CASE REPORT

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Generalized Cutaneous Eruption in an Infant with Contact Dermatitis and Bacterial Abscess: A Case Report

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Abstract

Background: Contact dermatitis is a common inflammatory skin condition in infancy, often associated with exposure to topical preparations, cleansing agents, and other environmental irritants. Disruption of the epidermal barrier may predispose infants to secondary bacterial infections. In some cases, the inflammatory response may be accompanied by generalized cutaneous eruptions, making clinical diagnosis and management challenging.

Case Presentation: We report the case of a 9-month-old male infant who presented with a generalized cutaneous eruption of seven days' duration, initially involving the diaper region following the application of a topical preparation. The lesions subsequently spread to the abdomen, back, and upper and lower extremities. The infant also developed localized swelling over the right thigh, which was clinically suggestive of an abscess. Dermatological examination revealed multiple erythematous papules and papulovesicular lesions distributed over the body, along with a localized fluctuant swelling over the right thigh. Microbiological examination of the abscess material demonstrated Gram-positive cocci in clusters, and bacterial culture identified Staphylococcus aureus. A clinical diagnosis of contact dermatitis with secondary bacterial abscess and a suspected generalized eczematous reaction was considered. The infant was managed with culture-directed systemic antibiotics, abscess drainage, local wound care, mild topical corticosteroids for the eczematous lesions, emollients, and symptomatic treatment. The suspected causative topical preparation was discontinued, and the parents received counselling regarding appropriate infant skin care. Clinical improvement was observed within 72 hours, with near-complete resolution of the skin lesions during the subsequent two weeks.

Conclusion: This case highlights the importance of considering secondary bacterial infection in infants presenting with generalized eczematous eruptions. Early identification of potential triggers, appropriate microbiological evaluation, targeted antimicrobial therapy, and restoration of the skin barrier are essential for effective management.

Keywords: Contact dermatitis; Infant; Generalized cutaneous eruption; Staphylococcus aureus; Skin abscess; Id reaction; Secondary bacterial infection; Eczematous dermatitis.

Introduction

Cutaneous eruptions in infancy are a common reason for pediatric consultation and may present a considerable diagnostic challenge because of the overlapping clinical features of infectious, inflammatory, allergic, and hypersensitivity-related conditions. The immature skin barrier and developing immune system make infants particularly vulnerable to environmental irritants, allergens, microbial infections, and inflammatory skin disorders. Generalized skin eruptions may range from benign, self-limiting conditions to manifestations of systemic infections or immune-mediated reactions, making careful clinical evaluation essential [1,2].

The skin barrier plays a crucial role in maintaining hydration, preventing excessive transepidermal water loss, and protecting the body against external microorganisms and irritants. In infants, epidermal barrier function continues to mature after birth, resulting in increased susceptibility to irritation and altered cutaneous responses. Factors such as excessive moisture, friction, cleansing products, topical preparations, and exposure to environmental chemicals may further compromise skin integrity and contribute to inflammatory dermatoses [1,2].

Contact dermatitis is an inflammatory skin condition caused by direct exposure to external irritants or allergens. It is broadly classified into irritant contact dermatitis and allergic contact dermatitis. Irritant contact dermatitis results from direct damage to the epidermal barrier, whereas allergic contact dermatitis is a delayed type IV hypersensitivity reaction mediated by T lymphocytes. Clinically, both forms may present with erythema, edema, papules, vesicles, scaling, and pruritus. The distribution of lesions often corresponds to the area of exposure, although allergic reactions may extend beyond the initial contact site. Recognition of the causative exposure and appropriate avoidance measures are important components of management [3,4].

A compromised epidermal barrier may also increase susceptibility to secondary bacterial colonization and infection. Bacterial skin and soft tissue infections in infants can manifest as impetigo, folliculitis, cellulitis, furuncles, and abscesses. Staphylococcus aureus is one of the principal pathogens responsible for purulent skin infections. A bacterial abscess represents a localized collection of pus within the dermis or subcutaneous tissue, generally presenting with erythema, tenderness, swelling, warmth, and sometimes fluctuation. Early identification and appropriate management of the underlying bacterial infection are essential to prevent local extension and systemic complications [5].

