





Generalized Pustular Psoriasis in Childhood: A Rare Case

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ABSTRACT

Background: Generalized pustular psoriasis (GPP) rarely occurs under 10 years of age. GPP is typically characterized by an eruption of generalized pustules accompanied by systemic symptoms such as fever for several days, malaise, and anorexia. Pustules are sterile, with a size of 2-3 mm, and spread over the trunk and extremities. This disease can be life-threatening; therefore, optimal therapy is required. **Purpose:** to report a rare case of GPP in childhood. **Case:** A 4-year-old girl with complaints of widespread red patches that spread to her neck, back, and hands, with red patches turning into streaks that are partially pus-filled and itchy. In almost all parts of the body, skin abnormalities were seen in the form of generalized erythematous plaques, well-defined borders, multiple pustules on the edges, and some plaques covered by thick scales and crusts. In the calculation of body surface area (BSA), the result is 44%, and in the calculation of generalized pustular psoriasis area and severity index (GPPASI), the result is 21.30. The patient was treated with combination topical therapy of 3% salicylic acid, desoximethasone cream 0.25%, momethasone cream 0.1% vaseline albume as emollients, and coal tar. Significant improvement was seen after 1 month of therapy. **Discussion:** GPP in children is a rare case. GPP is idiopathic and can be life-threatening. Until now, there has been no standard therapy that is considered the most effective and safe for children. Topical therapy may be an option. **Conclusion:** The use of topical therapy in this case was considered effective in reducing symptoms and controlling disease progression.

Keywords: generalized pustular psoriasis, children, rare case.

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BACKGROUND

Psoriasis is a chronic and genetically based inflammatory skin disease characterized by impaired growth, epidermal differentiation, and multiple biochemical, immunologic, and vascular abnormalities.^{1,2} This disease appears as an erythematous plaque, well-defined with thick scales, and is usually found in areas of the body that are susceptible to trauma, such as the knees, elbows, and

scalp. The cause is unknown, and the main abnormality is in the keratinocytes.¹⁻³

Psoriasis is an immune-mediated illness with a hereditary and environmental basis, in which the activation of keratinocytes and immune cells produces keratinocyte hyperproliferation.⁴ Its interaction also causes a steady release of inflammatory cytokines from the skin lesion and immune cells, leading to a cascade of systemic problems.⁵ The two cytokines that are very

important in the pathogenesis of psoriasis are IL-23 and IL-17.^{6,7}

Psoriasis has a major psychosocial impact and reduces the quality of life of the sufferer. Skin with psoriasis lesions will look dry and peeling due to the accelerated proliferation of keratinocytes, which can extend throughout the body to form psoriatic erythroderma.⁸ Based on the type, psoriasis is divided into plaque psoriasis (psoriasis vulgaris), guttate psoriasis, pustular psoriasis, inverse psoriasis, and psoriatic erythroderma.¹⁻³ Pustular psoriasis consists of several clinical variations, including generalized pustular psoriasis (GPP) and localized pustular psoriasis. GPP based on clinical variations is divided into generalized pustular psoriasis (Von Zumbusch), annular pustular psoriasis, GPP of pregnancy (impetigo herpetiformis), and infantile generalized pustular psoriasis.² GPP (Von Zumbusch) is the most severe type of psoriasis, but the incidence is rare.⁹

GPP can occur at any age; it often occurs at the age of 15-30 years and rarely occurs under the age of 10 years.^{1,10} GPP can affect both sexes with a frequency of about 0.6-0.7 cases per 1 million people annually in Japan and France. This disease can be life-threatening; therefore, optimal therapy is needed depending on the severity of the disease.⁹

GPP of the von Zumbusch type is an acute variant of psoriasis. Characterized by a generalized pustule eruption accompanied by systemic symptoms such as fever for several days, malaise, and anorexia. Sterile pustules spread over the trunk and extremities, including nails, palms, and soles. Initially, there are a number of pustules, which then coalesce to form a lake-like appearance (lake of pus).¹² In this type, the skin's protective function is lost, resulting in the loss of body fluids and nutrients, and the patient is susceptible to infection.⁸

