dengan banyak papula eritematosa dengan sisik halus yang tersebar di batang tubuh dan ekstremitas. Temuan laboratorium menunjukkan peningkatan titer antistreptolisin-O. Berdasarkan fitur klinis dan histopatologi, pasien didiagnosis menderita GP. Pasien sebelumnya telah menerima terapi metotreksat dosis rendah (2,5 mg/minggu) selama kurang lebih enam bulan dengan respons klinis yang tidak memadai. Fototerapi NB-UVB dimulai tiga kali seminggu dengan peningkatan dosis secara bertahap. Perbaikan klinis yang signifikan diamati setelah 18 sesi, mencapai PASI90. Fototerapi NB-UVB memberikan efek terapeutik melalui imunomodulasi dan pengurangan proliferasi keratinosit. Respons cepat yang diamati dalam kasus ini mungkin terkait dengan karakteristik lesi dan pemilihan terapi yang tepat setelah pemberian dosis metotreksat subterapeutik. Berdasarkan kasus ini dapat disimpulkan bahwa fototerapi NB-UVB mungkin merupakan pilihan pengobatan yang efektif dan dapat ditoleransi dengan baik untuk GP dengan respons yang tidak memadai terhadap terapi sebelumnya, terutama pada pasien anak.

Keywords:
Guttate psoriasis; narrow band ultraviolet B (NB-UVB); phototherapy; psoriasis; Psoriasis Area and Severity Index (PASI)

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BACKGROUND

Guttate psoriasis (GP) is an acute variant of psoriasis characterized by multiple small, erythematous, drop-like papules, commonly affecting children and young adults and often associated with streptococcal infection.[1-3] The prevalence of GP varies, in Europe, in children aged 0-9 years. ranging from 0.37-0.55%, while in children aged 10-19 years ranging from 1.01-1.37%. Most cases are mild and respond to topical treatment; however, 17% are moderate or severe forms.[2,3]

Subjective symptoms such as itching are felt. Common clinical findings of GP include the wax drop phenomenon, Auspitz sign, and Koebner phenomenon, while supporting examinations can include anti-streptolysin titer-O (ASTO) and histopathological examination.[2,4] In patients with more extensive skin involvement or insufficient response to topical or systemic treatment, phototherapy, particularly narrowband ultraviolet B (NB-UVB), is recommended as a first-line treatment due to its efficacy and favorable safety profile, especially in pediatric populations.[4,5] Phototherapy works by slowing keratinocyte proliferation, reducing epidermal and dermal T cells, and inducing anti-inflammatory-immunomodulatory effects in the skin.[4,6] This case report describes a pediatric patient with GP who showed rapid and significant clinical improvement following NB-UVB phototherapy after inadequate response to prior systemic therapy.

CASE ILLUSTRATION

A 12-year-old boy presented to the Dermatology and Venereology outpatient clinic at Sardjito General Hospital, Yogyakarta, Indonesia, with multiple erythematous, slightly oval-shaped papules and plaques covered with fine scales involving the face, neck, trunk, and extremities. The lesions were associated with pruritus. Five months prior to presentation, the patient first developed erythematous scaly lesions on the back, which gradually spread to involve most of the body. There was no history of fever, sore throat, or other systemic symptoms. The patient was initially treated at a secondary hospital and diagnosed with psoriasis, for which oral methotrexate at a dose of 2.5 mg/week was initiated.

The patient had been taking oral methotrexate (2.5 mg/week), cetirizine (10 mg/day), vitamin D supplementation (1000 IU/day), and topical hydrocortisone for four months previous to presenting to our center. However, no significant clinical improvement was observed, and the patient was scheduled for a biopsy to confirm the diagnosis and supporting laboratory tests to further trace the cause.

Histopathological examination revealed diffuse parakeratosis with mounds of parakeratosis, focal hypogranulosis, regular acanthosis with elongated rete ridges, and neutrophil exocytosis extending to the stratum corneum. The upper dermis showed edema with a moderate perivascular inflammatory infiltrate consisting of neutrophils, lymphocytes, and histiocytes, consistent with GP (FIGURE 1).

The patient had no prior history of systemic disease, atopy, drug allergy, or family history of psoriasis. Physical examination revealed stable vital signs without lymphadenopathy. Laboratory evaluation showed neutrophilia 77.5% (35 - 65%), lymphocytopenia 20.1% (23 - 53%), and eosinopenia 0.2% (1.0 - 4.0%), while liver and renal function tests were within normal limits. Antistreptolysin-O (ASO) titer was positive. Autoimmune markers, including ANA and anti-dsDNA, were within normal limits.

