Received: 12 January 2019 | Revised: 13 May 2019 | Accepted: 26 May 2019

DOI: 10.1002/ccr3.2263

CASE REPORT

Clinical Case Reports Open Access WILEY

Successful treatment with oral methylprednisolone and cyclosporine for refractory pyoderma gangrenosum in children: Report of a case and review of the literature

Xiaowen Huang[1] | **Kai Han**[1] | **Ruzeng Xue**[2,3] | **Li Li**[1] | **Kang Zeng**[1] | **Liuping Liang**[1]

[1]Department of Dermatology, Nanfang Hospital, Southern Medical University, Guangzhou, China

[2]Dermatology Hospital, Southern Medical University, Guangzhou, China

[3]Guangdong Provincial Dermatology Hospital, Guangzhou, China

Correspondence
Liuping Liang, Department of Dermatology, Nanfang Hospital, Southern Medical University, 1838 North Avenue, Guangzhou 510515, China.
Email: llp7211@163.com

Abstract

We reported the successful treatment with oral methylprednisolone and cyclosporine in combination with topical wound care on a boy with pyoderma gangrenosum presenting as huge and deep ulceration on buttocks and legs.

KEYWORDS

cyclosporine, pyoderma gangrenosum, steroids, wound care

1 | INTRODUCTION

Pyoderma gangrenosum (PG) is a rare inflammatory neutrophilic dermatosis, rare in infants and children. Here, we describe a 4-year-old boy referred with huge and deep ulceration on his buttocks and whole legs, and present a review of the literature. We reported the successful treatment with oral methylprednisolone and cyclosporine in combination with topical wound care. The interesting feature in this case is the occurrence of some new lesions during the treatment with oral methylprednisolone, which is confusing with Malassezia folliculitis.

Pyoderma gangrenosum is one part of the neutrophilic dermatosis, presenting as the cutaneous characteristic ulceration. Some patients are also affected with concomitant disorders, such as chronic inflammatory bowel disease.[1] The treatment of PG is challenging, especially in children.[2] With this case, we noticed the obvious side effects of steroids in the treatment. Then, cyclosporine was given while tapering methylprednisolone and achieved a good therapeutic effect. Moreover, the case here indicated that the topical measures of wound care in PG therapy were necessary.

2 | CASE REPORT

A 4-year-old boy was referred to our department with several huge ulcers on his legs and buttocks. Several small papules and pustules occurred from the buttocks, rapidly enlarged then developed to deep ulceration within 2 months. It was diagnosed as PG in another hospital, and treated with oral prednisolone and intravenous gamma globulin. Prednisolone was begun from 1 mg/kg/d and then added to 2 mg/kg/d from day 15. Gamma globulin was applied at the dose of 0.4 g/kg/d for 5 days. There was no

obvious improvement of the lesions after 1 month. The ulcerations expanded to the thigh. Then, he was transferred to our department in the condition of fever and lesions progression. He could not walk by himself because of the painful ulceration. He was the only affected individual in his family, without past medical history or any signs of underlying systemic disease. Examination revealed areas of deep ulceration on legs and buttocks. The huge ulcers were with violaceous undermined borders in keeping with PG (Figure 1A,B). Pathology showed focal acanthosis and diffused mixed infiltration of neutrophils and histiocytes with red blood cells extravasation in the dermis (Figure 2A-C). Stains for pathogenic organisms were negative. Blood tests were normal. Swabs taken from the ulcer surface showed the growth of *Staphylococcus aureus*. Based on the history, examination, and investigative findings, the diagnosis of PG was made. We tried to clarify the inducements implicated in the development of PG, but did not get the definite evidence here. The systemic therapies included oral methylprednisolone and cefuroxime. The initial dose of methylprednisolone applied was 1.5 mg/kg/d. We strengthened the local treatments for wound care, such as ulcers exposure to ozonated water and 5% potassium permanganate solution (PPS) once daily, and the application of red laser irradiation, combined with topical corticosteroids and antibiotic (mupirocin ointment) contributed to the wound healing. Obvious improvement of the lesions was achieved till one month. He was discharged with methylprednisolone at the dose of 1 mg/kg/d.

