Staphylococcal Infection Mimicking Child Abuse
What Is the Differential Diagnosis and Appropriate Evaluation?

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Abstract: Twins with similar skin lesions are described. Although initially concerning for nonaccidental burn injury, further evaluation led to the diagnosis of bullous impetigo caused by Staphylococcus aureus. Thoughtful assessment is important in such cases to protect the child and prevent misdiagnosis.

Key Words: abuse, burns, staphylococcal disease, bullous impetigo
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Burn injury is documented in 6% to 20% of all abused children.1 Children can present for medical care with skin lesions that are suggestive of nonaccidental burn injury, but their lesions may infrequently be caused by skin infections, which mimic abusive burns. The following case is presented to illustrate the potential confusion caused by infection and an approach that may clarify the diagnosis.

CASE

Two-year-old twin girls were brought to the emergency department by an unrelated babysitter in the middle of the night with a chief complaint of “worsening diaper rash.” Based on a vague history and the appearance of their lesions, the emergency department physician diagnosed both children with bilateral immersion burns of the buttocks. As the physician was reporting them to Child Protective Services, the babysitter fled with the children. When law enforcement located the children, they were admitted to a children’s hospital for evaluation of nonaccidental injury.

History revealed that the day preceding admission, the girls were at a different caregiver’s home where their diapers were changed infrequently, resulting in prolonged contact with urine and feces. Later that day, they were noted by their biologic mother to have 2 quarter-sized lesions in the perineal area, which were described as raised, firm “blisters.” Both girls had a history of methicillin-resistant Staphylococcus aureus (MRSA) skin infections and had been previously treated with oral antibiotics. One had also required an incision and drainage, and both had been given a recent bleach bath, which caused initial concern for chemical burns.

Physical examination of twin A revealed erythematous, partially ruptured bullae, without purulent material, involving both buttocks (Fig. 1). The lesion on her left buttock was 4.75 × 3 cm, with an intact 1.5 × 1.5-cm bullous lesion centrally and a collarette of desquamation. The 5 × 3-cm lesion on her right buttock was desquamated. The skin of the perianal and genital region remained intact. Examination of twin B also revealed erythematous, ruptured bullae on both buttocks. The lesion on her left buttock was desquamated and measured 12.5 × 4 cm. The 15.5 × 3.8-cm lesion on her right buttock was also desquamated. It extended anteriorly to the genital region. In addition, with firm pressure, a serosanguineous, purulent exudate could be expressed from an erythematous punctate lesion at the site of previous infection. Both girls also had regions of postinflammatory hyperpigmentation from eczema. No distant areas of skin blistering were noted. Despite their skin lesions, both girls were happy and playful throughout the examination. Bacterial cultures obtained from the ruptured bullae were positive for MRSA. Based on susceptibilities, treatment was initiated with oral clindamycin, and both girls were discharged to their mother.

DISCUSSION

When presented with a child in whom a burn injury is suspected, the physician must consider abuse in the differential diagnosis. Scalding, especially hot water immersion, is the most common type of burn injury seen in child abuse.2–5 Suspicion of child abuse is appropriate when the caretaker’s explanation of the injury is not consistent with the child’s developmental abilities, when there is delay in seeking medical care, when explanations for the injury change, or when injury is attributed to siblings.6–10 In suspected immersion scald injury, the pattern of injury can be helpful in determining its mechanism. Patterns suggestive of non-accidental burn injury include uniform burn depth, sparing of flexural areas, sharp, body contour line burn margins, bilateral burn symmetry, absence of splash marks, and sparing of areas held in contact with cooler surfaces, such as tub bottoms.

