Received: 11 May 2023 | Revised: 12 July 2023 | Accepted: 11 August 2023

DOI: 10.1002/ccr3.7857

CASE REPORT

Clinical Case Reports Open Access WILEY

Rare pyoderma gangrenosum correlated with systemic lupus erythematosus: A case report

Omid Pourbagherian[1] | **Kamran Javidi**[1] | **Mohammad Taghizadieh**[2] | **Mehdi Jafarpour**[3]

[1]Immunology Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

[2]Department of Pathology, Tabriz University of Medical Sciences, Tabriz, Iran

[3]Connective Tissue Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Correspondence
Mehdi Jafarpour, Connective Tissue Diseases Research Center, Tabriz University of Medical Sciences, Flat 1, Imam Reza Hospital, Tabriz, Iran.
Email: jafarpourmehdi1360@gmail.com

Key Clinical Message

The simultaneous occurrence of pyoderma gangrenosum and systemic lupus erythematosus is exceedingly rare and poses diagnostic challenges due to the similarity of skin manifestations in both conditions. The exact relationship between the two conditions remains unclear; however, it is hypothesized that immune dysregulation and neutrophilic infiltration may play a role in the development of pyoderma gangrenosum in SLE patients. Clinicians should be vigilant in recognizing such uncommon associations to ensure prompt and appropriate management.

KEYWORDS

inflammatory skin disease, pyoderma gangrenosum, systemic lupus erythematosus

1 | INTRODUCTION

Pyoderma gangrenosum (PG) is an infrequent kind of inflammatory skin disease that may lead to the development of swiftly expanding and distressing skin ulcers.[1] The initial documentation of PG was conducted by Dr. Louis Brocq in 1916. However, it was not until the 1930s that Dr. Brunsting characterized a series of patients with identical clinical symptoms.[2] The etiology of PG remains unclear; however, it is hypothesized to be an autoimmune condition characterized by the immune system's attacks on healthy tissue, resulting in the development of ulcerations. PG impact individuals of all gender, race, or ages, albeit with a higher incidence rate among adults and a greater prevalence among female.[3]

PG is also known as a neutrophilic disease which is distinguished by an aberrant aggregation and activation of neutrophils. On the contrary, SLE is a chronic autoimmune disorder that is distinguished by the generation of autoantibodies. These autoantibodies are responsible for incorrectly attacking the body's own tissues and organs.

PG is correlated with fundamental medical conditions, including inflammatory bowel disease (IBD), rheumatoid arthritis, lupus, and specific blood disorders. It is plausible for it to manifest consequent to pharmaceutical administration or subsequent to surgical intervention or physical injury.[4] The concurrent development of PG with systemic lupus erythematosus (SLE) is an infrequent phenomenon, with only a limited number of cases having been documented.

PG can be classified into multiple groups, which include

1. Classic PG: The prevalent manifestation which is distinguished by the prompt emergence of distressing ulcers featuring elevated, purple borders

2. Bullous PG: This form can be identified by the emergence of vesicles containing fluid that rapidly disintegrates, forming ulcers.
3. Pustular PG: This form can be recognized by the appearance of multiple small pustules that amalgamate to create distressing ulcers.
4. Vegetative PG: This class stands out by the emergence of skin lesions resembling cauliflower growths that pose a challenge for effective management.
5. Postoperative PG: This type manifests after surgical procedures and is believed to be associated with skin trauma or injury.
6. Systemic PG: The last form is linked with systemic illnesses, such as rheumatoid arthritis and rarely SLE.[5]

The clinical manifestations of PG include the emergence of one or multiple painful, swiftly advancing ulcers or lesions with uneven margins and a necrotic core. It is noteworthy that the clinical manifestation of PG has the potential to resemble other medical conditions, including infections, malignancies, or autoimmune disorders. Therefore, an accurate diagnosis necessitates a comprehensive medical assessment.[3]

PG is a condition that can be effectively managed through various treatment modalities which may encompass corticosteroids, immunosuppressive medications, antibiotics, and surgical intervention. Timely medical intervention is crucial in cases of PG, as prompt treatment can mitigate the risk of complications and enhance prognosis.

2 | CASE REPORT

The subject of this case study is a female patient who is 55 years old and has been diagnosed with lupus for 20 years. Additionally, she has been diagnosed with lupus nephritis for 14 years and has been receiving intermittent treatment with immunosuppressive and corticosteroid medications such as hydroxychloroquine, cyclosporine, mycophenolate mofetil, and prednisolone in varying dosages. The aforementioned patient had severe skin lesions in the form of two painful papules in the anterior and lateral areas of the leg. These papules progressively became larger and transformed into an ulcerated lesion with 5 × 5 cm dimensions, and the center of the lesions was found to be necrotic (Figure 1). Concomitant with the disease, the individual exhibited a malar rash, small joint arthritis, and renal involvement.

