Dermatology Reports

https://www.pagepress.org/journals/index.php/dr/index

eISSN 2036-7406

Please cite this article as:

Zhang Y, Gong Y, Shi X, et al. A rare case of keloid combined with bullous pemphigoid. *Dermatol Rep 2025 [Epub Ahead of Print] doi: 10.4081/dr.2025.10484*

Submitted 20/06/25 - Accepted 04/07/25

A rare case of keloid combined with bullous pemphigoid

Ying Zhang,[1] Yiyi Gong,[1] Xiangguang Shi,[1] Huyan Chen,[1] Yining Wei,[1] Wenyu Wu,[1-3] Mengguo Liu,[1]

[1]Department of Dermatology, Huashan Hospital; [2]National Clinical Research Center for Aging and Medicine, Huashan Hospital; [3]Ministry of Education Key Laboratory of Contemporary Anthropology, School of Life Sciences, and Academy for Engineering and Technology, Fudan University, Shanghai, China

Correspondence: Mengguo Liu, MD, Huashan Hospital, Fudan University, 12 Wulumuqi Zhong Rd, Shanghai 200040, China.
E-mail: liumengguo@126.com

Conflict of interest: the authors have no conflict of interest to disclose.

Key words: keloid; bullous pemphigoid; dupilumab; biological therapy.

Conflict of interest: the authors have no conflict of interest to declare.

Ethics approval and consent to participate: no ethical committee approval was required for this case report by the Department, because this article does not contain any studies with human participants or animals. Informed consent was obtained from the patient included in this study.

Consent for publication: the authors obtained written consent from the patient for the publication of his photographs and medical information. Patient consent forms were not provided to the journal but are retained by the authors.

Funding: this study was supported by grants from the National Natural Science Foundation of China (No. 81602747).

Acknowledgments: we thank the patient for granting permission to publish this information.

Abstract

Keloids and bullous pemphigoid (BP) are two clinically and pathophysiologically distinct dermatologic disorders – the former involves abnormal scar formation due to excess collagen deposition, while the latter is an autoimmune blistering disease. We report a case of a 67-year-old man with a 19-year history of abdominal keloids and the subsequent appearance of vesicular skin lesions. Histopathologic examination revealed both keloidal fibrosis and subepidermal blister formation. Serum testing demonstrated elevated anti-BP180 antibody levels. Initial treatment with topical and systemic agents, including neomycin, glycyrrhizin, spironolactone, and minocycline, resulted in limited improvement. Subsequently, dupilumab – a monoclonal antibody against the interleukin (IL)-4 receptor α – was introduced. After two months of dupilumab therapy, the vesicular lesions resolved, keloids stabilized, serum anti-BP180 antibody levels normalized, and the Dermatology Life Quality Index (DLQI) score decreased from 11 to 2.

Introduction

Keloids are benign fibrotic skin tumors caused by abnormal fibroblast proliferation and excessive collagen deposition, often associated with pruritus and pain. The etiology remains unclear but may involve factors such as skin tension, inflammation, hormonal influences, and ethnicity.[1,2] Recent studies suggest that the pathogenesis involves the activation of the transforming growth factor (TGF)-β/SMAD signaling pathway, as well as interleukin (IL)-6- or IL-13-mediated immune responses, and type 2 helper T-cell (Th2) cytokines, which may play a key role in the development of scars and keloids.[3]

Bullous pemphigoid (BP) is an acquired autoimmune blistering skin disease, primarily affecting the elderly.[4,5] The disease mechanism involves autoantibodies against BP180 and BP230, which attack the basement membrane zone, activate the complement system, and lead to eosinophilic infiltration, ultimately disrupting the adhesion between basal keratinocytes and the basement membrane.[6]

Dupilumab is a humanized IgG4 monoclonal antibody targeting the IL-4 receptor alpha chain (IL-4Rα). It was initially approved for the treatment of atopic dermatitis (AD) and functions by blocking the signaling pathways of IL-4 and IL-13.[7] Recent studies have shown that type 2 inflammation – particularly the IL-4/IL-13 axis – may play a critical role in both keloid and BP pathogenesis.

Case Report

A 67-year-old male patient presented with a 19-year history of keloid formation on the abdomen, accompanied by itching, pain, and recurrent ulceration, which worsened during cold and rainy weather.

This condition developed following cholecystitis surgery in 2006. In December 2024, he developed vesicular lesions on the abdomen that were fragile and exudative. The patient denied any occupational exposure to chemical or irritant substances and had a smoking history but quit 20 years ago. His only comorbidity is well-controlled hypertension on long-term medication.

Physical examination revealed an irregular, map-like keloid on the right abdomen, measuring approximately 15 cm at its longest and 12 cm at its widest. Multiple thin-walled vesicles filled with clear fluid were observed on and around the keloid, along with a solitary vesicle on the left upper chest (Figure 1 A,B). Serum anti-BP180 antibody was elevated (10.89 RU/mL > 9 RU/mL). The patient's Dermatology Life Quality Index (DLQI) was 11.

