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Review

Atypical presentations of bullous pemphigoid: Clinical and immunopathological aspects

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ABSTRACT

Bullous pemphigoid may occur in extremely variegated manners, misleading even experienced dermatologists. Indeed the type and/or distribution of lesions may be unusual. Furthermore, there may be an atypical demographic profile of patients, a different clinical course and a different responsiveness to therapy. Up to 20% of the cases the onset is characterized by a non-bullous phase, lasting weeks, months or in particular cases remaining the only manifestation of the disease. During this early phase lesions are generally pruritic erythematous, eczematous or urticarial; however, lesions may also resemble polycyclic, targetoid, nodular or lichenoid lesions. These atypical lesions may also coexist with typical bullae. Other atypical presentations include a vesicular eruption and an erythroderma. Manifestations in children differ from adult forms, presenting an exclusive genital involvement in 50% of cases or a preponderant involvement of the face, the palms and the soles. Rarely bullous pemphigoid is confined to certain body areas, due to particular triggering factors or to a lower disease activity. Therefore, the need to formulate universally recognized diagnostic criteria is increasingly evident, especially for atypical bullous pemphigoid. Direct immunofluorescence of perilesional skin and detection of circulating autoantibodies are mandatory in the diagnosis, especially when the clinical presentation is doubtful.

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1. Introduction

Bullous pemphigoid (BP) is a rare autoimmune blistering disease, with an annual incidence ranging from 6 to 13 new cases per 1 million

population per year [1–3]. BP typically affects elderly people (65–75 years of age) and males are slightly more affected than females [1,4].

Classically, BP is clinically characterized by large (1–3 cm), tense, serous or hemorrhagic bullae, which appear on erythematous, urticarial or eczematous lesions or apparently normal skin. Blisters evolve into eroded and crusted areas and then heal with no scarring. Sometimes post-inflammatory changes in pigmentation or *milium* might be visible [5]. The bullae generally appear in clusters and quickly become widespread. The sites of predilection include the lower abdomen, proximal extremities (especially the inner thighs), flexor surfaces of the forearms, groin

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and axillae. The face and the neck are usually not affected. The involvement of the oral cavity is rare, limited to 10–30% of patients [1]. This is the typical clinical picture of BP; however, BP may occur in an extremely variegated and deceiving manner.

In the past, especially in the nineties, the predominant tendency was to label encyclopedically all of the unusual presentations of BP as actual variants of BP. However some of these hypothetical variants have been reported only once or twice in the literature and have never been reconfirmed by more recent studies.

Examples of such supposed variants are pigmented pemphigoid, seborrheic pemphigoid and polymorphic pemphigoid. The term polymorphic pemphigoid was used many years ago in the literature [6,7] to define patients with an atypical subepidermal bullous disease with mixed clinical and histological features of both BP and of other blistering diseases such as dermatitis herpetiformis and linear IgA dermatosis [8]. Yet, this term is not precise, since patients who actually were affected by linear IgA dermatosis or vesicular BP or mixed subepidermal diseases were reported under this terminology; therefore, such variant should be considered obsolete [8]. Furthermore, probably both pigmented pemphigoid and seborrheic pemphigoid actually represent an unusual expression of BP correlated to peculiar characteristics of the affected patient. To the best of our knowledge, only one case of pigmented BP has been described and the authors themselves consider it an atypical presentation ascribable to the patient's phototype IV [9]. Whereas, the supposed variant of seborrheic pemphigoid is most likely, explained by an excessive secretion of sebum or a concomitant seborrheic dermatitis, that may have been the triggering factors for BP, a sort of Koebner phenomenon. Only two cases of seborrheic pemphigoid have been reported [7,10] and in the past twenty years this term has been no longer used.

Therefore, trying to categorize all variations in the presentation of BP as atypical variants is probably of little significance, because BP is by its very nature, a polymorphic disease. In this review we intend to give a quick overview only of the well-documented atypical presentations BP, which could mislead even experienced dermatologists (Table 1). The clinical presentation can be atypical because of the unusual type of lesions and/or the atypical distribution of the lesions.

2. Atypical presentations of bullous pemphigoid

The onset of classical BP is often characterized by a non-bullous phase of variable duration; from weeks to several months and in a few



Fig. 1. Pemphigoid nodularis: polymorphic lesions representing the progressive stages of the disease: erythematous papules and nodules, nodules topped by blisters and finally sero-hemorrhagic crusts resulting from the rupture of bullae.



