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Case Report

Challenges in Diagnosing Staphylococcal Scalded Skin Syndrome in Children with Kwashiorkor: A Case Report

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Abstract

Background: Staphylococcal scalded skin syndrome (SSSS) is a type of exfoliating skin disease with high incidence in children. This condition can cause serious morbidity and even mortality with certain comorbid diseases such as malnutrition. Malnutrition could mask the diagnosis of SSSS because of its similarity to numerous differential diagnoses. Accuracy of clinical diagnosis is then essential to determine the proper initial management.
Case Illustration: This case report presents a 6-month-old male baby with staphylococcal scalded skin syndrome and kwashiorkor. The patient presented with complaints of multiple erythematous plaques and widespread vesicular lesions that subsequently ruptured, resulting in erosions. Physical examination revealed edema, coarse hypopigmented hair, multiple erythematous plaques, erosion, along with scales and crusts. Laboratory examination showed leukocytosis. The patient was administered intravenous ampicillin and chloramphenicol, along with wet dressings. The skin lesions showed improvement, but unfortunately, the patient passed away due to septic shock.
Discussion: Differential diagnoses discussed include Toxic Epidermal Necrolysis (TEN), zinc deficiency, blistering secondary to edema, and kwashiorkor. The patient in this case exhibited clinical features more aligned with SSSS, but overlapping conditions like zinc deficiency could not be definitively excluded.
Conclusion: Proper diagnosis can help decide the correct early management and improve patient prognosis.

Keywords*: kwashiorkor, malnutrition, staphylococcal scalded skin syndrome, SSSS*

Background

Staphylococcal scalded skin syndrome (SSSS) is caused by the exfoliative toxins (ET_S) A and B produced by the *Staphylococcus aureus* that damages Desmoglein-1, a protein for keratinocyte adhesion of the epidermis.[1] This sequence causes epidermolysis. Clinical signs that can manifest include fever, wide erythema, and flaccid blisters, which can lead to erosion and exfoliation of the epidermis.[2] The incidence is between 0.09 and 0.56 cases per million people.[3] It is often seen in infants and children under 5 years old.[1,4] This could be explained by the inability of their immature immune system to produce antibodies against ETs, and to clear toxins from the kidney.[5]

Other comorbidities, such as malnutrition, can worsen this disease. We present a case of SSSS in a 6-month-old baby with kwashiorkor.

Case Illustration

A 6-month-old male infant was admitted to the hospital with multiple erosions distributed throughout his body approximately 3 weeks before admission. The patient had experienced a febrile episode one month earlier, followed by blisters and erythema resembling burn wounds across his entire body. Initial management at a local primary healthcare facility involved the administration of paracetamol and topical hydrocortisone. However,

the lesions persisted and worsened despite treatment, accompanied by persistent fever, cough, and diarrhea. The patient was referred to a pediatrician and received a diagnosis of kwashiorkor, with suspicion of SSSS. Subsequently, the patient was transferred to the emergency unit.

No previous cases of similar skin disorders were reported within the patient's family. The patient's family belongs to the low-to-middle socioeconomic class, with concerns regarding their living conditions' hygiene. The patient is primarily cared for by an illiterate grandmother. Notably, the patient did not receive breast milk or formula but was fed mashed bananas mixed with water and sugar. Information regarding antenatal, natal, and postnatal care is unavailable.

Upon admission, the patient exhibited irritability and had a fever of 38.5°C. His height was measured at 61 centimeters, weighing 5400 grams. Generalized edema was observed (Figure 1), and examination revealed sparse, brittle, and hypopigmented hair (Figure 2A). Multiple erythematous plaques, accompanied by erosions, crusts, and scales, were observed in the perioral region, chest, abdomen, posterior neck, back, axilla, groin, genital area, and buttocks. (Figure 2B and 2C). The extremities displayed post-epidermolysis lesions, characterized by epithelialization and the formation of collarette scale-like lesions. The Nikolsky sign examination yielded positive results. No mucosal involvement was observed. Laboratory investigations indicated leukocytosis (white blood cells: 22,400/uL) and hypoalbuminemia (albumin: 1.4 g/dL). Chest imaging showed signs of bronchopneumonia. Blood culture and other infection markers were not performed due to facility limitations.

