Crusted Scabies and Tinea Corporis After Treatment of Presumed Bullous Pemphigoid

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Practice Points

- Scabies, known as the great imitator, is known to clinically mimic a variety of cutaneous disorders.
- Scabies can clinically and immunohistochemically mimic bullous pemphigoid.
- Immunosuppressive treatment of presumed bullous pemphigoid can transform common scabies to crusted scabies.
- Because crusted scabies is highly contagious, both the patient and the patient's home and work environments must be aggressively treated to eradicate the large burden of mites.

We report a case of scabies that immunohistochemically mimicked bullous pemphigoid (BP) in an 82-year-old woman who presented with intractable pruritus. Bullous pemphigoid initially was diagnosed by direct immunofluorescence (DIF), though no blisters were clinically present. Subsequent immunosuppressive therapy for treatment of presumed BP led to the development of crusted scabies and widespread tinea corporis.

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Crusted scabies is the uncontrolled proliferation of *Sarcoptes scabiei* var *hominis*.[1] The condition was first reported in 1848 among a population of lepers in Norway and is sometimes referred to as Norwegian scabies. Although patients with common scabies typically are infested with 10 to 15 mites, patients with crusted scabies can be plagued with more than 1 million mites.[1] Crusted scabies is characterized by exfoliative dermatitis with associated hyperkeratosis and crusting. Crusts typically are gray, yellow, brown, or cream colored, and may have fissures. They are firm, adhere to the skin, and resemble a pumice stone when removed.[1]

Scabies mites trigger a delayed-type immune reaction in the host. This immune response combined with mechanical removal of mites by scratching reduces the mite load and suppresses mite proliferation, yet rarely eliminates the mites completely. Not surprisingly, immunosuppressed patients as well as those with reduced cutaneous sensation or the inability to scratch are at risk for developing crusted scabies.[1]

Scabies often is easily identified, but there are reports in the literature of it mimicking urticaria,[2] Darier disease,[3] dermatitis herpetiformis,[4] and bullous pemphigoid (BP).[5] We present a case of scabies that immunohistochemically mimicked BP; the immunosuppressive treatment of the presumed diagnosis of BP led to the development of crusted scabies and widespread tinea corporis.

Case Report

An 82-year-old woman presented to our clinic with a 20-month history of ongoing pruritus that initially developed on the arms but had become more generalized over the last 10 months. Prior therapies administered at an outside facility included doxepin hydrochloride, cetirizine, and triamcinolone acetonide

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ointment, which provided some symptomatic relief. When the pruritus did not resolve, the patient returned to the outside facility and was treated for suspected scabies with permethrin cream 5% once that day and again 1 week later.

On 1-month follow-up, the pruritus had failed to improve. At this time, 2 skin biopsies were performed. The first biopsy showed subacute epidermal spongiosis with focal subcorneal and intraepidermal pustules. The second biopsy showed chronic superficial dermal inflammation with eosinophils. Direct immunofluorescence (DIF) showed linear IgG, focal C3, and trace focal IgA deposits in the basement membrane zone (BMZ). Based on these findings, a diagnosis of BP was made and the patient was started on mycophenolate mofetil. When the pruritus failed to improve, her regimen was changed to methotrexate and prednisone, with no symptomatic changes.

With no notable improvement seen, the patient was referred to our clinic for further evaluation. Initial physical examination revealed large, brown-gray, crusted, hyperkeratotic plaques on the bilateral dorsal hands and arms. Several burrows were observed on the hands and feet (Figure 1A). Multiple annular, circumscribed, erythematous, scaling plaques were noted on the trunk, buttocks, and bilateral lower extremities (Figure 1B).

Skin scrapings from the burrows on the hands revealed numerous mites and eggs, confirming the diagnosis of scabies. A potassium hydroxide preparation performed on scrapings from annular scaling lesions on the trunk and buttocks showed hyphal elements consistent with tinea corporis.

Based on the confirmed diagnosis of scabies and tinea corporis, the patient's immunosuppressive therapy for BP was discontinued and oral ivermectin (0.2 mg/kg) and permethrin cream 5% were administered one time immediately and again in 5 days, along with oral terbinafine. The patient's caregiver, her daughter, also was treated with permethrin cream 5%. All fomites were washed to prevent transmission of scabies mites, eggs, and larvae. Additionally, indirect immunofluorescence (IIF) testing was ordered and was found to be negative for circulating antibodies against BP180 and BP230.

When the patient returned for follow-up 1 month after treatment was initiated, all lesions on the hands, arms, trunk, buttocks, and lower extremities had cleared (Figure 2). Additionally, the patient reported that her itching had resolved and that her skin "hadn't felt this good in years." At 6-month follow-up, the patient was still asymptomatic without any cutaneous lesions.