Fig. 2. Vesicular bullous pemphigoid: serous and hemorrhagic vesicles on erythematous skin, with sero-hemorrhagic crusts.

cases it may be the only manifestation of BP. Some authors report that such condition in up to 20% of the patients [1]. Lesions are itchy erythematous or eczematous patches and urticarial plaques [11]. A correct diagnosis during this phase might be difficult, since the early lesions are non-specific and might resemble a broad spectrum of conditions, such as chronic prurigo, eczema, urticaria and toxic drug reactions. Therefore, in elderly patients with a long lasting highly pruritic eczema-like or urticarial erythema, after excluding more common etiologies, BP should be taken into consideration in the differential diagnosis [12,13].

Very rarely the manifestations are even more atypical at this stage, resembling polycyclic or targetoid, nodular, lichenoid or vesicular lesions, making the diagnosis even more difficult. Such initial lesions may be the only sink sign throughout the entire disease or evolve later on into blisters.

Indeed, BP might present with lesions resembling figurate erythema, annular erythema or erythema giratum repens, with polycyclic and annular aspects [14,15]. In patients with these types of lesions underlying malignancies have been reported [16–20]. Therefore, it should be noted that further investigation to rule out such an eventuality is necessary.

The clinical diagnosis of BP can be challenging in the setting of erythema multiforme (EM)-like lesions. Till now, only four case reports describe EM-like BP [21–24]. In all reported cases, patients presented clinical features of both EM and BP, with wide-spread bullous lesions and multiple target lesions; Alcalay et al. described in three patients also severe erosions in almost all the mucous membranes, configuring EM major-like lesions [23]. Out of these four case reports, in three drug-induced EM-like BP was suggested; the suspected drugs were penicillins [23], furosemide [21] and in the third case the patient was receiving multiple medications (citalopram, thioridazine, and flupentixol) [24]. Only Hayakawa et al. report an idiopathic form of EM-like BP [22].

Hyperkeratotic, excoriated, and pruritic nodules on the extremities can be the first sign of the disease, anticipating by weeks, or months the blisters. However, sometimes blisters cannot be observed throughout the whole course of the disease, making diagnosis substantially difficult. Many authors have defined this particular form of BP pemphigoid nodularis (PN) [25–34] Fig. 1. Patients, mostly elderly women, show mixed clinical features of both prurigo nodularis and BP. From a pathogenetic perspective, it is interesting to notice that the antibody titre is often low in such patients, perhaps not sufficient to induce blister formation, but subclinical pemphigoid with pruritus, excoriations, and nodules [35]. This form of BP is especially difficult to treat, since it is quite often unresponsive to conventional therapy with potent topical steroids, often requiring systemic steroids and different immunosuppressive agents used alone or in combination [36,37] and lesions persist for years and may easily relapse.

Table 1
Atypical manifestations of bullous pemphigoid.

Atypical manifestation	Types of lesions	Distribution	Mainly affected	References
Non-bullous bullous pemphigoid	Erythematous and/or urticarial pruritic plaques	Widespread	Elderly	[1,13,14]
Annular erythema-like	Polycyclic, annular, figurate lesions	Widespread	Elderly	[15,18–20]
Erythema multiformis-like	Erythematous urticarial plaques with annular or figurate pattern; possible marginal blisters	Large body areas	Elderly	[21–24]
Pemphigoid nodularis	Hyperkeratotic excoriated and pruritic nodules; blisters on pre-existing nodular lesions or on uninvolved skin	Lower and upper extremities	Elderly women	[8,25,27–30,32–37]
Lichen planus pemphigoides	Planar, purple, polygonal, pruritic, papules, and plaques; blisters on pre-existing lesions or normal skin	Acral distribution; palms and soles in children	Fifth decade; female predominance Rarely in children	[38–44]
Vesicular bullous pemphigoid	Small vesicles on urticarial or erythematous base	Symmetrically distributed on extremities, trunk	Elderly Rarely in children	[45–49]
Erythrodermic bullous pemphigoid	Erythroderma and blisters	Entire body surface	Elderly	[50–52]
Vulvar bullous pemphigoid	Blisters and persistent erosions	Vulva perineum	Children, elderly	[53,54,57–66]
Childhood bullous pemphigoid	Typical lesions	In infants widespread lesions and frequent involvement of palms, soles and face; in older children 50% of cases exclusive genital involvement	Children	[55–70]
Bullous pemphigoid induced by physical agents	Typical lesions	Initially exclusively localize to the damaged area	Elderly	[81–105]
Dyshidrosiform bullous pemphigoid	Vesicles and bullae often hemorrhagic	Palms and soles	Elderly; few juvenile cases	[73,106–115]
Vegetans bullous pemphigoid	Vegetative, crusted purulent and sometimes eroded lesions	Groin, axillae, neck, hands, infra-mammary, and perioral regions	Elderly and fifth decade	[116–123]
Pretibial bullous pemphigoid	Multiple tense blisters and eroded areas	Pretibial region	Elderly	[74–79]
Umbilical bullous pemphigoid	Typical lesions	Umbilical region	Elderly	[5,71]
Drug-induced bullous pemphigoid	Broad spectrum of possible lesions: nodules, bullae eczema, erythema multiforme, Steven–Johnson syndrome, fixed drug eruption, porphyria cutanea tarda, pemphigus vulgaris	Variable	On average younger patients compared to classic BP	[126–133]

