Association of recalcitrant scabies infestation and bullous pemphigoid in an infant

Thilo Gambichler,[1,2] Rita Mansour,[1] Tobias Rothoeft,[3] Enno Schmidt,[4] Martin Doerler,[1] Laura Susok[1,5]

[1]Department of Dermatology, Ruhr-University of Bochum; [2]Department of Dermatology, Christian Hospital of Unna; [3]Department of Pediatrics, Ruhr-University of Bochum; [4]Department of Dermatology and Lübeck Institute of Experimental Dermatology, University of Lübeck; [5]Department of Dermatology, Hospital Dortmund, Witten/Herdecke University, Faculty of Health/School of Medicine, Dortmund, Germany

Dear Editor,

In adults, bullous pemphigoid (BP) has been described in association with scabies.[1,2] We here describe an infant with recalcitrant scabies who developed generalized BP as confirmed by serological and immunofluorescence studies.

About four weeks after birth, an otherwise healthy non-vaccinated male infant was diagnosed with scabies. His parents and sister were diagnosed with scabies as well. First, the infant was treated with two cycles of permethrin 5%, which did not result in the resolution of skin lesions. Finally, the infant was admitted to our hospital for inpatient treatment. On examination, there were generalized papules, scales, and crusts also affecting the palms and soles. Dermoscopy revealed curvilinear scaly burrows consistent with a diagnosis of scabies. A third cycle of permethrin 5% was administered but the skin symptoms worsened after hospital discharge. Four weeks after scabies diagnosis the infant developed multiple erythematous annular confluent plaques on his entire body, partly with tense blisters and bloody crusts (Figure 1a-c). Since there still was dermoscopic evidence for active scabies (Figure 1d), the infant was admitted and treated with crotamiton cream and oral ivermectin (200 µg per kg body weight on day one and day 7). Because of the blistering skin lesions, we performed skin biopsies revealing subepidermal clefting and mixed dermal inflammatory infiltrates on haematoxylin-eosin staining (Figure 2a). By direct immunofluorescence (DIF), linear C3 deposits at the dermal-epidermal junction were observed (Figure 2b). ELISA of serum revealed highly increased anti-BP180 NC16A IgG with 1,780 U/ml (<20 U/ml). Immunoblot with conditioned concentrated medium of cultured human keratinocytes did not reveal immunoglobulin A (IgA) reactivity against leukocyte adhesion deficiency type 1, the soluble cell-drived ectodomain of BP180 typically targeted in linear IgA disease. Initial treatment was performed with 15 mg intravenous prednisolone daily over 14 days resulting in significant improvement of his skin condition. However, 14 days after the second ivermectin dosage, living mites could be observed again on high-resolution imaging (*Supplementary video*). Hence, a third ivermectin cycle was administered followed by a second application 7 days later. The prednisolone dosage was tapered to 2.5 mg daily over a 3-week period. Serum anti-BP180 NC16A IgG significantly decreased to 58 U/ml. The skin lesions gradually cleared over time.

Since the first description of juvenile BP in 1970, there are approximately 100 cases reported in childhood with only a dozen in infants.[3-6] Lesions on the palms and soles are typical of childhood BP, especially in children under one year, and the widespread skin involvement and presence of BP180 autoantibodies predominate in infants as well. In the present case, mucous membrane lesions were not present, those being most frequently observed in children older than 1 year.[3-6] Our immunological investigations widely excluded differential diagnoses such as linear IgA dermatosis and epidermolysis bullosa acquisita.[6] Preceding vaccinations and much rarer infections have been linked to the development of infantile BP.[4,5] However, the true role of vaccines or infections in the pathogenesis of infantile BP is still questioned. In adult-onset BP, however, there exists evidence that infestations with scabies mites can trigger BP, even though the epidemiological and clinical presentation of scabies infection complicated by bullous lesions may resemble BP.[1] There are studies that have demonstrated deposits of immunoglobulins or complement at the anti-basement membrane zone (BMZ) or vessels of patients with scabies, even when blisters were absent and indirect

Correspondence: Thilo Gambichler, Department of Dermatology, Ruhr-University of Bochum, Bochum, Germany.
E-mail: t.gambichler@klinikum-bochum.de