Comment

Scabies often is referred to as the great imitator. Reports exist in the literature of scabies mimicking urticaria,[2] Darier disease,[3] dermatitis herpetiformis,[4] and BP (Table).[5-24] Immune deposits have occasionally been found in patients with common scabies who have undergone DIF testing.[25-28]

Bullous pemphigoid is an autoimmune disease mediated by autoantibodies directed at the BMZ. Clinical presentation varies. Classically, BP presents as tense bullae filled with clear liquid on an erythematous base, though it also can present initially as either a nonspecific pruritus or pruritus with urticaria.[29] Classic DIF findings are a linear bandlike pattern of IgG or C3 at the dermoepidermal junction.[30] These DIF findings are sensitive for BP (90.5%); however, positive IIF

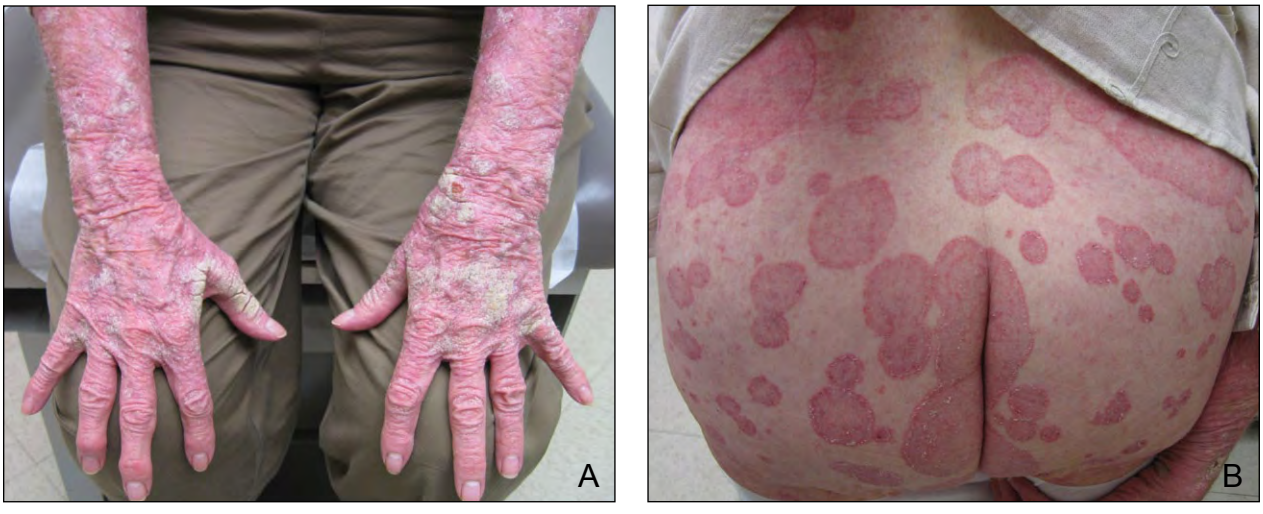

Figure 1. Crusted scabies with thick, hyperkeratotic, crusted, brown-gray plaques on the bilateral dorsal hands and arms. Multiple burrows were noted. Skin scrapings revealed mites and eggs, confirming the diagnosis (A). Widespread tinea corporis with multiple well-defined, annular, erythematous, scaling plaques on the buttocks (B) as well as the trunk and lower extremities (not pictured). Skin scrapings of the lesions were prepared with potassium hydroxide and revealed hyphal elements, confirming the diagnosis.