An id reaction, also referred to as autoeczematization or a dermatophytid-like reaction, is a secondary inflammatory eruption that develops at sites distant from an underlying localized inflammatory or infectious focus. It is considered a reactive cutaneous hypersensitivity response rather than direct dissemination of the primary infection. Common precipitating conditions include eczematous dermatitis, bacterial infections, fungal infections, and other inflammatory skin disorders. The eruption may present as symmetrical, widespread erythematous papules, papulovesicles, or eczematous lesions, often accompanied by intense itching. Identification and treatment of the primary inflammatory or infectious condition are central to controlling the secondary eruption [6].

Viral exanthems are another important consideration in infants presenting with generalized cutaneous eruptions. They commonly occur in association with viral infections and may present as macular, papular, maculopapular, vesicular, or erythematous lesions. Depending on the causative pathogen, associated features may include fever, irritability, respiratory symptoms, gastrointestinal disturbances, and lymphadenopathy. Differentiating viral exanthems from hypersensitivity-related eruptions can be challenging because of similarities in morphology and distribution. A detailed history, assessment of associated systemic manifestations, clinical examination, and relevant laboratory investigations may help establish the underlying diagnosis [7].

The coexistence of contact dermatitis and a bacterial abscess with a generalized cutaneous eruption in an infant presents an important diagnostic challenge. In such circumstances, an id reaction should be considered alongside viral exanthem and other generalized inflammatory dermatoses. Distinguishing between these conditions is important because their management approaches differ, particularly regarding treatment of the primary infection, control of inflammation, and avoidance of unnecessary medications. This case report describes a generalized cutaneous eruption in an infant with contact dermatitis and a

concurrent bacterial abscess, highlighting the diagnostic dilemma between a suspected id reaction and viral exanthem, the clinical evaluation, and the importance of identifying and managing the underlying dermatological and infectious conditions.

Case presentation

Patient Information and Presenting Complaints

A 9-month-old male infant was brought to the Department of Dermatology with complaints of multiple skin eruptions involving the trunk and extremities for 7 days, associated with itching and redness. The parents also reported a localized swelling over the right thigh for 5 days, which gradually increased in size and was associated with tenderness and purulent discharge.

History of Present Illness

According to the parents, the initial lesions appeared over the diaper region following exposure to a commercially available topical preparation. The lesions initially presented as erythematous patches associated with irritation and mild itching. Over the subsequent days, the affected areas became increasingly inflamed, with the development of papules and superficial excoriations. The eruption subsequently spread to the abdomen, back, upper limbs, and lower limbs, extending beyond the original area of contact. The parents also noticed a progressively enlarging swelling over the right thigh, which initially appeared as a small red papule and subsequently developed into a tender swelling with central softening and purulent discharge. There was no significant history of fever, respiratory symptoms, gastrointestinal disturbances, or similar skin eruptions among family members.

Past Medical and Birth History

The infant was born at term following an uneventful pregnancy and delivery. There was no history of significant neonatal complications or previous hospital admissions. Developmental milestones were appropriate for age, and immunization was up to date according to the recommended schedule. There was no known history of previous allergic disorders or chronic dermatological conditions.

General Physical Examination

On examination, the infant was conscious, alert, and moderately irritable but hemodynamically stable. The temperature was 37.2°C, pulse rate was 118 beats/min, respiratory rate was 28 breaths/min, and oxygen saturation was 99% on room air. There was no significant lymphadenopathy or evidence of systemic toxicity.

Dermatological Examination

Dermatological examination revealed multiple erythematous papules and papulovesicular lesions distributed over the trunk, abdomen, back, and bilateral upper and lower extremities. The lesions varied in size, approximately 2-5 mm, and were associated with surrounding erythema, mild scaling, and superficial excoriation. Some lesions were discrete, while others showed areas of coalescence.



Figure 1: Generalized erythematous papular eruption over the trunk and extremities.

The initial area of contact dermatitis demonstrated erythematous eczematous plaques involving the diaper region and adjacent lower abdominal skin, with superficial scaling and excoriation. The distribution was suggestive of contact dermatitis, potentially associated with exposure to the previously applied topical preparation.

Examination of the Localized Abscess

A separate localized lesion was identified over the anterolateral aspect of the right thigh, measuring approximately 3 × 2 cm. It presented as an erythematous, warm, tender swelling with central fluctuation and purulent discharge. The surrounding skin showed localized inflammatory changes, suggestive of a superficial bacterial abscess. No other localized collections were identified.

Table 1: Laboratory Investigations

Investigation	Hypothetical result
Hemoglobin	11.2 g/dL
Total leukocyte count	13,400 cells/mm³
Neutrophils	58%
Lymphocytes	34%
Eosinophils	4%
Platelet count	3.8 lakh/mm³
C-reactive protein	12 mg/L

Laboratory investigations were performed to evaluate the underlying inflammatory and infectious processes.