Two weeks later, during his subsequent visit, some fresh erythematous papules and pustules were observed on the buttocks, around the healed ulcer, without worsening pain (Figure 1C). We also noticed increased growth of body hair and weight gain with fat deposits in his abdomen, face, and the back (Figure 3), which were the common side effects of oral steroids. Were the fresh papulopustulars indicating recrudescence of PG, or the side effect of steroids? Finally, we made the diagnosis of Malassezia folliculitis for the finding of Malassezia spores from the pustule (Figure 2D), combined with the increased growth of body hair and weight gain with fat deposits in his abdomen, face, and the back. We considered these fresh lesions occurred following administration of steroid for the proliferation of Malassezia yeasts. Antifungal therapy with itraconazole (75 mg/d) was added to his treatment regimen. And, cyclosporine 25 mg twice daily was given while tapering methylprednisolone to 0.75 mg/kg/d. One month later, methylprednisolone was reduced to 0.5 mg/kg/d. In the next 3 months, cyclosporine was still applied and methylprednisolone was decremented gradually to complete discontinuation. During the regular outpatient clinic follow-up, he continued to improve, finally as typically healed with cribriform scarring (Figure 1D).

3 | DISCUSSION

Pyoderma gangrenosum affects about 4% of children and ranks among the most painful skin disorders.[1] The lesions of PG are characteristic, beginning with little pustules that progress to enlarging ulcers.[3] It often requires combination therapies, especially in the pediatric population. Till now, the treatment has been almost based on case reports, so we summarized the therapies of PG in children here.[4-9] In the literature review, corticosteroids with or without steroid-sparing therapy are applied in 60% of all reported cases.[5] The two most commonly used steroid-sparing agents in pediatric PG are dapsone (34.9%) and cyclosporine (30.4%).[6] PG responds to different treatments also depending on the setting and underlying associated diseases.[7,8]

Long-term use with steroids has many side effects. In the case here, we observed obvious cushingoid features and fresh papulopustulars, which made us confusing whether it was the relapse of PG or induced by steroids. The finding of Malassezia spores from the lesion provided clues to the later consideration. The therapeutic approach was adjusted to combination of reducing methylprednisolone with cyclosporine, and then, lesions achieved remission soon. It has been mentioned in the treatment options for PG, and the best evidence-based study data are available for cyclosporine and prednisolone.[9,10] Here, we combined the two drugs and achieved a good response.

Topical government of PG is required to contribute to the healing of ulcers. About 5% potassium permanganate solution and ozonated water have been reported as effective treatment methods for certain types of wounds.[11,12] We had no idea why the lesion was in progress before he came to us, although with prednisolone over 1 mg/kg/d for more than 1 month. We considered that besides systemic treatment, we actually strengthened measures for wound care. The patient had dramatic improvement to immersion of ozonated water and PPS, and local red light irradiation. In vitro and in vivo studies have demonstrated the local light irradiation enhanced the epithelialization and improved the wound healing.[13] This is a highly effective treatment for decreasing pain and accelerating tissue repair. In our case here, it actually accelerated wound-healing process significantly. We noticed that there is lacking of available information about topical management of PG lesions in literatures. This case puts wound care as an important issue here. In summary, for the treatment of PG, cyclosporine is working well during reducing methylprednisolone, and the management of PG lesions is necessary and helpful, especially in the refractory cases.

ACKNOWLEDGMENTS

We obtained the written informed consent from the patient's parents.