The Psoriasis Area and Severity Index (PASI) score initially was 1.4 (mild), but progressively increased to 27.2 (severe)

over six months of methotrexate therapy. Due to the worsening disease and extensive involvement (>10% of the body surface area), NB-UVB phototherapy was selected as the next therapeutic modality.

NB-UVB phototherapy was initiated three times weekly with an initial dose of 500 mJ/cm² and gradual dose escalation. PASI scores were evaluated periodically. The patient's initial PASI score before phototherapy was 27.2 (severe). After 9 sessions, the PASI score decreased to 8.3 (69.48% reduction). After 18 sessions, the PASI score further decreased to 2.6 (90.44% reduction), achieving PASI90. At session 20, the PASI score reached 0.6, corresponding to a 97.79% reduction (FIGURE 2 and 3).

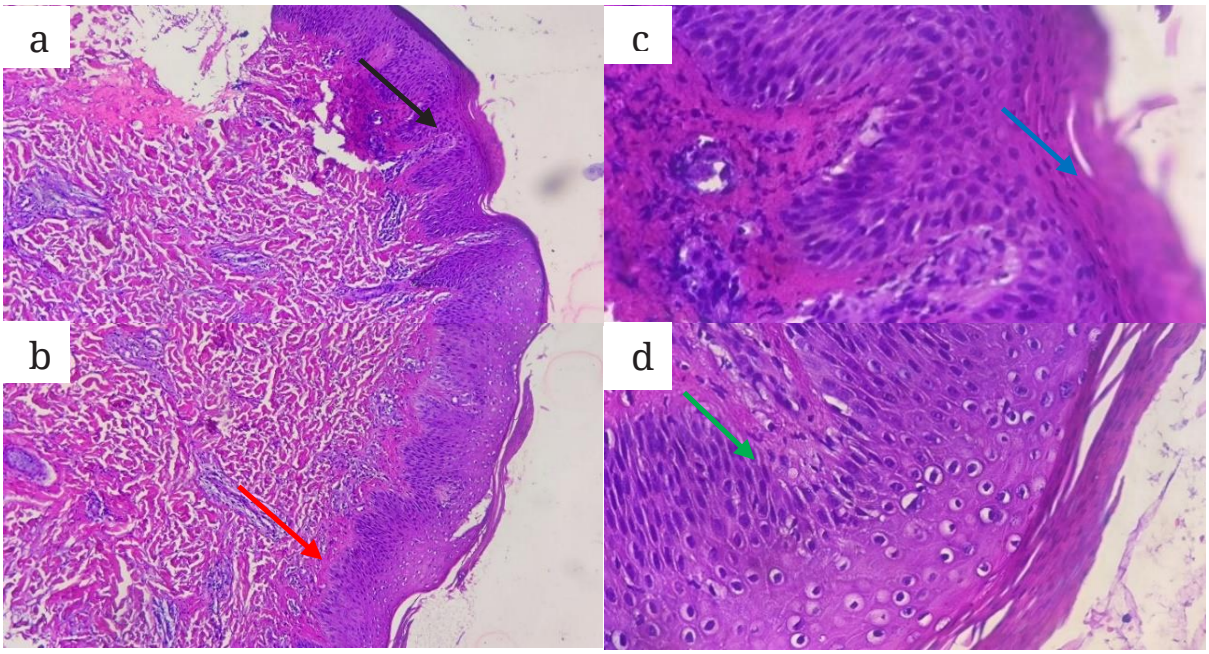

FIGURE 1. Histopathological examination with HE staining. (a,b) Epidermis showing diffuse parakeratosis with focal mounds of parakeratosis (black arrows), focal hypogranulosis, and regular acanthosis with elongated rete ridges (red arrows), some appearing club-shaped. Neutrophil exocytosis extending into the stratum corneum is also observed (blue arrows). (c,d) Upper dermis demonstrating edema and a moderate perivascular inflammatory infiltrate composed of lymphocytes, neutrophils, and histiocytes (green arrows). No evidence of malignancy is identified.