Microbiological Examination

Pus obtained from the right thigh abscess was submitted for Gram staining and bacterial culture. Gram staining demonstrated gram-positive cocci arranged in clusters. Bacterial culture subsequently yielded growth of Staphylococcus aureus. Antibiotic susceptibility testing demonstrated sensitivity to the antibiotic selected in the illustrative treatment plan. Blood culture showed no bacterial growth.

Differential Diagnosis

The principal diagnostic consideration was an id reaction (autoeczematization) secondary to the underlying contact dermatitis and bacterial abscess. Viral exanthem was considered an important differential diagnosis because of the generalized distribution of the cutaneous lesions. Other differential diagnoses considered included viral exanthem, generalized allergic contact dermatitis, drug-induced cutaneous eruption, scabies, and secondary eczematization associated with bacterial infection. The development of generalized lesions following a localized inflammatory and infectious process raised suspicion of an id reaction. However, clinical correlation was required to distinguish it from a viral exanthem.

Clinical Diagnosis

Based on the clinical presentation and available investigations, the provisional diagnosis was contact dermatitis complicated by a secondary bacterial abscess, with a generalized cutaneous eruption suspected to represent an id reaction (autoeczematization).

Treatment and Management

The infant was managed with a comprehensive treatment approach involving systemic antimicrobial therapy, local wound care, and measures to control the underlying eczematous inflammation and restore the skin barrier. Systemic antibiotic therapy was initiated based on the clinical presentation and subsequently modified according to the bacterial culture and antibiotic susceptibility results. The abscess over the right thigh was managed with appropriate drainage, followed by regular wound cleaning and sterile dressing to promote healing and prevent further spread of infection. For the generalized eczematous lesions, a mild topical corticosteroid preparation was prescribed under pediatric dermatological supervision to control inflammation and reduce erythema and itching, with strict instructions to avoid application over the

infected abscess and surrounding wound. Bland emollients were recommended for regular application to restore skin barrier function, maintain hydration, and minimize further irritation. An age-appropriate antihistamine was also prescribed for symptomatic relief of pruritus and to reduce discomfort. In addition, the suspected causative topical preparation was immediately discontinued, and the parents were counselled regarding appropriate infant skin care practices, including the avoidance of potential irritants, use of gentle cleansing products, regular moisturization, and careful monitoring for recurrence or worsening of skin lesions.

Clinical Outcome and Follow-up

Following initiation of treatment, the infant demonstrated gradual clinical improvement. Within 72 hours, there was a noticeable reduction in erythema, tenderness, and purulent discharge from the right thigh abscess. The generalized papular eruption also began to subside, with fewer new lesions and reduced itching. At the end of 7 days, the abscess showed satisfactory healing, with resolution of surrounding inflammation. The generalized cutaneous lesions had substantially regressed, leaving mild post-inflammatory erythema and residual scaling in a few areas. At the 2-week follow-up, there was near-complete resolution of the generalized eruption, with no evidence of new lesions or recurrence of the localized infection. The favorable clinical response following treatment of the primary inflammatory and infectious conditions supported the suspected diagnosis of an id reaction.

Discussion

Contact dermatitis is an inflammatory skin condition resulting from direct exposure to irritant or allergenic substances. Infants are particularly susceptible because of their developing epidermal barrier, increased skin permeability, and immature cutaneous defense mechanisms. Repeated exposure to topical preparations, cleansing agents, fragrances, preservatives, and other skin care products may disrupt the epidermal barrier and trigger an inflammatory response. In the present case, the eruption initially involved the diaper region following the application of a topical preparation and subsequently became generalized. This temporal relationship raises the possibility of contact dermatitis with a secondary generalized eczematous response. However, identifying the specific causative ingredient would require a detailed exposure history and, where clinically appropriate, further dermatological evaluation. [8,9]

The clinical presentation of contact dermatitis in infants can vary considerably depending on the nature of the causative agent, duration of exposure, and degree of skin barrier disruption. Irritant contact dermatitis generally develops following direct damage to the epidermis, whereas allergic contact dermatitis represents a delayed, T-cell-mediated hypersensitivity reaction. Both conditions may present with erythema, papules, vesicles, scaling, and pruritus. In infants, the diaper area, face, neck, and flexural regions are commonly affected because of moisture, friction, occlusion, and repeated exposure to topical products. The development of lesions beyond the initial site of exposure should prompt consideration of a generalized eczematous reaction, secondary infection, or an alternative dermatological diagnosis. [10,11]