The individual exhibiting these clinical manifestations was admitted to the Rheumatology Department at Imam Reza Hospital in Tabriz, where, based on following consultation with the medical team, the patient was scheduled to undergo a skin biopsy as a means to pursue further investigation. The dermatology team conducted a skin biopsy (Figure 2). The biopsy's pathology results showed skin tissue with compact hyperkeratosis, acanthosis, associated with superficial dermal fibrosis and intradermal neutrophilic abscess formation, and leukocytoclastic vasculitis which was compatible with PG, in the early stage.

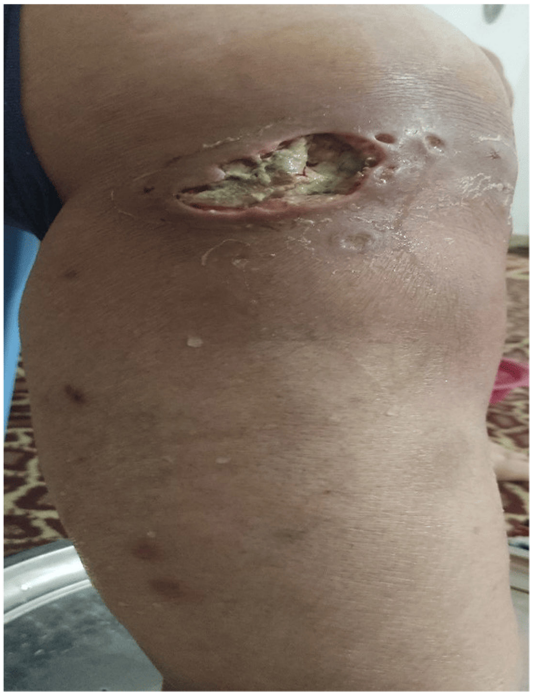

FIGURE 1 A mucopurulent painful and ulcerated lesion of right sided foot with irregular borders compatible with pyoderma gangrenosum.

Initial results of laboratory blood tests revealed elevated levels of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). Also, levels of anti-dsDNA antibody increased. The levels of other blood test parameters are shown in Table 1. First-line therapy in PG treatment is using local corticosteroids and local calcineurin inhibitors. If the patient did not respond adequately to the treatment, it leads to a reevaluation of therapeutic options such as systemic corticosteroid and cyclosporin. In the reported case because the patient shows lupus flares and not respond to pervious treatments such as mycophenolate mofetil and cyclosporin, we decide to initiate treatment with cyclophosphamide. Due to the presence of malar rash, proteinuria, and elevated levels of serum creatinine, and arthritis the patient was treated with pulse therapy of methylprednisolone (1 g) for 3 consecutive days and an intravenous injection of Cyclophosphamide (750 mg). Following that patient were prescribed to hydroxychloroquine (400 mg/day) and prednisolone (60 mg/day). Subsequently, prednisolone dosage began tapering gradually and Cyclophosphamide was injected

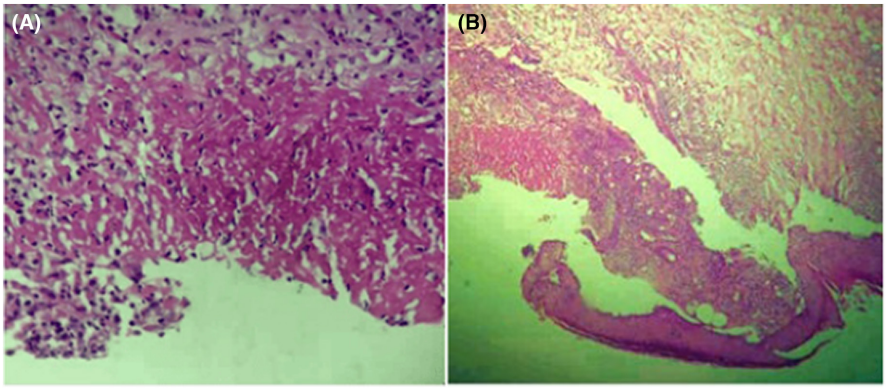

FIGURE 2 (A): Microscopic view (histologic) of bar-shaped skin with subcutaneous tissue (H&E, ×10) showed hyperkeratosis, and acanthosis, associated with superficial dermal fibrosis and intradermal neutrophilic abscess formation. (B): The stratum corneum of the epidermis, which constitutes the outermost layer of the epidermis, is composed of flattened, fully keratinized, and dead skin cells. (H&E, ×100).

TABLE 1 Blood test results of the patients at initial medical examination.