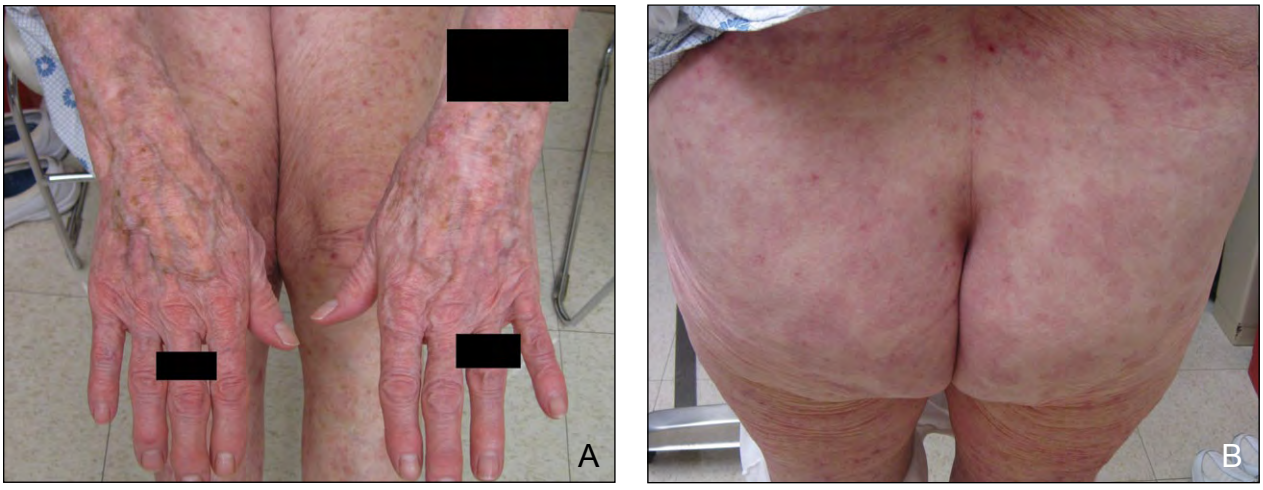

Figure 2. Resolution of the crusted scabies lesions occurred after discontinuation of immunosuppressive therapy and initiation of ivermectin and permethrin cream, administration of permethrin cream for the patient's caregiver, and extensive fomite decontamination (A). Resolution of widespread tinea corporis occurred after discontinuation of the immunosuppressants and treatment with terbinafine (B).

with circulating anti-BMZ antibodies is the most specific (99%).[31]

The pathophysiology of antibodies at the dermoepidermal junction in scabies remains speculative, and it has not been determined if the antibodies are directed against BP antigens. The antibodies may be the result of cross-reactivity between scabies mite antigens and BMZ antigens. Alternatively, the mites may injure the BMZ directly or the secretion of their lytic enzymes may injure the area indirectly. Either may lead to the exposure of or an alteration in BMZ antigens, which subsequently triggers autoantibody production. Lastly, scabies mites can potentially occur concurrently with true BP or induce BP via the Köbner phenomenon.[15] Thus scabies-induced BP must be differentiated from BP-like scabies. Differentiation is best accomplished by IIF,[1] which is highly specific for true BP.[31] It always is virtually negative in BP-like scabies (Table).[5-24]

A PubMed search of articles indexed for MEDLINE using the term *bullous pemphigoid and scabies* revealed 20 reports in which immunofluorescence testing was performed in patients with common scabies complicated by bullae (Table).[5-24] Although all of them described the bullae as clinically mimicking BP, only 7 cases[6,7,15,17,20-22] reported DIF findings consistent with BP. Only 2 of these 7 cases had positive IIF upon testing.[7,15]

There were 3 reports of crusted scabies that presented with BP-like lesions.[6,20,21] In at least 2 of these cases, hyperkeratosis and crusting occurred after corticosteroid therapy was initiated, supporting the hypothesis that the immune system is vital in keeping the mite load in check. Direct immunofluorescence revealed the classic bandlike deposition of IgG and C3 at the dermoepidermal junction in 2 of 3 cases[20,21]; IIF was negative in all.[6,20,21] Similar to our patient, Van Neste and Lachapelle[22] described a patient with crusted scabies and no clinical blisters who had bandlike deposits of C3 along the dermoepidermal junction.

Konishi et al[14] reported 2 cases of scabies associated with true BP and documented circulating antibodies against BP180 and/or BP230 antigens as determined by Western blot analysis. However, further analysis revealed the bullae had appeared months after the scabies infection had been treated and cleared, which calls into question if this true BP can be linked to the scabies infestation.[14] Supporting the hypothesis that true BP may be induced by scabies, Bornhövd et al[15] described the case of a patient who developed bullous lesions at the time of a confirmed scabies infestation. Both DIF and IIF studies were positive. Additionally, the bullous lesions recurred after the scabies had resolved.[15]

Crusted scabies is a rare and highly contagious disease caused by an uncontrolled proliferation of scabies mites. It most commonly occurs in patients who are immunosuppressed. The high mite burden and extensive shedding of mites into the patient's home and work environments makes transmission via skin-to-skin contact and fomites possible.[1] The optimal treatment regimen includes scabicidals, keratolytics, and decontamination of the patient's home and work environments. Dual therapy with permethrin cream 5% and oral ivermectin is preferred. Topical treatments should be repeated until the mites are eradicated.[1] It is important that fingernails are clipped and that the