Although most cases of GPP are idiopathic, various precipitating factors have been reported. These factors include drugs, infection, and pregnancy. A detailed drug history is important because it can link the initiation or discontinuation of medication to the onset of disease. Rapid depletion of systemic corticosteroids is a frequently reported trigger for GPP flares. Several other drugs can also be triggers, including antibiotics such as amoxicillin, terbinafine, calcipotriol ointment, betamethasone ointment, tumor necrosis factor-alpha (TNF-) inhibitors, ustekinumab, and the withdrawal effects of cyclosporine.¹¹

CASE REPORT

A 4-year-old girl came to the Dermatology and Venereology Polyclinic of the Regional General

Hospital (RSUD), Dr. Zainal Abidin Banda Aceh, with complaints of several red, round spots with the size of corn kernels in the abdomen three weeks ago. The patient had a low-grade fever a few days before the red spots appeared. The red patches are painful and itchy, so the patient is taken to a pediatrician. The patient was given the antibiotic syrup Erythromycin for 7 days and the topical Mupirocin cream, which was applied twice a day to the red spots. After 1 week, the red spots have not improved, getting wider and spreading to the neck, back, and hands, accompanied by a change in the red spots to become streaks that are partially purulent and itchy. The skin on some parts of the body is covered with thick scales.

The history of cavities, cold coughs, canker sores, discharge from the ears, and bladder pain was denied. The patient has lost about 1 kg of weight. History of food allergies, drug allergies, sneezing in the morning or cold air, asthma or shortness of breath, and eczema previously denied. There are no similar abnormalities in the family. The results of the physical examination showed the patient's body temperature was 36.5 °C, his weight was 13.5 kg, and his other vital signs were normal. There was no geographic tongue or fissure tongue. No enlarged lymph nodes were seen.

On dermatological examination in almost all parts of the body except the palms of the hands and feet, there were well-defined erythematous annular plaques with multiple pustules on the edges, and some plaques were covered by thick scales and brownish yellow crust (Fig. 1.A-B). The calculation of body surface area (BSA) was 44%, and the calculation of generalized pustular psoriasis area and severity index (GPPASI) was 21.30. The differential diagnosis in this case is GPP, acute generalized exanthematous pustulosis (AGEP), and staphylococcal scalded skin syndrome (SSSS).

On laboratory examination, there was an increase in leukocytes of $12.2 \times 10^3/\text{mm}^3$, ESR of 48 mm/Hours and monocytes of 13%. Other examinations were normal, such as hemoglobin 11.6 g/dL, hematocrit 36%, erythrocytes $4.8 \times 10^6/\text{mm}^3$, platelets $489 \times 10^3/\text{mm}^3$, SGOT 19 U/L, SGPT 9 U/L, albumin 3.90 g/dL, urea 13 mg/dL, creatinine 0.38 mg/dL, GDS 113mg/dL, Rheumatoid Factor (RF) negative, and ASTO < 200 IU/ μL .

A skin biopsy was performed on the lesion on the right back for histopathological examination. The results of the histopathological examination showed a picture of parakeratosis and acanthosis accompanied by Munro microabscess consisting of neutrophil cells in the stratum corneum, subcutis, and lymphocytic inflammatory cells around the blood vessels (Figure 2).



Figure 1. Clinical feature (A-B) : the first-time condition of the patient when visited the dermatology polyclinic at RSUDZA with a GPPASI score of 21.30 (C-D); follow-up on day 21 with a GPPASI score of 18.9 (E-F); follow-up on day 30 with a GPPASI score of 9.3.