Blisters arising on pre-existing lichenoid papules or normal skin, with acral distribution, represent another possibility. This presentation of BP is commonly defined lichen planus pemphigoides (LPP) [38–43]. Clinical features and histopathology of LPP display findings of lichen planus (LP) as well as BP. LLP affects mainly younger age groups (fifth decade), with a slight female predominance. It has been suggested that basal cell injuries caused by chronic inflammation in LP could have a pathogenetic role by exposing BMZ components to autoreactive

lymphocytes and therefore inducing LLP [44]. In LPP the typical histologic features of both BP and LP coexist. This variant generally responds to standard treatments and shows a relatively benign course.

A very interesting variant is vesicular BP. In such a scenario there is actual blistering of the skin, however the lesions are smaller (Fig. 2). Patients present with numerous small pruritic tense vesicles often on an urticarial or erythematous base symmetrically distributed on extremities and trunk, as seen in dermatitis herpetiformis [45–47]. Cases are reported mostly in elderly people [45] and sometimes in children as well [48,49]. Therapies using systemic corticosteroid combined with minocycline are usually effective [45].

In some cases the manifestations of BP are so severe to cause erythroderma. This is a very unusual presentation of BP but well documented, and it is characterized by blister formation, before or after the onset of erythroderma [50,51]. A few cases were described of patients with exfoliative erythroderma without any blistering at all [52]. Among other more common causes of erythroderma, also BP should be taken in consideration, especially if the patients don't fit into any specific category.

Mucosal involvement is seen in a minority of patients (10–30%) and generally regards the oral mucosa; however, genital mucosa is affected in 9% of adult patients and 40% of pediatric cases. Vulvar involvement in BP is described in 9% of adult patients and 40% of children [53–55]. Vulvar BP, instead, is exclusively localized and confined to the vulva, with self-limited, non-scarring lesions. It is a rare variant of BP; to our knowledge there are 15 cases in the literature to date [53, 56–66]. Most cases are described in children [56,67] but a few cases regard older women as well [59]. It is not clear why the disease is localized to the vulva. Patients refer: vulvar discomfort and soreness and dysuria, due to blisters. Recurrent genital blisters and persistent erosions of the



Fig. 3. Dyshidrosiform pemphigoid: vesicles and bullae on palmar surface of the hand. (Courtesy of Professor Clara De Simone Department of Dermatology, Catholic University of the Sacred Heart, Rome, Italy. clara.desimone@rm.unicatt.it.)

labia minora, vulval vestibule, *introitus*, perineum, which heal without scarring, are typically observed. This variant of BP shows a good response to topical steroid treatment [53]. This variant may be confused with herpes simplex or sexual abuse in children [53].

Manifestations of BP in children often differ from those of adults because in fact, other than the purely vaginal manifestations; in infants (<1 year) the head, the palms of the hands and soles of the feet are often involved [56,68,69].

The pathogenetic mechanism, underlying these age-related differences, is unknown but could be attributed to possible age-dependent expression of BP antigens in various skin areas [70].