The patient received treatment from a pediatrician and a dermatologist within the isolation ward and underwent a therapeutic regimen for malnutrition. Ampicillin 300 mg and chloramphenicol 150 mg were administered every 8 hours as antibiotic therapy. The patient received topical therapy consisting of gentamicin cream and wet dressings with 0.9% NaCl. By the third day, the lesions began to dry, and skin erythema showed improvement. However, on the eleventh day, the patient developed profuse diarrhea and dyspnea. On the eighteenth day of hospitalization, the patient experienced hemodynamic instability and died due to septic shock.

Discussion

SSSS is a skin disease characterized by multiple blisters and desquamation caused by the exfoliative toxins of *Staphylococcus aureus*.[1] SSSS primarily affects infants and children between the ages of 6 months and 5 years, as well as immunocompromised adults.[6] Skin lesions are usually preceded by prodromal symptoms of upper respiratory tract infection.[7] In this case, the patient was 6 months old, with prodromal symptoms of fever, diarrhea, and cough.

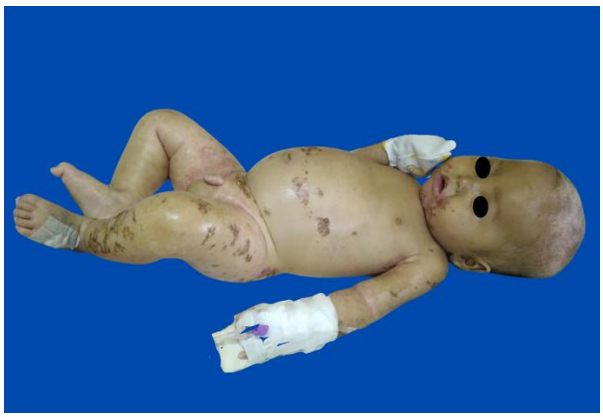

Figure 1. Generalized edema. Multiple erythematous plaques, erosions, crusts, and scales.

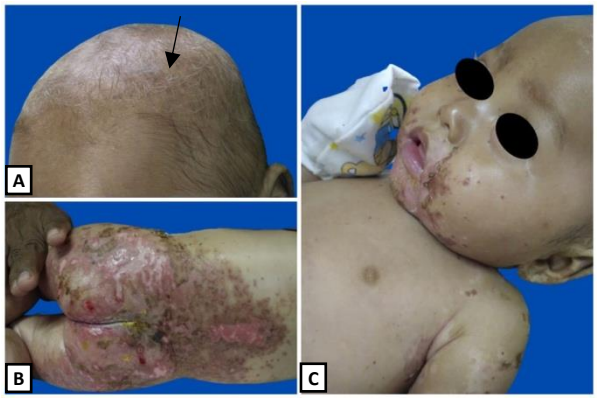

Figure 2. A. Sparse, brittle, and hypopigmented hair (black arrow). **B.** Multiple erythematous plaques and multiple erosions covered with crusts. **C.** Periorificial crusting.

Clinical manifestations of SSSS are acute widespread erythema with flexural accentuation, flaccid blisters, periorificial crusting, and a positive Nikolsky sign upon skin examination.[2,8] In children, blisters could be provoked by multiple causes. In this case, we try to discuss a few possible differential diagnoses, especially in patients with

malnutrition who has comorbid that could interfere with the diagnostic workup.

Toxic epidermal necrolysis (TEN) has similar clinical manifestations to SSSS but is a more severe condition. Unlike SSSS, TEN is usually drug-induced and often involves mucosal areas.[1,7] In our patient, a history of blisters followed by erosion and exfoliation without mucosal involvement, along with periorificial crusting, suggests a diagnosis more aligned with SSSS. With adequate facilities, a biopsy and a culture could have been utilized to differentiate the two conditions.

