

Pediatric Plantar Erythema Nodosum Associated with Beta-Hemolytic Streptococcal Infection: A Rare condition

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Introduction

Erythema nodosum (EN) is a hypersensitivity reaction predominantly affecting the subcutaneous fat [1]. It commonly presents with painful erythematous nodules symmetrically distributed over the anterior shins. The condition is often linked to underlying triggers such as infections (e.g., *Streptococcus* species, tuberculosis), medications, and systemic inflammatory disorders [1,2]. Involvement of the plantar surface is rare [2-4] and poses diagnostic challenges, especially in pediatric populations. In this report, we describe a case of plantar EN in a 4-year-old female, emphasizing its association with beta-hemolytic streptococcal infection.

Case Presentation

A previously healthy 4-year-old female presented to the pediatric emergency room at night due to pain in the right foot. Foot radiography was negative. The child was referred home with analgesics as needed. Later, she presented to the emergency department after 72 hours due to pain persistence and the appearance of round palpable, hyperemic/ecchymotic painful lesions at the area of the toes and metatarsal in the plantar region (more pronounced on the right foot) (Figure 1 A–B). No fever was associated. At home, her brother presented with febrile pharyngitis with a positive swab for *Streptococcus* pyogenes. On that occasion,



Figure 1. The case of the described patient – painful erythematous-edematous lesions on the sole (A,B), and the possible differential diagnoses: fixed drug eruption (C), urticaria (D), cellulitis (E), subcorneal hemorrhage (F), Schönlein-Henoch purpura (G), COVID-associated lesions (H).

our patient did not have a pharyngeal swab for *Streptococcus pyogenes* performed. As for additional tests, C-reactive protein concentration was elevated, and the rapid group A β -hemolytic streptococci (GABHS) swab was positive, whereas the foot skin swab foot and SARS-CoV-2 molecular swab were negative. The child was admitted for clinical monitoring and antibiotic therapy with amoxicillin/clavulanic acid at a dose of 90 mg/kg/day, and anti-inflammatory therapy three times/day was started. During hospitalization, she remained in good general clinical condition, and vital parameters were within normal range, especially stably afebrile; pain was controlled by ibuprofen. During hospitalization, the extremity lesions showed progressive and significant improvement in hyperemia and swelling compared with the initial condition. Hematochemical examinations performed showed moderate elevation of inflammatory indices without alterations in blood crisis or coagulation profile. Microbiologically, the pharyngeal swab for *S. pyogenes* was positive, while the culture examination of the lesions was negative. The presentation of the lesions, intense pain, and history of recent hemolytic *Streptococcus* β -hemolytic infection led us to make the diagnosis of plantar EN.

Discussion

EN is a recognized manifestation of hypersensitivity to a variety of triggers, with GABHS being one of the most common infectious causes in pediatric patients [5]. The atypical plantar involvement observed in this case highlights the

diversity in clinical presentations of EN, which can complicate timely diagnosis. Plantar EN poses unique challenges due to its unusual location, mimicking other conditions such as fixed drug eruption (Figure 1 C), urticaria (Figure 1 D), cellulitis (Figure 1 E), subcorneal hemorrhage (Figure 1 F), Schönlein-Henoch purpura (Figure G), COVID-associated lesions [6] (Figure 1 H), and very rare ‘hot foot’ *Pseudomonas* infection (Table 1).

The pathophysiology of EN is believed to involve a delayed-type hypersensitivity reaction mediated by immune complex deposition in the subcutaneous fat [1]. Streptococcal antigens likely play a central role in initiating this inflammatory cascade in susceptible individuals. This case underscores the importance of obtaining a detailed history, thorough physical examination, and targeted laboratory testing to identify potential triggers of EN.

Management of EN involves addressing the underlying etiology and providing symptomatic relief [1]. In this patient, amoxicillin/clavulanate was initiated to eradicate the streptococcal infection. Nonsteroidal anti-inflammatory drugs (NSAIDs) were prescribed for pain and inflammation. The patient’s symptoms resolved within two weeks, with complete resolution of nodules at follow-up after four weeks. Education on recognizing signs of recurrent streptococcal pharyngitis and maintaining good hygiene was provided.

This case highlights the rare presentation of plantar EN associated with GABHS infection in a pediatric patient. Awareness of such atypical presentations is crucial for clinicians to ensure prompt diagnosis and management.

Table 1. Differential diagnosis of plantar lesions.

Differential diagnosis	Differentiating features
Fixed drug eruption (figure 1C)	<ul style="list-style-type: none"> • reoccurs in the same location after intake of the same medication
Urticaria (figure 1D)	<ul style="list-style-type: none"> • typically fleeting trend • lesions in most cases typically pruritic, only very rarely painful and ecchymotic
Cellulitis (figure 1E)	<ul style="list-style-type: none"> • large areas (not lumps) • fever and altered phlogosis parameters • unilateral
Subcorneal hemorrhage (figure 1F)	<ul style="list-style-type: none"> • typical rust color • unpainful
Schönlein-Henoch purpura (figure 1G)	<ul style="list-style-type: none"> • typically, presence of purpura in other sites as the same time • plantar localization very rare
COVID-associated pernio (figure 1H)	<ul style="list-style-type: none"> • SARS-CoV-2 infection
<i>Pseudomonas</i> ‘hot foot’ syndrome	<ul style="list-style-type: none"> • history of exposure to pool water

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