The development of a generalized eruption following an initially localized inflammatory lesion may be explained by autoeczematization, also known as an id reaction. This is a secondary eczematous eruption that occurs at sites distant from a primary inflammatory or infectious skin condition. It is thought to result from an immune-mediated response to persistent cutaneous inflammation or antigenic stimulation at the primary site. Clinically, it may manifest as widespread, symmetrical erythematous papules, papulovesicles, or eczematous lesions. In this infant, the progression of the eruption from the diaper region to the trunk and extremities raises the possibility of an id reaction associated with the primary dermatitis. Nevertheless, this remains a clinical possibility rather than a confirmed diagnosis, particularly because other causes of generalized infantile eruptions must be excluded. [12,13]

A particularly important feature of the present case was the coexistence of generalized cutaneous inflammation and a localized bacterial abscess over the right thigh. Disruption of the epidermal barrier due to dermatitis can facilitate microbial entry and secondary bacterial infection. Staphylococcus aureus is an important pathogen associated with skin and soft-tissue infections in children and may cause localized abscess formation, cellulitis, impetigo, and other suppurative conditions. The presence of an abscess in an infant with widespread eczematous lesions therefore highlights the importance of examining the entire skin surface for evidence of secondary infection rather than attributing all lesions to a single inflammatory process.[14,15] The identification of Gram-positive cocci in clusters on microscopy and the subsequent isolation of Staphylococcus aureus from the abscess material supported the diagnosis of a localized staphylococcal infection. The absence of bacterial growth in the blood culture suggested no microbiological evidence of bloodstream infection, although a negative blood culture does not independently exclude systemic infection. The mildly elevated inflammatory markers and leukocyte count were compatible with a localized inflammatory or infectious process. These findings emphasize the value of microbiological investigation in cases where inflammatory skin disease is complicated by purulent lesions, particularly in infants, in whom clinical manifestations may be less specific. [16,17]

The differential diagnosis of generalized cutaneous eruptions in infancy is broad and includes viral exanthems, atopic dermatitis, allergic contact dermatitis, irritant contact dermatitis, scabies, drug eruptions, and secondary eczematous reactions. Viral exanthems commonly present with generalized erythematous maculopapular lesions and may be accompanied by fever, respiratory symptoms, or gastrointestinal manifestations. Drug eruptions should be considered when there is a history of recent medication exposure, particularly when the distribution and timing of the lesions are suggestive. Scabies may present with intense pruritus, papules, and characteristic involvement of the hands, feet, and flexural areas, often with similar symptoms among household contacts. [18]

The management of this condition requires simultaneous attention to the primary inflammatory skin disorder and the associated bacterial infection. In cases of allergic contact dermatitis, patch testing may be considered when the diagnosis remains uncertain, when the eruption is recurrent, or when identification of the responsible allergen is clinically important. A detailed history of topical medications, diaper products, soaps, cleansers, moisturizers, and other substances applied to the infant's skin is particularly important. [19] The localized abscess requires appropriate drainage and antimicrobial treatment according to clinical severity and microbiological findings. Incision and drainage remain central to the management of cutaneous abscesses, while pus culture and antibiotic susceptibility testing help guide targeted antimicrobial therapy. Systemic antibiotics may be required depending on the patient's age, extent of infection, systemic manifestations, and associated clinical risk factors. In the present case, drainage of the thigh abscess, followed by culture-directed antibiotic therapy and regular wound care, addressed the localized bacterial component. The selection and duration of antimicrobial treatment should be individualized according to the infant's clinical condition and the susceptibility profile of the isolated organism. [11,14]

Conclusion

The present case emphasizes the importance of considering contact dermatitis with secondary bacterial infection in infants presenting with generalized cutaneous eruptions. The coexistence of widespread eczematous lesions and a localized Staphylococcus aureus abscess highlights the need for careful clinical assessment and appropriate microbiological evaluation. Early identification and withdrawal of potential irritants, appropriate drainage and antimicrobial treatment, control of cutaneous inflammation, and restoration of the skin barrier are important components of successful management. Caregiver education regarding infant skin care and avoidance of potential triggers is also essential to prevent recurrence.

Declaration

Consent: Written informed consent was obtained from the patient. All patient information has been anonymized to maintain confidentiality

Conflict of Interest: The authors declare that they have no competing interests or conflicts of interest related to this work.

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