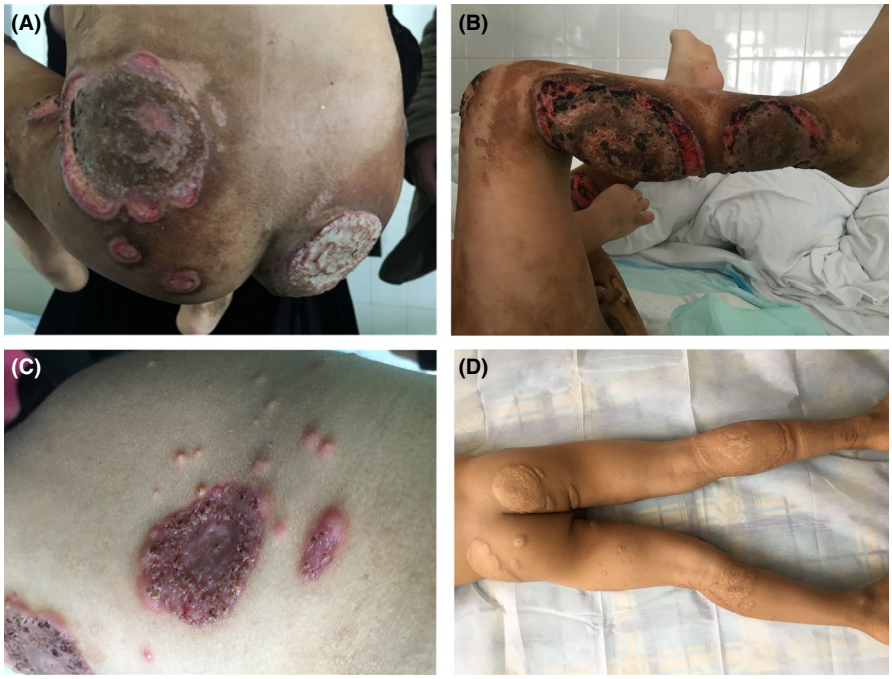

FIGURE 1 Huge ulcers on buttocks and legs at presentation (A, B). Fresh erythematous papules and pustules on the buttocks, around the healed ulcer, 4 mo after systemic steroids therapy (C). The cribriform scarring on buttocks and legs healed for 1 y (D)

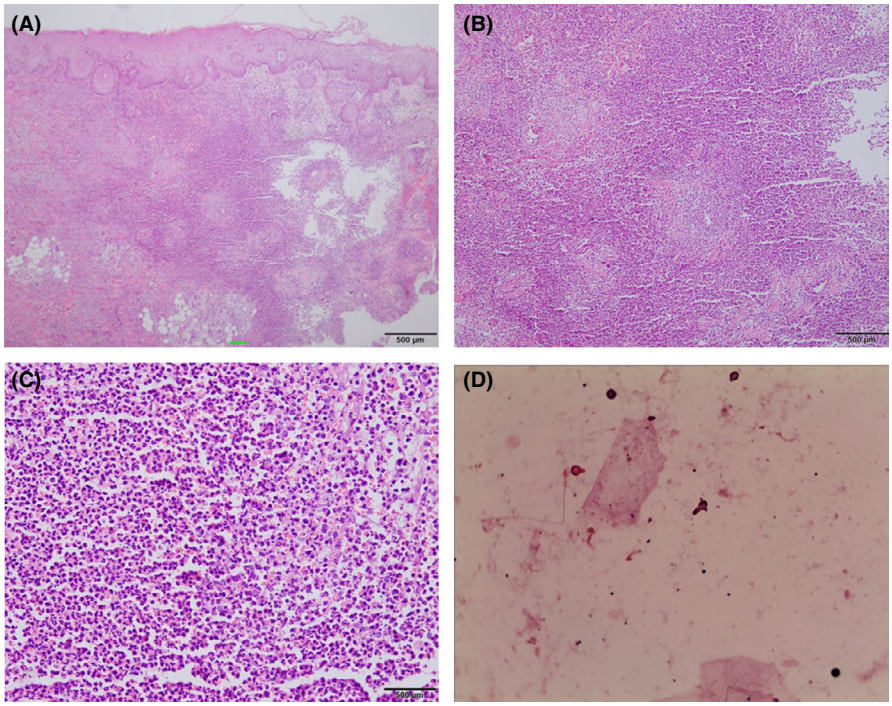

FIGURE 2 Skin biopsy showed focal acanthosis and diffuses mixed infiltration of neutrophils and histiocytes with red blood cells extravasation in the dermis (A-C). The spores of Malassezia spp from the pustules (D)

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

XH: collected the data of the patient and finished the writing of the manuscript. KH: collected the data of the patient and communicated with the parents. RX: did the histopathology. LL: applied the topical treatment for the patient. KZ and LL: were incharge of the patient and edited the manuscript.

ORCID

Xiaowen Huang https://orcid.org/0000-0003-3939-293X

REFERENCES

1. McAleer MA, Powell FC, Devaney D, O'Donnell BF. Infantile pyoderma gangrenosum. *J Am Acad Dermatol*. 2008;58:S23-S28.
2. Feldman SR, Lacy FA, Huang WW. The safety of treatments used in pyoderma gangrenosum. *Expert Opin Drug Saf*. 2018;17:55-61.