In rare cases BP at the beginning is localized. In most cases the disease becomes widespread after a few weeks or months; however, sometimes the localized lesions remain the only presentation of the disease. The reason for the elective localization of lesions in certain sites is mostly unknown but in some cases can be explained by particular triggering factors that act only on a specific body area or in other cases it might be explained by a lower disease activity, which generates limited lesions [71].

An example of low-activity forms of BP might be umbilical BP that presents with blisters and erosions limited to the umbilical area, which is also a predilection site for patients with widespread BP [5,12,71]. This might be the case in pretibial pemphigoid as well, which is a very rare presentation of BP with groups of multiple tense blisters associated with eroded areas exclusively on the pretibial region [72–79].

Venning and Wojnarowska observed that a recognizable factor precipitating or localizing BP was identified in no more than 15% of patients, suggesting that an induction can only account for a minority of BP cases [80]. It is interesting to note that in the forms of BP induced by physical agents, the correlation between the Koebner effect and the site of the lesions is clear and well documented. Physical agents (eg, radiation therapy, ultraviolet radiation, thermal or electrical burns, surgical procedures, transplants) can induce atypical BP. These particular localized forms are rare, but well-documented events [81]. Lesions originate at the damaged sites and can remain localized or eventually spread to different body areas. The exact pathogenetic mechanisms are still unclear, but possibly the direct mechanical injury of the skin induces the exposure of antigens of the basal membrane zone (BMZ) normally hidden to the immune system, thus inducing antibody formation or precipitating BP in individuals with pre-existing low titres of epidermal autoantibodies (so-called subclinical BP).

BP on irradiated areas was reported in 28 patients is predominantly observed in female patients with breast cancer (78%) [81–84]. The majority has blisters confined to the irradiated areas (89%), but some developed a generalized disease. The latter phenomenon may be explained by epitope spreading, whereby a relatively restricted immune response spreads to involve different sites on the same autoantigen and different autoantigens. In most cases the onset of BP occurred more than one year after the radiotherapy [85].

Ultraviolet radiation can also induce localized BP [86–89]. Psoralen ultraviolet A (PUVA) [90], narrowband ultraviolet B phototherapy (NBUVB) and photodynamic therapy (PDT) can induce typical and atypical, localized or generalized forms of BP. Rakvit et al. reported a case of localized BP induced by PDT [91] and Chan et al. reported a case of generalized lichen planus pemphigoides induced by NBUVB therapy [92].

BP on thermal or electrical injuries is rare [93–97]. The bullae appear from 2 weeks to 8 months after the burns and can remain localized or evolve to a generalized form. Surgery and trauma are two other exogenous factors that can induce BP, by damaging the skin and locally altering the immune response [98–102]. BP around stomas is a very rare form and difficult to recognize and the differential diagnosis should include contact allergic dermatitis [103]. Unilateral BP in hemiplegic patients was described in two cases with rash and bullae localized only on the hemiplegic side [104]. BP on ischemic areas was reported after revascularization, potentially due to secondary complement activation [105].

In addition to these situations, in which a well-defined koebnerizing agent is easily identifiable, perhaps even in other cases of localized BP, such a pathogenesis could be assumed, with triggering factors yet to define.

Indeed, dyshidrosiform pemphigoid (DP) presents with vesicles and bullae initially limited only to palmo-plantar areas, resembling dyshidrosiform dermatitis (pompholyx) [73,106–115] Fig. 3. The vast majority of cases evolve to widespread BP, only 3 cases in the literature remain purely confined to palms and soles. Perhaps DP could be induced by repeated trauma of on hands and feet. In a few cases an associated nickel allergy was reported, which led to the hypothesis that metal sensitisation may trigger this form of localized BP, as already suggested for other autoimmune skin blistering diseases.

Another example could be BP vegetans, which has a rare vegetative intertriginous presentation of BP that may be associated with chronic inflammatory bowel diseases. Clinically it is very similar to pemphigus vegetans with vegetative, crusted purulent and sometimes eroded lesions in the groin, axillae, neck, hands, inframammary, eyelids, and perioral regions [26,116–124]. In the case of BP vegetans localization is limited to the intertriginous areas and could venture the hypothesis that in this case the maceration and the possible presence of yeast or fungi may be a trigger and explain the peculiar localization [116,117,125].