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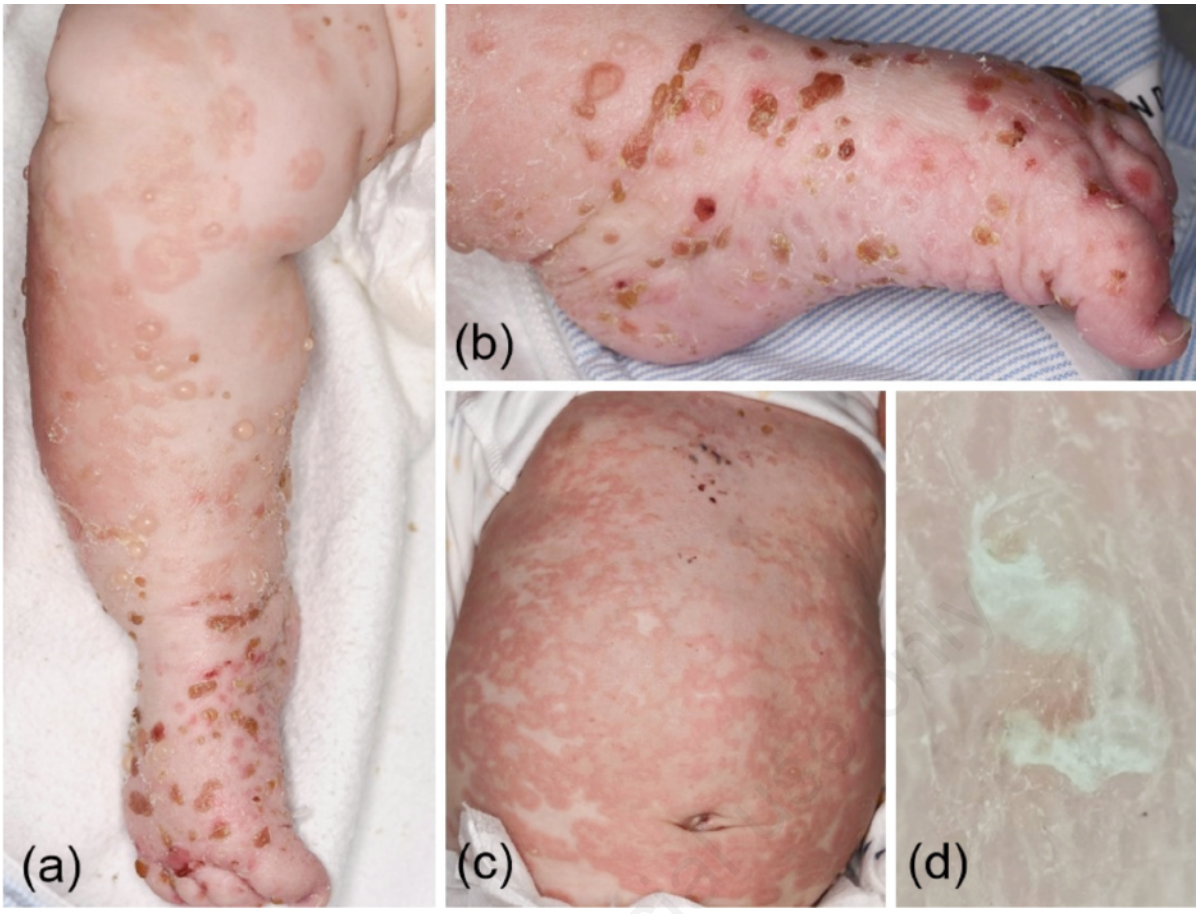

Figure 1. Showing disseminated annular confluent erythematous lesions with tense blisters and crusts on the lower limbs and abdomen of an infant with a history of scabies (**a-c**). Dermoscopy revealed curvilinear scaly burrows still consistent with a diagnosis of scabies (**d**).