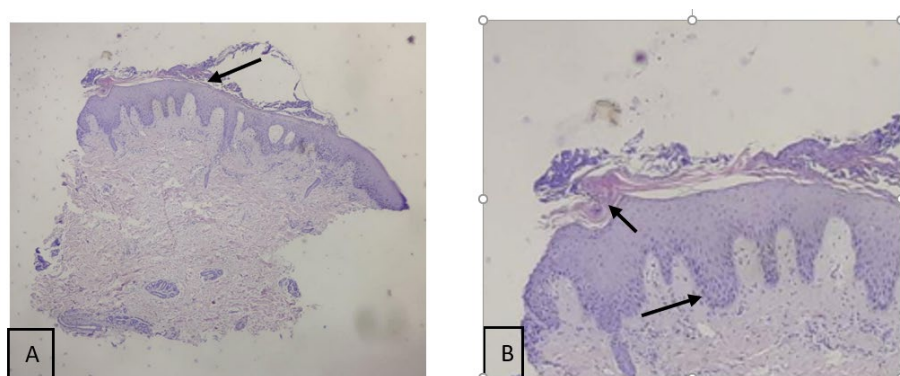


Figure 2. The results of histopathological examination with HE staining (A) at 40x magnification show Munro microabscess (down arrow), and (B) at 100x magnification show Rete Ridges elongation (side arrow) and parakeratosis (up arrow).

Based on the clinical manifestation and histopathological features, the patient was diagnosed with GPP. The patient was treated with combination topical therapy of 3% salicylic acid, desoximethasone cream 0.25%, momethasone cream 0.1% vaseline albume as emollients, and coal tar. There was an improvement after one week, with GPPASI score was 18.9 and one month after therapy GPPASI score was 9.3 the sheets of pustules sequentially disappeared from her entire body and face. This case report has received written informed consent from the patient's parents for publication on May 1, 2023.

DISCUSSION

GPP (von Zumbusch type) is the most severe but rare type of psoriasis.⁹ The clinical manifestations of GPP are dominated by eruptions of miliary pustules accompanied by systemic symptoms such as fever, cephalgia, malaise, arthralgia, anorexia, and nausea. Pustules are superficial and sterile, with a size of 2-3 mm, scattered on the trunk and flexural parts of the extremities. The skin around the pustule is usually erythematous. A number of pustules then coalesce to form a lake of pus, which then dries and peels with a mild erythematous skin condition.^{1,2} This is consistent with the patient's clinical features in the form of red, itchy, painful patches accompanied by fever. Pustules are found almost all over the body. On physical examination, all over the body, except the face, genitalia, palms, and feet, there are miliary pustules, some are confluent on the surface of the erythematous skin. The possible differential diagnosis in this case is AGEP and SSSS. Clinical data and histopathological confirmation support the diagnosis of GPP in this case. The differential diagnosis of GPP is a challenging. Many histopathologic and clinical characteristics of GPP coincide with those of other pustular dermatologic disorders such as AGEP. It is especially important to distinguish GPP from others conditions because these illnesses differ in their clinical course and therapy but share many similarities.¹²

Evidence of scaling plaques in this patient recommended PP as a diagnosis, while mucosal involvement, while uncommon, was a trait distinct to AGEP.¹² On histopathology, Munro microabscesses and Kojog's spongiform pustules are the characteristic of psoriasis while the classic AGEP finding of subcorneal/intraepidermal pustules.¹³

There are several methods of calculating the severity of GPP, one of which is GPPASI. The GPPASI combine scores for each body area (head, trunk, lower and upper extremities) for redness (erythema), pustules, and scaling (desquamation) with the percentage involvement of these areas. GPPASI is a

modified composite index and an adaptation of the PASI score. The induration component has been substituted with a pustule component, with an overall score range from 0 (least severe) to 72 (most severe). Representative areas of GPP are selected for each region of the body. It is then measured in terms of redness intensity, pustules, and peeling of the skin, which will be ranked from none (0), mild (1), moderate (2), severe (3), or very severe (4). Not only that, the affected area was also assessed as a score of 0 (no body surface affected), a score of 1 (1-9%), a score of 2 (10-29%), a score of 3 (30-49%), a score of 4 (50-69%), a score of 5 (70-89%), or a score of 6 (90-100%). Then these two values are combined into the final GPPASI. It is said to be mild GPP if the GPPASI score is 10, the GPPASI score is 10-20, and the GPPASI score is severe >20.¹⁴ The adaption of psoriasis disease measurements, as well as the development of assessment tools specific to GPP severity, such as GPPASI, will allow for more effective and accurate monitoring of GPP patients.¹⁵ In this patients after calculating the GPPASI score, a score of 21.30 was obtained, which was entered into a severe degree.