Interestingly when drugs trigger BP, the spectrum of possible manifestations is very broad, ranging from typical features with tense bullae arising from an erythematous, urticarial basis to an unusual pattern of nodules with bullae [126], polymorphic eruptions simulating other drug-induced reactions such as localized bullous reactions, eczematous reactions, erythema multiforme/Steven–Johnson syndrome, fixed drug eruption, porphyria cutanea tarda and pemphigus vulgaris [81]. Various drugs are triggers for BP: sulfasalazine [127], penicillin [128], fluoxetine [129], furosemide [130], ACE inhibitors [131], and nonsteroidal anti-inflammatory drugs [132,133]. Drugs probably act as triggers by either modifying the immune response or altering the antigenic properties of the epidermal basement membrane [81]. However etiopathology of BP is still partially unknown, and possible mechanisms might be discovered in the near future as it is happening for pemphigus [134]. The diagnosis of DIBP can be very difficult because of the heterogeneous clinical manifestations but the histologic, and immunopathologic features are identical or closely similar to those of the idiopathic disease. It should be noted that an accurate drug history of patients must be taken.

Moreover, BP might even present with a mixture of various features and dyshidrosiform, vesicular, vegetating, or nodular lesions may coexist [1] and the predominant type of lesions may possibly vary in the course of the disease. Borradori et al. reported a case of pretibial pemphigoid evolving after 5 years in a generalized pemphigoid nodularis eruption [72]. Yasuda et al. instead, described a case of dyshidrosiform pemphigoid concomitant to vesicular pemphigoid [135].

3. Diagnostic approach in atypical BP

The diagnosis of bullous pemphigoid, when the clinical presentation is deceiving, may be very difficult. Indeed, the clinical presentation is certainly the first clue that guides the clinician in the diagnostic process. The relevance of the clinical features is well known and recognized by many authors as a crucial element for the diagnosis [1,136]. Vaillant et al. already in 1998 [136] report a set of 4 statistically significant predictors for BP, all of which were clinical: 1) absence of atrophic scars 2) absence of head and neck involvement 3) absence of mucosal involvement and 4) age greater than 70 years. The presence of 3 of the 4 significant clinical criteria allowed the diagnosis of BP, with a positive predictive value of 95%, a sensitivity of 90%, and a specificity of 83%. Such data were confirmed by further studies [1,137]. However, there is a particular subset of patients who fulfill less than 3 clinical criteria and don't present the classical clinical features of BP. For example,

vulvar pemphigoid involves the genital mucosa and mainly affects children. Therefore such criteria perfectly work in most cases, but not all.

Nevertheless, all cases of atypical BP have the same immunopathological features of the classic form, ultimately allowing the correct diagnosis. The histological and direct immunofluorescence (DIF) findings and the detection of circulating autoantibodies, by indirect immunofluorescence (IIF), enzyme-linked immunosorbent assay (ELISA) or immunoblotting are the key elements to the correct diagnosis.

Histological findings are not pathognomonic but highly suggestive of BP. In early phases, subepidermal clefts, eosinophilic spongiosis, and/or an infiltrate of eosinophils in the upper dermis lining the dermal–epidermal junction are detectable [138]. While the histologic changes in established lesions are characterized by subepidermal bullae, by the absence of acantholysis, and by a superficial dermal infiltrate mainly with eosinophils and few neutrophils or lympho-monocytes; although, neutrophil-predominant cases may also exist.

DIF is the strongest criteria for diagnosis, since it is found positive in nearly 100% of patients [11]; Kershenovich et al. refer to it as an obligatory criterion [139].

DIF of perilesional skin shows a continuous linear deposition of IgG (70–90% of patients), or C3 (90–100% of patients), or both, along the basement membrane zone (BMZ). This pattern may also be seen in cicatricial pemphigoid (CP) and epidermolysis bullosa acquisita (EBA). BP can be differentiated from these conditions by salt-split skin test. DIF on the patient's autologous skin, after treatment with 1 mol/L NaCl, reveals IgG on the blister roof (epidermal side of split skin) in patients with bullous pemphigoid, while, in CP and EBA, the IgG localizes to the blister floor (dermal side of split skin).

Indirect immunofluorescence (IIF) studies can demonstrate in 60–80% of patients the presence of circulating IgG autoantibodies that typically bind to the epidermal side of salt-split normal human skin [1]. Circulating autoantibodies can be detected by enzyme-linked immunosorbent assay (ELISA), with sensitivity up to 100% when various ELISAs using the NC16A domain and other extracellular portions of BP180 or of BP230 are used together [1,77,140,141]. Nowadays, ELISA has mostly replaced immunoblot and immunoprecipitation techniques, which are valid techniques but not very easy for routine testing [137].