Zinc deficiency can manifest with similar skin lesions. In zinc deficiency, eczematous, crusted plaque lesions with well-defined borders are typically observed in the perioral, anogenital, and acral regions. Additional symptoms, such as diffuse alopecia and diarrhea, may also be present.[9] In our case, crusted plaque lesions were not limited to the areas above but instead appeared throughout the body. Given the overlap between zinc deficiency and SSSS in malnourished individuals, we could not definitively exclude the possibility of concurrent zinc deficiency. Although zinc levels could not be measured due to facility limitations, supplemental zinc was still administered as part of the initial treatment for malnutrition.

Blistering secondary to edema is another potential etiology to consider. In cases of acute exacerbation of edema, particularly in patients with preexisting edema or anasarca, tense cutaneous bullae may develop. These blisters lack surrounding erythema and typically resolve once the edema improves.[10] In our case, the patient's caregiver reported the presence of blisters before admission. However, upon examination, no further blisters were observed despite the presence of edema and erythematous lesions throughout the body.

Kwashiorkor, a form of severe malnutrition, also presents with similar manifestations. Cutaneous findings in kwashiorkor are described as dark pigmented patches that may desquamate, often referred to as "flaky paint" dermatosis. Beneath these patches, atrophic depigmented areas resembling healing burn lesions can be observed. Skin manifestations in kwashiorkor are typically chronic and non-oozing.[11] In our case, the lesion pattern was more consistent with epidermolysis, characterized by acute blistering followed by widespread desquamation.

The high rate of SSSS in children under 5 years old can be linked to the inability to produce adequate antibodies to ET toxins due to their immature immune system and inadequate renal capacity to excrete toxins.[3,12] Comorbidities such as malnutrition can worsen the condition. This patient had kwashiorkor, which compromises the immune system by affecting the development of the thymus and the long-term reduction of lymphocytes.[13] This condition could increase the susceptibility to opportunistic infections.[14]

A recent study shows the mortality rate of SSSS to be around 0.33%.[15] Other studies also reported a mortality rate of about 11%.[7] Causes of death include sepsis, pneumonia, and electrolyte imbalance.[2,15,16] Unfortunately, only limited data on SSSS-related mortality in children with underlying diseases is available. However, in adults, mortality rates can reach approximately 63% due to the immune-suppressive effects of underlying conditions such as renal failure, diabetes mellitus, or human immunodeficiency virus (HIV) infection.[5,17] In our case, the patient had underlying kwashiorkor, which further compromised the immune system and contributed to worsening the patient's condition.

The patient received an antibiotics regimen of ampicillin and chloramphenicol per malnutrition guidelines. Although there was an improvement in skin lesions, the drug of choice for SSSS should be penicillinase-resistant penicillin, the first generation of cephalosporin, clindamycin, or vancomycin.[18] These regiments were unfortunately unavailable in our center. Another shortcoming of this case was the unavailability of a histopathology examination, which could have confirmed the diagnosis of SSSS. Gentamicin was administered based on the availability of topical medication in our facility. Gentamicin is commonly used for skin and soft tissue infections caused by gram-negative bacteria. The topical antibiotics commonly used for SSSS include mupirocin and fusidic acid, as *Staphylococcus aureus* is the causative agent.[19] However, reports suggest the effectiveness of a combination of beta-lactam antibiotics and gentamicin in combating gram-positive bacteria.[20]

Conclusion

The presence of malnutrition poses a significant challenge in diagnosing and managing SSSS and vice versa. This highlights the importance of accurate clinical evaluation of skin lesions in SSSS, particularly in primary healthcare settings with limited resources. In certain cases, referrals to healthcare facilities with adequate resources are

necessary to establish an accurate diagnosis and provide appropriate management, thereby improving patient prognosis.

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None

Conflict of Interest

None

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