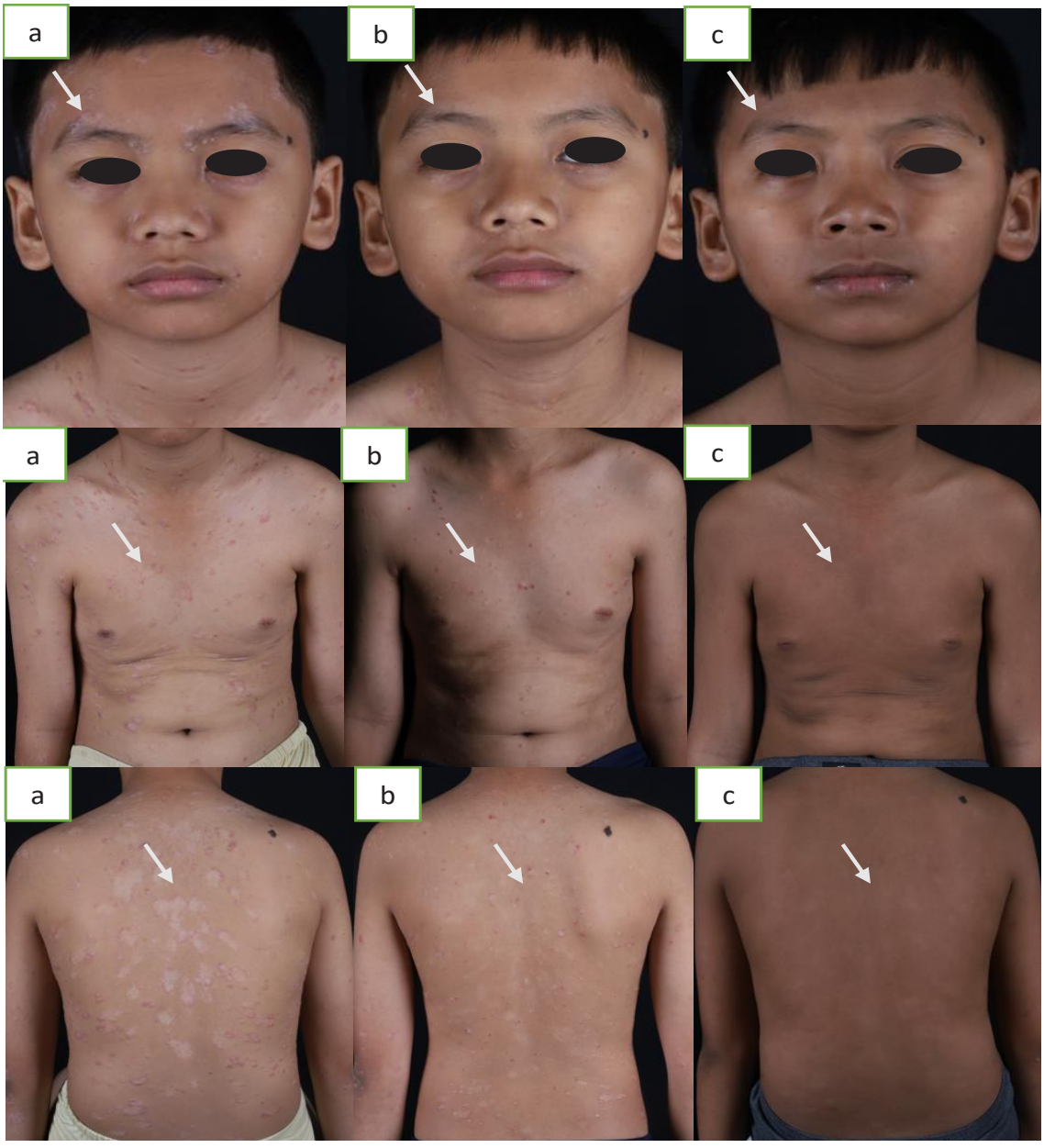

FIGURE 2. Serial photographs showing progressive clinical responses of the face and trunkus during NB-UVB phototherapy. (a) Baseline showing multiple erythematous patches and papules with fine scales (arrows), (b) after 9 sessions demonstrating partial improvement (arrows), and (c) after 20 sessions showing near complete resolution.

