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Delayed Bullous Pressure Urticaria in a Female Patient: A Rare Clinical Presentation and Therapeutic Challenge

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Abstract:

Delayed pressure urticaria usually presents with painful swelling after sustained mechanical pressure, whereas frank blistering is exceptional. We report a 44-year-old woman with a more than 10-year history of recurrent pressure-induced oedema, angioedema, and bullous lesions, with marked worsening over the preceding two years. During hospitalization, erythematous-oedematous changes on the right forearm evolved into tense serous bullae after mechanical loading, supporting that this was not typical pressure urticaria but a bullous variant. Diagnostic evaluation excluded several alternative causes of blistering, including autoimmune bullous disease, and provocation testing confirmed delayed pressure urticaria together with symptomatic dermographism. Because the patient declined skin biopsy, the diagnosis relied on the characteristic pressure dependence of lesions, supportive provocation testing, and clinical response. The patient improved with short-term systemic corticosteroids and high-dose bilastine, and long-term disease control was subsequently achieved with gradual antihistamine dose adjustment and structured follow-up using UCT and AECT assessments. This case highlights delayed bullous pressure urticaria as a rare and potentially misleading presentation of chronic inducible urticaria, underscores the need to distinguish it from more common oedematous forms of pressure urticaria and from primary bullous dermatoses, and emphasizes early recognition, trigger avoidance, and minimization of prolonged corticosteroid exposure.

Keywords: delayed pressure urticaria; chronic inducible urticaria; bullous urticaria; angioedema

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Introduction

The EAACI/GA²LEN/EuroGuiDerm/APAAACI guidelines classify urticaria by duration (acute or chronic) and triggers (spontaneous or inducible). Urticaria is a condition with unclear etiology that may also indicate other underlying conditions. It presents as sudden skin wheals, often with angioedema (which may occur alone) [1].

Delayed pressure urticaria (DPU) is classified as a form of chronic inducible urticaria (CIndU) [2]. The triggering factor is pressure (physical force divided by the area of application) [1].

The most common manifestation of delayed pressure urticaria (DPU) is a painful erythematous swelling of exposed skin, typically occurring between 4 and 6 hours following pressure [3]. Skin changes in DPU usually persist for more than 24 hours [3]. DPU is a long-lasting form of chronic inducible urticaria (CindU), with the average disease duration ranging between 6 and 9 years, significantly impairing daily functioning for patients [3]. The endotype of patients with DPU partly suggests an autoimmune mechanism, with normal concentrations of anti-TPO antibodies of the IgG class, along with increased levels of tIgE, CRP, and D-dimers [3]. This paper presents a case report of the blistering form of DPU – delayed bullous pressure urticaria (DBPU) in a female patient—a form which, to the best of our knowledge, has not previously been reported in the literature.

Case Presentation

A 44-year-old, obese female patient presented recurrent cutaneous lesions and angioedema of more than 10 years' duration, including symptom exacerbation over the preceding 2 years. She described recurrent monthly episodes of painful, pronounced edema in areas subjected to excessive pressure—such as prolonged sitting, underwear pressure, unilateral recumbent sleeping, and tight footwear—along with blistering lesions triggered by mechanical pressure in these sites. A solitary episode of unilateral tongue edema was also reported. The patient noted associations between symptom intensity and elevated psychological stress or seasonal infections, as well as urticaria exacerbations following penicillin derivatives and a single episode after clarithromycin usage. She had previously been prescribed prednisone combined with bilastine on an as-needed basis at symptom occurrence. In the preceding two years, the patient required systemic corticosteroid therapy as frequently as twice monthly.

Upon admission to the department, the patient presented with a heavy bag carried on her right forearm, where erythematous-oedematous changes were evident in the mechanically stressed area. By the second day, the edema had intensified, accompanied by the formation of tense serous blisters, the largest measuring 7 × 5 cm. (Fig. 1)

Comprehensive differential diagnostic evaluation was undertaken. Imaging studies showed no abnormalities. Laboratory assessments revealed elevated anti-thyroid peroxidase antibodies and interleukin-6 levels. Specific IgE against food were negative, as were antinuclear antibodies and anti-neutrophil cytoplasmic antibodies. Antibodies targeting the epidermal basement membrane and desmosomes of the spinous layer were also negative. C1 esterase inhibitor concentration and activity, along with tryptase levels, were within normal ranges. Physical provocation testing was performed: the TempTest was negative, excluding cold and heat urticaria; dermographism testing was positive confirming symptomatic dermographism, and strongly positive test with dermographometer for DPU was proved (Fig. 2). A skin biopsy was planned; however, the patient declined to undergo the procedure.