Laboratory tests (unit)	Laboratory values	Normal range
WBC (×1000/μL)	8.1	4.0–11.0
Hb (g/dL)	8	12–18
Plt (×1000/μL)	151	130–440
ESR 1nd h (mm/h)	80	Female: < 50 Years up to 30
CRP (mg/L)	86	Up to 6
ANA (IU/mL)	Positive	<30.0
Anti-dsDNA (IU/mL)	100	<10
C3 mg/dL	70	75–175
C4 mg/dL	Normal	16– 48
Aps Ab U/L	Negative	8– 33
Creatinine (mg/dL)	2	16–120
Urea (mg/dL)	108	12.8–43
LFT	Normal	–
24 h urine protein (mg/m^2/day)	1200	<100

for 6 consecutive months (750 mg/month). Also, the patient was given mycophenolate mofetil (2 g/day). Subsequent follow-ups of the patient showed that all skin lesions were completely healed and the patient's lupus was under control.

3 | DISCUSSION

Lupus, or systemic lupus erythematosus (SLE), is a chronic autoimmune disease that has the potential to impact a multitude of bodily organs and tissues. The condition at hand is distinguished by the immune system's incorrect attack on cells and tissues that are in fact healthy. Thereby instigating a cascade of inflammatory responses and subsequent Dermatological irregularities frequently manifest as the primary indicators of disease, exhibiting a diverse range of visual manifestations and degrees of severity. PG is an uncommon kind of inflammatory skin disease that is not caused by an infection and is characterized by painful necrotic ulcers that often appear on the legs.[6] It is believed that PG is an autoimmune disease; however, the exact cause of the disease is not completely known.

Although PG is frequently linked with systemic conditions such as inflammatory bowel disease, rheumatoid arthritis, and hematologic malignancies, the incidence of PG as a prior symptom of SLE is very uncommon and has only been described in a few individuals to this point.[7]

Pinar Ozuguz et.al reported a genital ulcerative PG in Behcet's disease which is showed the association between neutrophilic dermatoses conditions.[8] Also, several researchers reported the association between PG and connective tissue disorders such as systemic sclerosis, dermatomyositis, and SLE.[3,9]

The identification of PG is established through the process of excluding other potential sources of cutaneous ulcerations that present with similar characteristics, such as infections, cancers, vasculitides, venous insufficiencies, and trauma.[10]

To date, in the majority of cases that have been documented, before the manifestation of PG symptoms, a diagnosis of SLE was made. H. B. Kwon et al. delineated the clinical manifestation of PG in a female patient aged 35 years, who exhibited the characteristic symptom of painful ulcers on her lower extremities as our case. The subsequent assessment indicated that the patient also presented with SLE, posited as the fundamental etiology

of her dermatological manifestation. They deliberate on the plausible mechanisms that connect the two aforementioned conditions and underscore the significance of prompt identification and intervention.[11]

In another case study, S. N. Jha et al. demonstrated a female patient, aged 30 years, diagnosed with SLE, presented with PG affecting her lower limbs. The authors delve into the plausible immunological mechanisms that underlie this correlation and emphasize the significance of interdisciplinary administration.[12] The precise etiological mechanisms that connect PG and SLE remain enigmatic. It has been postulated that dysregulated immune responses, which encompass abnormal neutrophil activation and malfunction, are implicated in the pathogenesis of both diseases. The co-occurrence or successive onset of PG and SLE may be attributed to genetic variables, immunological irregularities.

4 | CONCLUSION

In this case study article, we demonstrated a rare case of PG related to SLE. The results of our study provide evidence for a potential correlation between active SLE and PG, although the underlying mechanism remains unknown. Considering the treatment which our team performed with a complete recovery, we suggested this first-line treatment strategy.

AUTHOR CONTRIBUTIONS

Omid Pourbagherian: Conceptualization; investigation; methodology; resources; supervision; writing – original draft; writing – review and editing. **Kamran Javidi:** Data curation; resources. **Mohammad Taghizadieh:** Data curation; formal analysis; visualization. **Mehdi Jafarpour:** Investigation; project administration; supervision; validation; visualization; writing – original draft.

ACKNOWLEDGMENTS

The authors express their gratitude for the valuable contribution made by the patient in providing biopsy and blood donation. The authors appreciate support provided by Imam Reza Hospital, Tabriz, Iran.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

DATA AVAILABILITY STATEMENT

Although this study is about a rare disease, patient's data are available for further purposes.

ETHICS STATEMENT

This study has been performed according to the Declaration of Helsinki.

CONSENT STATEMENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

ORCID

Mehdi Jafarpour https://orcid.org/0009-0008-3555-8908

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How to cite this article: Pourbagherian O, Javidi K, Taghizadieh M, Jafarpour M. Rare pyoderma gangrenosum correlated with systemic lupus erythematosus: A case report. *Clin Case Rep*. 2023;11:e7857. doi:10.1002/ccr3.7857