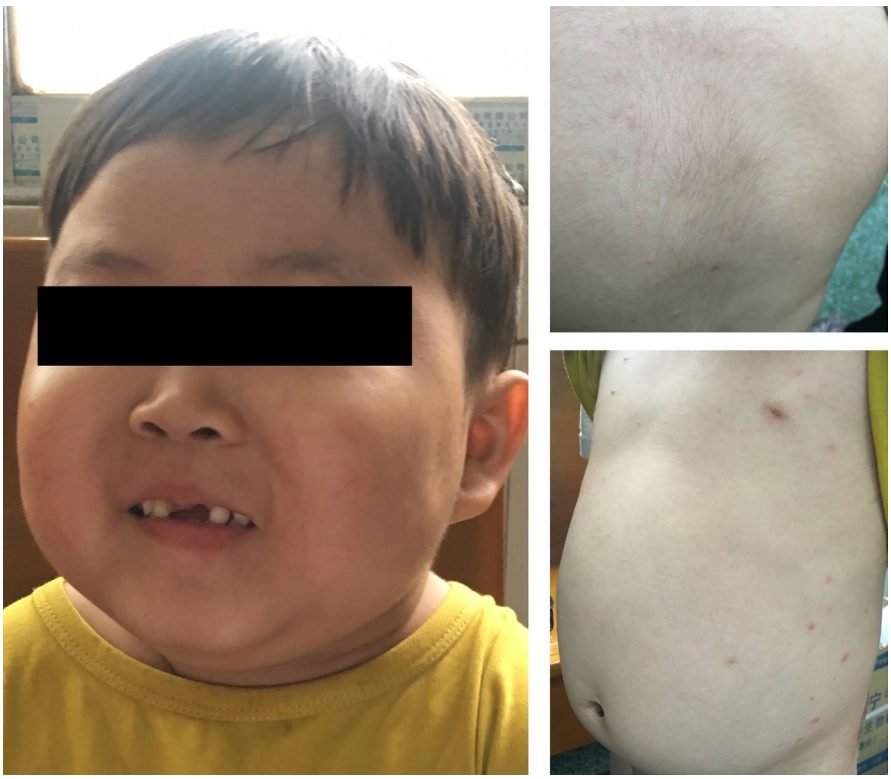

FIGURE 3 Increased growth of body hair and weight gain with fat deposits in the patient's abdomen, face, and the back, 4 mo after systemic steroids therapy

3. Gameiro A, Pereira N, Cardoso JC, Gonçalo M. Pyoderma gangrenosum: challenges and solutions. *Clin Cosmet Investig Dermatol*. 2015;28:285-293.
4. Abdelrahman W, Walsh MY, Hoey SE, O'Kane D. Pyoderma gangrenosum: a rare cause of cutaneous ulceration and one easily misdiagnosed. *Case Rep Pediatr*. 2016;2016:1-3.
5. Kechichian E, Haber R, Mourad N, El Khoury R, Jabbour S, Tomb R. Pediatric pyoderma gangrenosum: a systematic review and update. *Int J Dermatol*. 2017;56:486-495.
6. Lee GL, Chen AY. Neutrophilic dermatoses: kids are not just little people. *Clin Dermatol*. 2017;35:541-554.
7. DeFilippis EM, Feldman SR, Huang WW. The genetics of pyoderma gangrenosum and implications for treatment: a systematic review. *Br J Dermatol*. 2015;172:1487-1497.
8. Manda G, Finch P, Mponda K. Pyoderma gangrenosum associated with Crohn's disease in a Malawian teenage boy: case report and review of literature. *Trop Doct*. 2018;48:43-46.
9. Allen CP, Hull J, Wilkison N, Burge SM. Pediatric pyoderma gangrenosum with splenic and pulmonary involvement. *Pediatr Dermatol*. 2013;30:497-499.
10. Quist SR, Kraas L. Treatment options for pyoderma gangrenosum. *J Dtsch Dermatol Ges*. 2017;15:34-40.
11. Delgado-Enciso I, Madrigal-Perez V, Lara-Esqueda A, et al. Topical 5% potassium permanganate solution accelerates the healing process in chronic diabetic foot ulcers. *Biomed Rep*. 2018;8:156-159.
12. Mirmortazavi A, Haghi HR, Fata A, Zarrinfar H, Bagheri H, Mehranfard A. Kinetics of antifungal activity of home-generated ozonated water on *Candida albicans*. *Curr Med Mycol*. 2018;4:27-31.
13. Sperandio FF, Simões A, Corrêa L, et al. Low-level laser irradiation promotes the proliferation and maturation of keratinocytes during epithelial wound repair. *J Biophotonics*. 2015;8:795-803.

How to cite this article: Huang X, Han K, Xue R, Li L, Zeng K, Liang L. Successful treatment with oral methylprednisolone and cyclosporine for refractory pyoderma gangrenosum in children: Report of a case and review of the literature. *Clin Case Rep*. 2020;8:416–419. https://doi.org/10.1002/ccr3.2263