Several risk factors present in this case led to concern for nonaccidental injury. Abusive burns typically occur in children younger than 6 years,1,5,14 with a mean of between 2 and 4 years.7,11,13,19 Abusive childhood burns occur more frequently in families with a single, young, socially isolated parent from lower socioeconomic classes.8,11,13,20–28 Buttock and/or genital burn injuries are also more commonly associated with abuse,4,5 and may be triggered by toileting issues. Another aspect of this case that led the emergency department physician to consult Child Protective Services was the vague history provided at the time of presentation. Although the history may have been vague because the babysitter was not the primary care provider, presentation for care by an unrelated adult caregiver is also a factor suspicious for abuse.10 The physician’s concern for maltreatment was also heightened when the babysitter fled with the twins.

Infection, in this case, was likely precipitated by the breakdown of the skin’s normal barrier function as a consequence of prolonged contact with urine and feces, which caused severe diaper dermatitis.29 This allowed infection to develop in toddlers previously colonized with MRSA. Although the emergency
department physician was originally concerned about burns caused by bleach, prolonged irritant chemical contact is typically required to produce skin lesions such as these.\textsuperscript{5,30} Diluted bleach baths actually had been prescribed by the children's physician to control their MRSA. Properly diluted, bleach baths are not a risk factor for chemical burns.

On examination by the child abuse pediatrician, the lesions were described as non-linear, poorly demarcated, non-papular skin erosions with perianal groove sparing. Erythema and desquamation were present in intertriginous areas, which are more likely to be spared in an inflicted burn. In addition, purulent material was expressed from the area of apparent bruising. Consultation with the pediatric infectious disease service confirmed the diagnosis of staphylococcal bullous impetigo.

Additional workup for abuse was not indicated because an innocent etiology was identified. However, when nonaccidental burn injury is suspected in children 2 years or younger, the provider should consider a skeletal survey to assess for occult fractures.\textsuperscript{31} Childhood burns secondary to abuse are more likely to present with previous or concomitant signs of abuse or neglect, as well as prior reports to Child Protective Services.\textsuperscript{31,19,25,26,32-34}

Although abuse should be considered in cases with multiple risk factors, obtaining a thorough history and performing a comprehensive physical examination may help differentiate mimics of abusive burns, such as bullous impetigo, staphylococcal scalded skin syndrome, toxic epidermal necrolysis, Stevens-Johnson syndrome, and blistering distal dermatitis.\textsuperscript{5} If infection is suspected, a bacterial culture should be obtained. Toxic epidermal necrolysis typically presents in individuals older than 20 years rather than in children and is usually preceded by drug exposure. Stevens-Johnson syndrome is most commonly observed after a viral infection or drug ingestion.

*S. aureus* produces disease in skin and surrounding structures by direct infection, the production of toxins, or both mechanisms. When a blistering rash is present, staphylococcal disease should be suspected. Bullous impetigo and the more systemic syndrome of staphylococcal scalded skin syndrome (SSSS) may mimic abusive injuries because the epidermal loss that causes appears similar to that seen in partial-thickness scald burns. In bullous impetigo, erythema and bullae are present in locally infected lesions, and the organism can be cultured directly from the site of the skin lesions. The diaper area is a common site of infection. In SSSS, prodromal findings of fever, conjunctivitis, and/or pharyngitis are frequently present. The rash usually begins on the face, before encompassing the rest of the body with diffuse erythema. Within 48 hours, flaccid bullae develop and desquamation follows.\textsuperscript{35} Unlike bullous impetigo, the dermatologic manifestations of SSSS are secondary to a hemolytically disseminated skin toxin. The infection occurs at a distant focus, so *Staphylococcus* is not recoverable from the bullae.

**CONCLUSIONS**

Two cases of desquamating bullous lesions in the diaper area are presented. Although initially concerning for abusive burn injury, these were subsequently found to be due to infection. Although SSSS has been previously described as a mimic of child abuse,\textsuperscript{36} these cases are presented to broaden the understanding of staphylococcal disease to include bullous impetigo as a mimic of nonaccidental burn injury. In the evaluation of a child with suspected burn injury, a thorough history and physical examination, accompanied by appropriate laboratory evaluation, can help distinguish infection from abuse.

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**REFERENCES**