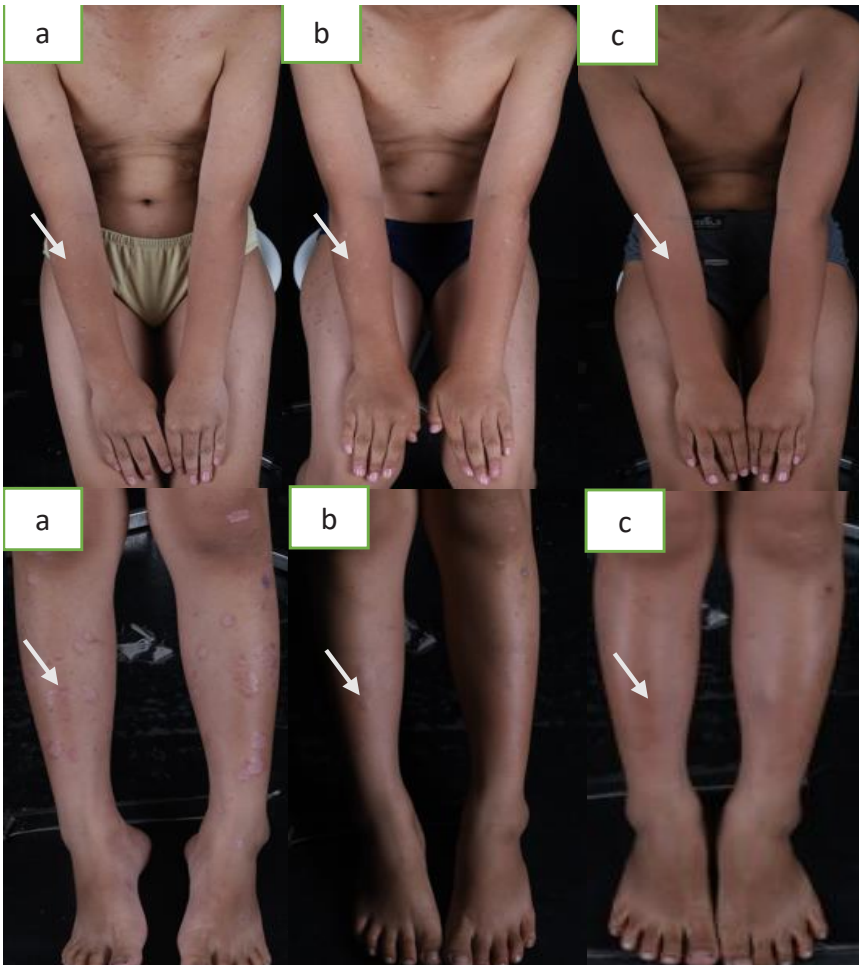

FIGURE 3. Serial photographs showing progressive clinical responses of the extremities during NB-UVB phototherapy session. (a) Baseline showing multiple erythematous patches and papules with fine scales (arrows), (b) after 9 sessions demonstrating partial improvement (arrows), and (c) after 20 sessions showing near complete resolution.

The progression of disease severity during oral methotrexate therapy over six-months before initiation of NB-UVB phototherapy is summarized in TABLE 1, demonstrating a gradual increase in PASI score despite continuous treatment. Despite approximately six months of continuous therapy with methotrexate, the lesions progressively worsened. It is important to note that the dose of methotrexate administered (2.5 mg/week) was below the standard therapeutic dose for psoriasis. Therefore, the lack of clinical response observed in this case may reflect suboptimal dosing rather than true treatment failure.

A possible contributing factor to disease exacerbation was psychological stress, as reported by the patient's parents in the form of bullying at school. However, no formal psychiatric assessment was performed, and this factor should be interpreted with caution.

NB-UVB phototherapy was initiated, resulting in rapid clinical improvement after the previous period. The PASI score decreased from 27.2 (severe) prior to phototherapy to 8.3 after 9 sessions (69.48% reduction). Further improvement was observed after 18 sessions, achieving PASI90 with a score of 2.6 (90.44% reduction), and continued to 0.6 after 20 sessions (97.79% reduction; PASI97). The final irradiation dose was 2780 mJ/cm² with a cumulative dose of 29,995 mJ/cm². The Dermatology Life Quality Index (DLQI) improved from 10 at baseline to 1 after 20 phototherapy sessions. No adverse effects, including erythema or other complications, were observed during the course of NB-UVB phototherapy. (TABLE 2).