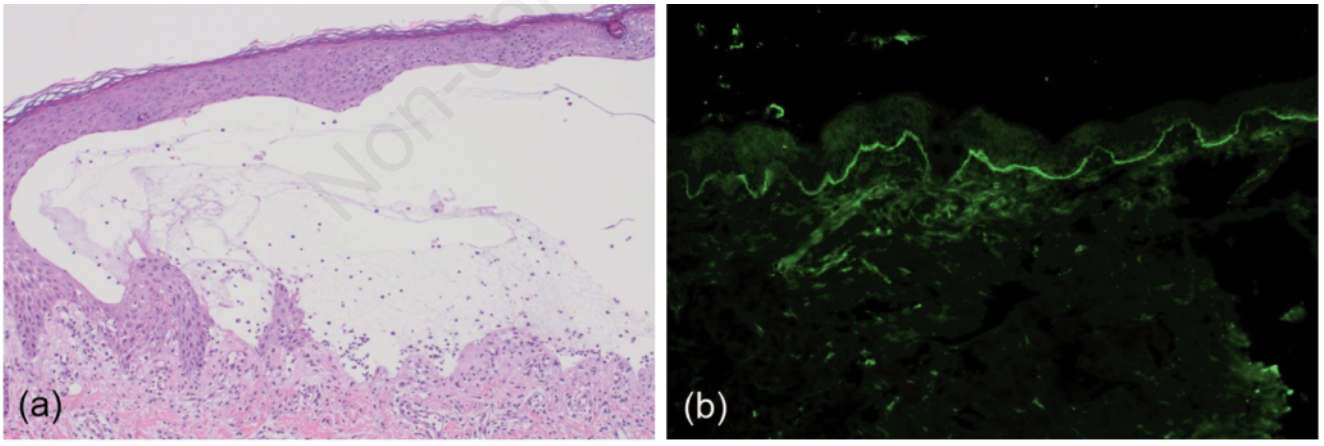

Figure 2. A skin biopsy of an infant with scabies and suspected bullous pemphigoid showed subepidermal clefting and mixed dermal inflammatory infiltrates on haematoxylin-eosin staining (**a**, magnification, × 100). Direct immunofluorescence revealed linear C3 deposits at the dermal-epidermal junction (**b**, magnification, × 100).

immunofluorescence was negative. Nevertheless, the detection of BMZ antibodies by means of DIF is sufficient to prove BP diagnosis. One may speculate that mites can induce aberrant immunological changes mediated by immunoglobulins and complement, thus possibly resulting in "true" BP in some patients with scabies. Two hypotheses exist regarding the mechanisms of BP autoantibody production in patients with scabies: i) mites penetration and/or its lytic secretions may damage the BMZ possibly causing release of BP antigens that finally result in the production of anti-BMZ antibodies; ii) mite components could act as an antigen, which cross-reacts with BP antigens, leading to the production of anti-BMZ antibodies.[2]

In conclusion, we demonstrate for the first time that scabies infestation may also trigger BP in infants.

References

1. Rozenblat M, Halaj A, Levi A, et al. Bullous pemphigoid and scabies: is there an association? J Drugs Dermatol 2022;21:1009-11.
2. Konishi N, Suzuki K, Tokura Y, et al. Bullous eruption associated with scabies: evidence for scabetic induction of true bullous pemphigoid. Acta Derm Venereol 2000;80:281-3.
3. Reis-Filho EG, Silva Tde A, Aguirre LH, Reis CM. Bullous pemphigoid in a 3-month-old infant: case report and literature review of this dermatosis in childhood. An Bras Dermatol 2013;88:961-5.
4. Neri I, Greco A, Bassi A, et al. Bullous pemphigoid in infant post vaccination: myth or reality? Int J Immunopathol Pharmacol 2016;29:295-9.
5. Nanda A, Nanda M, Dvorak R, et al. Bullous pemphigoid (BP) in an infant complicated by tuberculous meningoencephalitis. Int J Dermatol 2007;46:964-6.
6. van Beek N, Schmidt E. Autoimmune bullous diseases. In: Höger P, Kinsler V, Yan A (eds.). Harper's Textbook of Pediatric Dermatology, 4th edition. Wiley-Blackwell, Chichester; 2020:868-97.

Online supplementary materials

Video S1. Living scabies mite obtained from the infants' skin (magnification, × 200).