A biopsy of the site indicated by the black arrow in Figure 1A showed hyperkeratosis, focal parakeratosis, mild acanthosis, and subepidermal clefts. Fibrous scar tissue hyperplasia and collagenization were observed in the dermis (Figure 2A). A biopsy of the area indicated by the red arrow in Figure 1A revealed a subepidermal blister with abundant eosinophils in the blister cavity and perivascular infiltration of lymphocytes, eosinophils, and plasma cells in the superficial dermis (Figure 2B).

Initial management included daily wet dressings with a benzalkonium chloride solution and topical application of neomycin sulfate ointment, alongside oral glycyrrhizin compound tablets, spironolactone, and minocycline to control secondary infection and relieve symptoms. Despite this regimen, the vesicular eruptions and associated discomfort continued to progress. Consequently, we initiated dupilumab injections in place of the prior systemic agents. The dosing regimen consisted of 600 mg weekly for the first two weeks (two 300 mg injections each week), followed by 300 mg weekly for the next two weeks. During the second month, dupilumab 300 mg was administered every two weeks.

By the second week of therapy, preexisting vesicles had crusted without any new blister formation, and the patient's condition remained stable throughout the treatment period. Fourteen days after completing two months of dupilumab and supportive anti-infective therapy, his clinical status continued to be stable (Figure 3), serum anti-BP180 antibody levels declined (5.86 RU/mL < 9 RU/mL), and his DLQI score improved to 2. Subsequently, the patient was lost to follow-up.

Discussion

The coexistence of keloids and BP is exceptionally rare, with no prior cases reported to our knowledge. In this patient, the onset of blistering lesions occurred on preexisting abdominal keloids, complicating the clinical picture. Keloids represent a chronic fibroproliferative disorder characterized by abnormal extracellular matrix deposition, while BP is an autoimmune subepidermal blistering disease primarily

mediated by autoantibodies against hemidesmosomal proteins, especially BP180. Although the two entities differ significantly in pathogenesis, recent evidence suggests overlapping inflammatory pathways, particularly involving Th2 cytokines such as IL-4 and IL-13.[4,8]

Dupilumab, an IL-4Rα antagonist, blocks IL-4 and IL-13 signaling and is approved for diseases driven by Th2 inflammation, such as AD. In BP, IL-4 and IL-13 contribute to eosinophil activation and recruitment, which are hallmark features of the disease.[4] In keloids, these cytokines have been implicated in fibroblast activation, collagen production, and persistent inflammation, potentially promoting abnormal scar growth.[8] Therefore, dupilumab may have dual benefits in patients with overlapping features of these diseases by targeting a shared immunopathogenic axis.

Meanwhile, dupilumab is being increasingly explored in BP, with growing case-based evidence supporting its role in symptom relief and serologic remission.[9-11] In recent years, some case reports and small-scale studies have also attempted to use dupilumab in the treatment of keloids or keloid-associated pruritus, showing partial symptom improvement in selected patients.[12-14] However, its effect is still limited. The mechanism by which it might influence fibrotic processes, such as those seen in keloids, remains speculative. Whether its effect on pruritus and inflammation indirectly contributes to keloid stabilization warrants further investigation.

Conclusions

This case highlights a rare comorbidity of keloids and BP, suggesting potential overlap in type 2 immune pathways.