Therefore, we believe diagnostic criteria should focus on histological findings, DIF of perilesional skin and on the detection of circulating antibodies by IIF or ELISA, giving only a minor role to the clinical presentation, which is in more than 20% of cases atypical. In Table 2 we propose a set of criteria for BP, which could be applicable to all forms of BP, even the atypical ones.

Table 2
Diagnostic criteria for atypical bullous pemphigoid.

- Major criteria:
 - DIF of perilesional skin showing a continuous linear deposition of IgG, C3 or both
 - Detection of circulating antibodies against BP180 and/or 230 by ELISA and/or IIF on salt split skin (with deposition of IgG and C3 at the roof)
- Minor criteria:
 - Pruritus
 - Histological findings:
 - Early phases: subepidermal clefts, eosinophilic spongiosis, and/or an infiltrate of eosinophils in the upper dermis lining the dermal–epidermal junction are detectable.
 - Established lesions: subepidermal bullae, absence of acantholysis, superficial dermal infiltrate of eosinophils
 - Polymorphic clinical aspects: Widespread large, tense, serous or hemorrhagic bullae on pruritic erythematous, urticarial or apparently normal skin erythematous or urticarial pruritic plaques; polycyclic, annular, figurate lesions; hyperkeratotic excoriated nodules; planar, purple, polygonal, pruritic, papules; small vesicles; erythroderma; vegetative, crusted purulent lesions

The definite diagnosis requires:

- 2 major criteria
- 1 major criterion + 2 minor criteria.

4. Conclusions

In conclusion, it is clear that bullae are sometimes missing during the initial phases of BP or even throughout the entire disease. Therefore, we agree with other authors [1] on the need to reformulate the name of this disease, since BP is a polymorphic disease and the presence of bullae is probably not always imperative in defining this condition. Therefore it would be highly desirable to avoid the redundancy of the adjective “bullous”, since “pemphigoid”, derived from Greek already means “form of blister” [1]. We only partially agree with the term “cutaneous pemphigoid” proposed by Borradori et al. [142], because mucosal involvement, even if in a minority of cases, might be present (10–30%) and in children in 50% of cases it is the only manifestation of the disease [68]. Therefore, perhaps simply using the term pemphigoid could be a better solution, especially for the misleading forms of BP.

Furthermore, the need to formulate universally recognized criteria for the diagnosis of bullous pemphigoid is increasingly evident [1,137,139,143,144]. These criteria ought to make diagnosis possible even when in their clinical presentation is atypical. Ultimately, we believe that DIF of perilesional skin showing IgG or C3 deposits or both, and the detection of circulating antibodies against the two main antigens of BP are the two cornerstones in the diagnosis, especially when the clinical presentation is doubtful and we propose diagnostic criteria for atypical BP in Table 2. Furthermore, identifying unusual clinical manifestations of bullous pemphigoid is vital in order to establish as soon as possible a correct therapy. Especially because such forms of BP are the ones with a worse response to therapy, and new therapeutic strategies must be adopted such as a target therapy with monoclonal antibodies, e.g. rituximab, already successfully used in treating pemphigus [145,146].

Take-home messages

- BP is a polymorphic disease;
- Bullae are not the only lesions found in BP, especially in the initial phase;
- Other possible lesions are erythematous, eczematous patches, urticarial plaques, nodular, lichenoid, vesicular or polycyclic or targetoid lesions;
- BP is generally widespread but it may sometimes remain localized;
- If in doubt always perform DIF of perilesional skin and characterize circulating autoantibodies;

Abbreviations

BP	bullous pemphigoid
EM	erythema multiformis
PN	pemphigoid nodularis
LPP	lichen planus pemphigoides
LP	lichen planus
BMZ	basal membrane zone
PUVA	psoralen ultraviolet A
nbUVB	narrow band ultraviolet B
PDT	photodynamic therapy
DIF	direct immunofluorescence
IIF	indirect immunofluorescence
ELISA	enzyme-linked immunosorbent assay
CP	cicatricial pemphigoid
EBA	epidermolysis bullosa acquisita

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