The diagnosis of GP was established based on clinical findings supported by histopathological and laboratory evaluation. In this case, following a period of disease progression during prior systemic therapy, initiation of NB-UVB phototherapy was associated with a rapid and marked clinical improvement, achieving PASI90 after 18 sessions over six weeks

TABLE 1. Evaluation of PASI score of the patient in oral methotrexate therapy

Months	PASI score	Oral Methotrexate
1	1.4	2.5 mg/ week
2	2.6	2.5 mg/ week
3	3.4	2.5 mg/ week
4	8.5	2.5 mg/ week
5	11.0	2.5 mg/ week
6	27.2	2.5 mg/ week

TABLE 2. The PASI score of the patient, decrease precentage (%), DLQI at baseline and during follow-up at different session of NB-UVB phototherapy

Phototherapy session	Dose	Oral Methotrexate	PASI score	PASI Decrease Percentage (%)	DLQI
Before phototherapy	0 mJ/cm2	2.5 mg/ week	27.2	0%	10
Session-1	500 mJ/cm2	2.5 mg/ week	27.2	0%	10
Session-9	1072 mJ/cm2	2.5 mg/ week	8.3	69.48%	6
Session-18	2527 mJ/cm2	-	2.6	90.44%	4
Session-20	2780 mJ/cm2	-	0.6	97.79%	1

DISCUSSION

Guttate psoriasis (GP) commonly affects children and young adults and is frequently associated with infectious triggers, particularly streptococcal infection.[1-3] The prevalence of GP affects approximately 0.5–2% of pediatric patients.[3] While many cases are self-limited or respond well to topical therapy, patients with more extensive involvement may require additional therapeutic interventions, including phototherapy.[2,4]

Guttate psoriasis (GP) can remit spontaneously within a few months, but approximately 40-50% of cases can persist and progress to chronic plaque psoriasis.[5,9] Therefore, therapeutic management and avoidance of triggers are highly recommended to improve patient quality of life. Currently, there is no specific treatment algorithm for GP management. Therapy is based on the clinical response assessed in each case. The American Academy of Dermatology (AAD) Guidelines and European-S3 Guidelines of the European Academy of Dermatology and Venereology (EADV) recommend phototherapy with NB-UVB as the first-line treatment in psoriasis with more than 5% of the BSA without respond to topical or systemic treatment.[7,8]

Phototherapy options for GP include NB-UVB, BB-UVB, psoralen + UVA (PUVA), and excimer laser. Studies have shown NB-UVB to be more effective than BB-UVB in the treatment of GP. NB-UVB is also chosen as a safe and effective phototherapy agent for GP in children over 6 years of age.[5,6] Meanwhile, PUVA has many side effects and is not recommended for psoriasis therapy in children or young adults.[6,9]

The patient in this case showed progressive worsening of disease despite approximately six months of methotrexate therapy. However, the administered dose (2.5 mg/ week) was substantially lower than the recommended therapeutic dose for psoriasis.[6] Therefore, the lack of clinical response observed may reflect suboptimal dosing rather than true treatment failure. This distinction is essential when evaluating treatment outcomes and guiding subsequent management decisions.

NB-UVB phototherapy was selected as the subsequent treatment due to its established efficacy and favorable safety profile, particularly in pediatric patients with widespread disease.[5,6] Following initiation of phototherapy, the patient showed rapid and marked clinical improvement, achieving PASI90 after 18 sessions within six weeks. This finding is consistent with previous studies demonstrating that GP responds more rapidly to NB-UVB compared to plaque psoriasis.[9,10]

This may be explained by the relatively thinner and less hyperkeratotic nature of guttate lesions, allowing better ultraviolet penetration and more effective immunomodulation.[10-12] Additionally, studies have reported high rates of PASI75 and PASI90 achievement with NB-UVB therapy, further supporting its role as a first-line treatment in extensive psoriasis.[10]

A possible contributing factor to disease exacerbation in this case was psychological stress, as reported by the patient's environment. However, this observation should be interpreted with caution due to the absence of formal psychiatric evaluation and should not be considered a definitive causal factor.[7,14] Importantly, no adverse effects, including erythema or other complications, were observed during NB-UVB phototherapy, supporting its safety profile in pediatric patients.[10-15] However, long-term follow-up data were not available, which represents a limitation in assessing the sustainability of treatment response. Overall, this case highlights the importance of appropriate

treatment selection, critical evaluation of prior therapy adequacy, and the effectiveness of NB-UVB phototherapy in achieving rapid clinical improvement in GP.

CONCLUSION

We report a 12-year-old boy with GP who demonstrated disease progression during prior systemic therapy, likely related to subtherapeutic methotrexate dosing. Significant clinical improvement was achieved with 311 nm NB-UVB phototherapy, reaching PASI90 after 18 treatment sessions. This case emphasizes the importance of evaluating the adequacy of prior therapy, selecting appropriate treatment modalities, and recognizing the rapid efficacy of NB-UVB phototherapy in pediatric GP.

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