Immunofluorescence Findings in Patients With Bullous and/or Crusted Scabies

Reference (Year)	Patient Age, y/Gender	Type of Scabies	DIF	IIF	Other Findings
Viraben and Dupre[5] (1989)	34/F	Bullous	Negative	Negative	N/A
Bhawan et al[6] (1991)	76/M	Bullous	Linear deposits of IgG and C3 in BMZ	N/A	N/A
Ostlere et al[7] (1993)	36/F	Bullous	Linear deposits of C3 in BMZ; IgM and C3 around dermal blood vessels	Anti-BMZ IgG (titer of 1:10)	N/A
Said et al[8] (1993)	79/M	Bullous	Negative	N/A	N/A
Parodi et al[9] (1993)	69/M	Bullous	Discontinuous deposits of IgM and C3 in BMZ	Negative	N/A
Haustein[10] (1995)	73/M	Bullous	Nonspecific granular C3 deposits in BMZ	Negative	N/A
Veraldi et al[11] (1996)	66/F	Bullous	Granular deposits of C3 in BMZ	Negative	N/A
Clyti et al[12] (1997)	73/M	Bullous	Negative	N/A	N/A
	89/F	Bullous	Negative	N/A	N/A
Garcia et al[13] (2000)	70/F	Bullous	Negative	N/A	N/A
	72/M	Bullous	Negative	N/A	N/A
Konishi et al[14] (2000)	75/M	Bullous	N/A	Anti-BMZ IgG (titer of 1:160)	Western blot analysis revealed circulating antibodies to BP180
	72/M	Bullous	N/A	Circulating anti-BMZ IgG (titer of 1:160)	Western blot analysis revealed circulating antibodies to BP180 and BP230

Reference (Year)	Patient Age, y/Gender	Type of Scabies	DIF	IIF	Other Findings
Bornhövd et al[15] (2001)	76/M	Bullous	Granular C3 and C4 deposits in BMZ	Negative	N/A
	89/M	Bullous	Linear deposits of IgG and C3 in BMZ	IgG (titer of 1:160 monkey esophagus; titer of 1:80 rabbit esophagus), BP antigen	Patient had clinical relapse of BP without scabies
Brar et al[16] (2003)	52/F	Bullous	Negative	Negative	N/A
Balighi et al[17] (2006)	52/M	Bullous	Linear deposits of IgG and C3 in BMZ	Negative	N/A
Ansarin et al[18] (2006)	42/M	Bullous	Negative	N/A	N/A
Serra et al[19] (2010)	87/F	Bullous	Negative	N/A	N/A
Bhawan et al[6] (1991)	67/M	Bullous, crusted	Granular deposits of IgG in BMZ	Negative	N/A
Slawsky et al[20] (1996)	76/M	Bullous, crusted	Linear deposits of IgG and C3 in BMZ	Negative	N/A
Nakamura et al[21] (2006)	71/M	Bullous, crusted	Linear deposits of IgG and C3 in BMZ	Negative	N/A
Van Neste and Lachapelle[22] (1981)	89/F	Crusted	Linear deposits of C3 in BMZ	N/A	Thickened BMZ
Walton et al[23] (2008)	27/M	Crusted	Nonspecific deposits of IgM and IgA in BMZ; C3 in dermal vessel walls	N/A	N/A
	44/M	Crusted	Nonspecific deposits of IgM and IgA in BMZ; C3 in dermal vessel walls	N/A	N/A
Roxana Stan et al[24] (2011)	79/M	Bullous	Negative	Negative	N/A

Abbreviations: DIF, direct immunofluorescence; IIF, indirect immunofluorescence; F, female; N/A, not applicable; M, male; BMZ, basement membrane zone (dermoepidermal junction); BP, bullous pemphigoid.

scabicidal cream is applied to the nails and subungual areas, fingers and toes, naval, axilla, and gluteal cleft.[1] Keratolytics (salicylic acid 5%–10% in petroleum or urea 40%) act to remove the thick crusts, which retain excessive numbers of mites and prevent adequate penetration of the scabicidals.[1] Environmental decontamination consists of washing all sheets, linens, and clothing in hot water (60°C). Anything that cannot be washed should be placed in plastic bags for at least 1 week.

Conclusion

Scabies is known as the great imitator, as it can clinically mimic a number of cutaneous diseases. This case report highlights how scabies, including bullous and crusted scabies, can immunohistochemically mimic BP. It is important to note the similarities between these conditions, as treatment with immunosuppressives for presumed BP can transform common scabies to crusted scabies, which is highly contagious. Indirect immunofluorescence studies can help differentiate scabies with blister formation from true BP. This case highlights the importance of continually searching for alternative diagnoses when objective test results do not match the clinical findings or when treatment fails.

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