Given the severity of the skin lesions observed during hospitalization, accompanied by pruritus and burning sensations, short-term systemic corticosteroid therapy was promptly initiated in conjunction with an antihistamine at four-fold standard dose, resulting in gradual resolution of the lesions. During the hospital stay, similar erythematous-oedematous changes were also evident on the skin of the right lower leg, along with spontaneous urticarial wheals that resolved within hours following antihistamine administration. The applied treatment made impossible reliable drug provocation for drug hypersensitivity assessment.

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The patient was advised to continue chronic bilastine therapy at a total daily dose of 80 mg, alongside prednisone 10 mg with gradual tapering to discontinuation. She remains under follow-up at the hospital allergy clinic, routinely assessing symptom severity via the CRUSE application using the Urticaria Control Test (UCT) and Angioedema Control Test (AECT). Following glucocorticoid withdrawal, reinitiation proved unnecessary with UCT = 15 points and AECT = 14 points. After six months of bilastine 80 mg daily, dose reduction to 60 mg/day resulted in angioedema recurrence within one week, prompting restoration to 80 mg/day. A subsequent reduction attempt after another six months yielded favorable outcomes (UCT = 16 points, AECT = 15 points), enabling further titration to 40 mg/day after an additional six months; the patient currently maintains full disease control at this dose (UCT = 16 points, AECT = 16 points). Planned dose reductions will proceed under UCT and AECT oversight.

Discussion

Delayed bullous pressure urticaria constitutes a rare and particularly severe subtype of chronic inducible urticaria [4]. To our knowledge, the literature lacks case reports of DBPU in female patients, with the scant documented cases limited exclusively to males [5]. DBPU symptoms, characterized by fluid-filled bullae, can be provoked by diverse mechanical pressure stimuli, such as constrictive apparel, handling heavy loads, or tight footwear. Associated cutaneous manifestations are characteristically painful, protracted, and burdensome, markedly impairing patients' quality of life—a pattern mirrored in the index case, where the patient reported substantial daily activity restrictions due to the condition. The endotype of DPU partially implicates an autoimmune mechanism, featuring normal IgG-class anti-thyroid peroxidase antibody levels alongside concurrent elevations in tIgE, C-reactive protein, and D-dimers [6].

The involvement and release of histamine in chronic urticaria remain subjects of debate. Nevertheless, studies evaluating histamine concentrations in aspirated fluid from cutaneous lesions and serum of patients with DPU subjected to mechanical pressure have demonstrated substantially elevated levels [7]. Furthermore, individuals with DPU exhibit heightened cutaneous levels of tumor necrosis factor-α and interleukin-8 in both lesional sites and apparently unaffected skin, with histopathology characterized predominantly by neutrophil and eosinophil infiltrates [3].

Therapeutic management primarily involves identifying and avoiding potential triggering factors. Second-generation H1-antihistamines constitute the first-line therapy [8]. Additional agents used include omalizumab, cyclosporine, and glucocorticosteroids, particularly during exacerbations [3].

Oral glucocorticosteroids should be employed for the minimum feasible duration to mitigate the risks of cumulative, dose-dependent adverse effects. Extended glucocorticoid therapy markedly elevates the incidence of various comorbidities, including osteoporosis, arterial hypertension, obesity, type 2 diabetes, peptic ulcers, gastrointestinal haemorrhage, fractures, and cataracts. In the present case, a potential association between chronic corticosteroid administration and obesity development cannot be excluded [9].

A principal limitation of this case report is the absence of a skin biopsy, which the patient declined owing to apprehension about disrupting tissue integrity. This investigation would have been especially valuable for excluding bullous disorders in the differential diagnostics. Nonetheless, the lack of hallmark symptoms of bullous diseases, the responsiveness of lesions to pressure-exposed sites, and the excellent currently monitored sustained therapeutic response, militate against these alternative diagnoses [10].

A mobile application CRUSE, primarily validated for spontaneous urticaria, demonstrated comparable efficacy for chronic inducible urticaria in this case. It facilitates continuous symptom logging, lesion photography, and assessment of angioedema—the predominant disease manifestation. The UCT score, meanwhile, reflects overall satisfaction with treatment outcomes [11].

Conclusion

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This case illustrates that delayed pressure urticaria may rarely present with bullous lesions, creating diagnostic uncertainty and mimicking primary blistering disorders. Recognition of the pressure-dependent pattern, supportive provocation testing, exclusion of alternative diagnoses, and careful clinical follow-up were essential for establishing the diagnosis. Long-term control was achieved with high-dose second-generation antihistamine therapy and gradual dose adjustment, while systemic corticosteroids were limited to short-term use during severe exacerbation. Awareness of this unusual presentation may facilitate earlier diagnosis, reduce unnecessary investigations or prolonged corticosteroid exposure, and improve individualized management of chronic inducible urticaria.