References

1. Kim HJ, Kim YH. Comprehensive Insights into Keloid Pathogenesis and Advanced Therapeutic Strategies. Int J Mol Sci 2024;25:8776.
2. Limandjaja GC, Niessen FB, Scheper RJ, Gibbs S. The Keloid Disorder: Heterogeneity, Histopathology, Mechanisms and Models. Front. Cell Dev Biol 2020;8.
3. Wu J, Del Duca E, Espino M, et al. Guttman-Yassky, E. RNA Sequencing Keloid Transcriptome Associates Keloids With Th2, Th1, Th17/Th22, and JAK3-Skewing. Front Immunol 2020;11.
4. Zhang L, Chen Z, Wang L, Luo X. Bullous Pemphigoid: The Role of Type 2 Inflammation in Its Pathogenesis and the Prospect of Targeted Therapy. Front Immunol 2023;14.
5. Moro F, Fania L, Sinagra JLM, et al. Bullous Pemphigoid: Trigger and Predisposing Factors. Biomolecules 2020;10:1432.
6. Egami S, Yamagami J, Amagai M. Autoimmune Bullous Skin Diseases, Pemphigus and Pemphigoid. J Allergy Clin Immunol 2020;145:1031-47.
7. Olbrich H, Sadik CD, Ludwig RJ, et al. Dupilumab in Inflammatory Skin Diseases: A Systematic Review. Biomolecules 2023;13:634.
8. Nguyen JK, Austin E, Huang A, et al. The IL-4/IL-13 Axis in Skin Fibrosis and Scarring: Mechanistic Concepts and Therapeutic Targets. Arch Dermatol Res 2020;312:81-92.
9. Zhao L, Wang Q, Liang G, et al. Evaluation of Dupilumab in Patients With Bullous Pemphigoid. JAMA Dermatol 2023;159:953.
10. Liang J, Abulikemu K, Maolidan, et al. Nine Cases of Refractory Bullous Pemphigoid Treated with Dupilumab and Literature Review. Int Immunopharmacol 2023;116:109788.
11. Cao P, Xu W, Zhang L. Rituximab, Omalizumab, and Dupilumab Treatment Outcomes in Bullous Pemphigoid: A Systematic Review. Front Immunol 2022;13:928621.
12. Wong AJS, Song EJ. Dupilumab as an adjuvant treatment for keloid-associated symptoms. JAAD Case Rep 2021;13:73-4.
13. Bitterman D, Patel P, Wang JY, et al. Systematic review of dupilumab safety and efficacy for treatment of keloid scars. Arch Dermatol Res 2024;316:560.
14. Min MS, Mazori DR, Lee MS, et al. Successful Treatment of Keloids and Hypertrophic Scars With Systemic and Intralesional Dupilumab. J Drugs Dermatol 2023;22:1220-2.

Figure 1. Clinical images: clinical presentation before treatment.

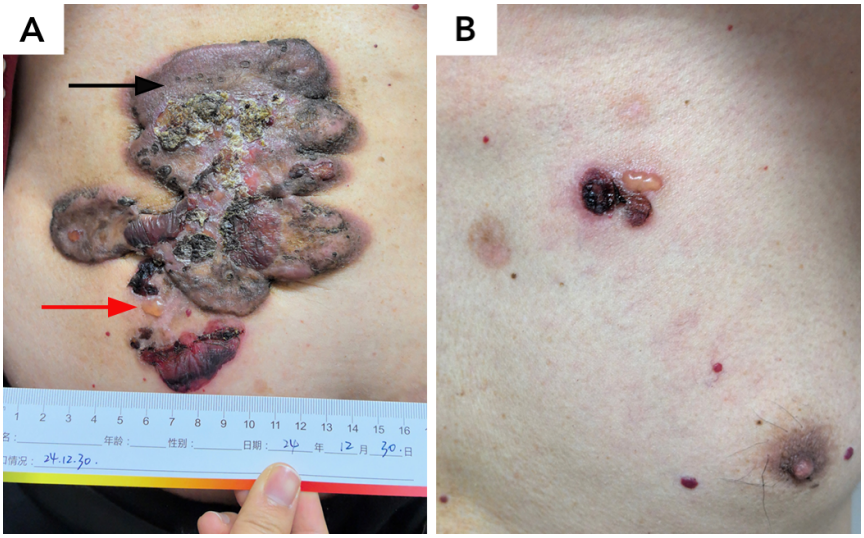

Figure 2. Histopathological images: **A)** biopsy from the site indicated by the black arrow in Figure 1A showing features consistent with keloid; **B)** biopsy from the site indicated by the red arrow in Figure 1A demonstrating features consistent with bullous pemphigoid.

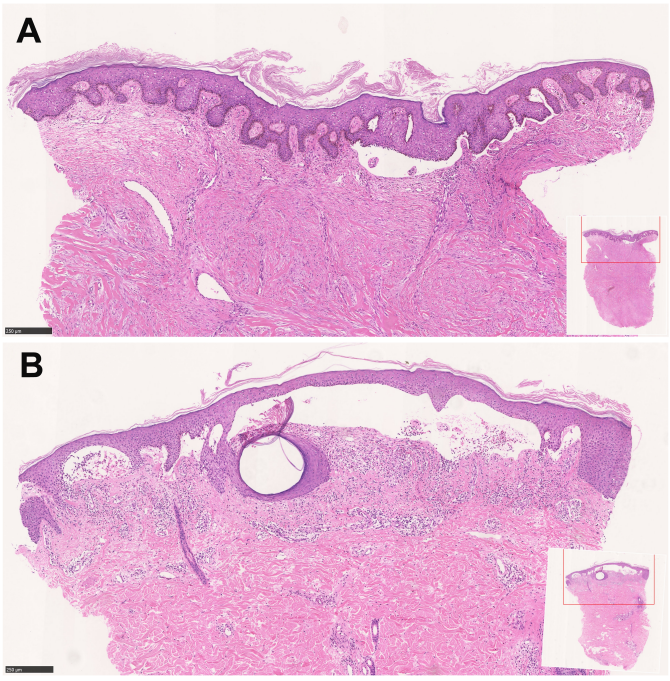

Figure 3. Clinical images: lesions' condition after treatment.