In GPP, it is important to perform a complete blood count with a type count (to evaluate leukocytosis and lymphopenia) and a comprehensive metabolic panel (to evaluate hypocalcemia, other electrolyte abnormalities, hypoalbuminemia, hepatic, and renal function). These are common initial assessments. Skin desquamation and loss of skin protective function can lead to electrolyte abnormalities. Hypocalcemia may occur as a result of hypoalbuminemia, but ionized calcium is usually normal and the patient is asymptomatic. Patients may have elevated levels of alkaline phosphatase, transaminases, and bilirubin and may have a positive anti-streptolysin titer.¹¹ Laboratory results show an increase in leukocytes of $12.2 \times 10^3/\text{mm}^3$ and an ESR of 48 mm/hour. There was no increase in SGOT and SGPT levels, and there was no hypoalbuminemia. The results of the Rheumatoid Factor (RF) examination were negative and ASTO < 200 IU/ μL .

Histopathological examination of GPP revealed Munro microabscesses (collections of intracorneal neutrophils) and Kojog's spongiform pustules, namely neutrophil accumulation under the stratum spinosum and damage to keratinocytes that can be found in psoriasis skin lesions.¹⁶ Histopathological changes in psoriasis are: hyperkeratosis, parakeratosis, acanthosis, increased mitosis in the stratum basalis, dermal edema with infiltration of polymorphonuclear cells, lymphocytes, monocytes, and neutrophils, and elongation and enlargement of the dermal papilla.¹⁷ The histopathological examination results in this case

found elongation of the rete-ridges, parakeratosis accompanied by Munro microabscesses and lymphocyte inflammatory cells were found around the blood vessels, which is consistent with psoriasis vulgaris.

GPP in children is a rare case, so that there is no established therapy as the safest and most effective therapy. Several treatment options that have been published are systemic retinoids, cyclosporine A, methotrexate, biologic agents and topical therapies, including NB-UVB. In this case, combination topical therapy was given with components such as salicylic acid, topical corticosteroids, emollients, and coal tar. Administration of 3% salicylic acid therapy in psoriasis acts as anti-inflammatory, antiproliferative, and exfoliating. The keratolytic nature of salicylic acid triggers desquamation of the stratum corneum, so it is useful in reducing the scale and thickness of psoriasis plaques. Coal Tar/LCD is a coal distillation product that plays a role in inhibiting keratinocyte proliferation by suppressing DNA synthesis. In addition, coal tar also has an anti-inflammatory effect. The use of topical corticosteroids acts as an anti-inflammatory, antiproliferative, and immunosuppressive agent. Corticosteroids have anti-inflammatory effects due to their ability to inhibit the release of arachidonic acid from phospholipids by inhibiting phospholipase A2. However, long-term use of corticosteroids can cause side effects such as skin atrophy, teleangiectasia and purpura. The administration of emollients (moisturizers) to these patients aims to help reduce itching and desquamation. In addition, the administration of emollients can improve skin barrier function and increase the penetration of other topical agents.¹⁸ Topical corticosteroids have remained the first-line therapy for childhood psoriasis, and the majority of children can be controlled only with topical medication. This is why we will start with topical therapy before moving on to systemic therapy for this patient.¹⁹

GPP is a rare form of childhood psoriasis that frequently necessitates systemic therapy, which is challenging due to a lack of randomized controlled trials and a defined standard protocol. Topical agents can be an appropriate therapeutic choice before starting systemic therapy.

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