Take-Home Messages

- Delayed bullous pressure urticaria is a rare presentation that may delay diagnosis and requires awareness of pressure-triggered blistering as a clinical clue.
- Early referral to an allergy specialist and targeted provocation testing can help confirm the diagnosis and avoid misclassification as other bullous disorders.
- Management should prioritize trigger avoidance and control with second-generation antihistamines while minimizing prolonged systemic corticosteroid exposure.
- Mechanical pressure during daily activities and medical procedures should be anticipated and reduced whenever possible.
- In the absence of a dedicated mobile application for physical urticarias, CRUSE may serve as a useful off-label monitoring tool in selected patients.

Declarations Author Contributions:

Łukasz Moos: conceptualization, patient management, supervision, writing – review and editing. Daria Wojdon: data curation, literature review, writing – original draft. Szymon Wolaniuk: literature review, writing – original draft. Anna Śnietka: data collection, manuscript preparation. Zenon Brzoza: supervision, critical revision of the manuscript.

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Declaration of Competing Interests: The authors declare no competing interests.

Data Availability: Data supporting the findings of this report are available from the corresponding author upon reasonable request, subject to patient confidentiality considerations.

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Figure Legends

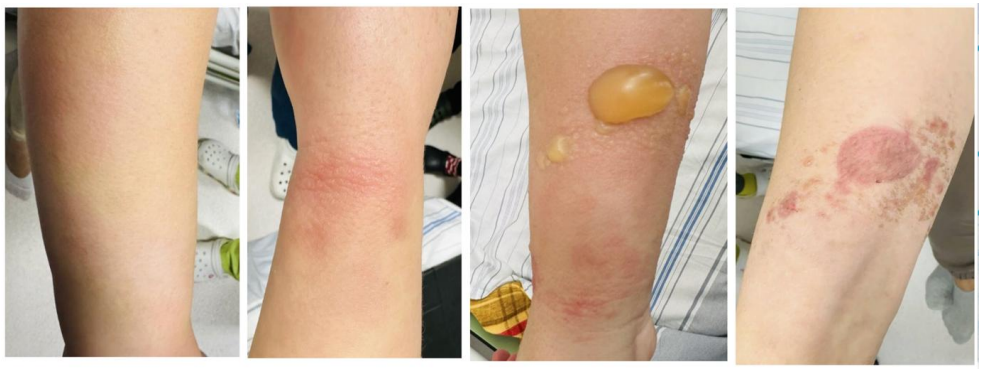

Figure 1. Progression of pressure-induced lesions on the right forearm during the patient's hospitalization.

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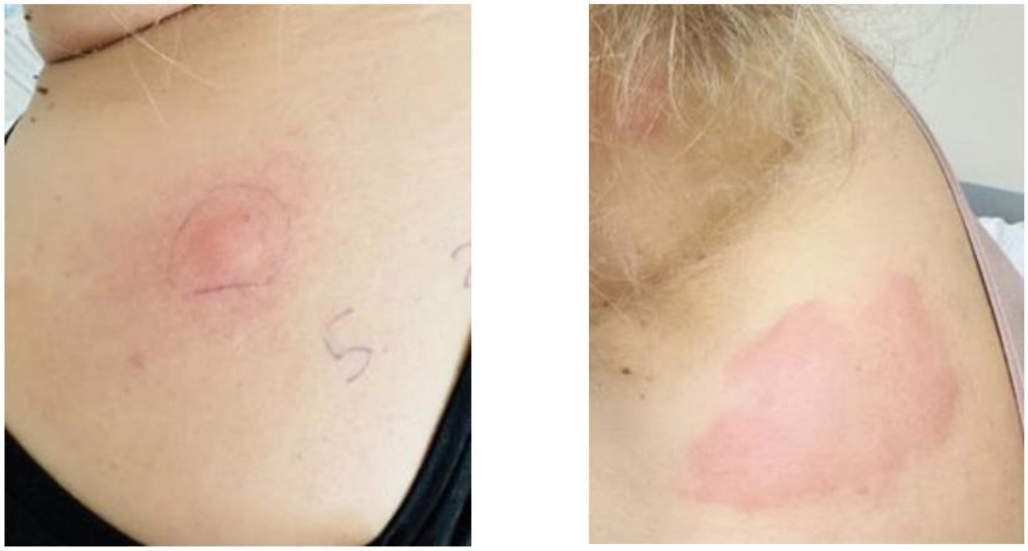

Figure 2. Strongly positive delayed pressure urticaria provocation test result, evaluated at 6 and 24 hours after provocation.