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. The treatment of PG is challenging, especially in children. 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.
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 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. 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. 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. 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.
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.

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)

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.
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, Hagh HR, Fata A, Zarrinfar H, Bagheri H, Mehranfar 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](https://doi.org/10.1002/ccr3.2263)