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CASE REPORT

Treatment of Refractory Segmental Vitiligo and Alopecia Areata in a Child with Upadacitinib and NB-UVB: A Case Report

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Abstract: Vitiligo and alopecia areata are both autoimmune skin diseases, and the chances of co-occurrence are very low. Conventional treatments often include glucocorticoids, which have many adverse reactions with long-term use and are difficult to achieve satisfactory results. Upadacitinib has been found to be effective in both vitiligo and alopecia areata due to partial overlap in pathogenic pathways. We report the successful treatment of vitiligo combined with alopecia areata in a nine-year-old child with upadacitinib in combination with UVB. The area of vitiligo and alopecia areata decreased significantly, and satisfactory results were obtained. It provides a new idea for the treatment of vitiligo complicated with alopecia areata in children.

Keywords: vitiligo, alopecia areata, JAK inhibitor, children

Vitiligo is a common skin disease of acquired depigmentation. The pathogenesis is unclear, which may be caused by autoimmune, neuroendocrine, oxidative stress, genetic susceptibility and environmental factors. Vitiligo, with a lower prevalence in Asians, affects about 0.5–2% of the world's population,[1] which is much rarer with co-occurrence of alopecia areata in China. Alopecia areata and vitiligo are both autoimmune skin diseases with some overlapping pathogenesis mechanisms.[2] Upadacitinib is a Janus kinase (JAK) inhibitor approved for the treatment of atopic dermatitis, rheumatoid arthritis, psoriatic arthritis, and ulcerative colitis. A few studies and experiences have shown that upadacitinib positively affects vitiligo and alopecia areata.[3–5]However, there is no case of vitiligo and alopecia areata treated with upadacitinib. We report a case of refractory segmental vitiligo combined with alopecia areata in a child who obtained a successful outcome using upadacitinib with narrow band-ultraviolet B (NB-UVB).

Case Report

There was a case of a 9-year-old girl who presented in our department on November 8, 2022, with facial white spots and areas of patchy alopecia for two months. Physical examination revealed several white plaques on the right face, the right auricle, and the back, with patchy alopecia on her scalp. Relevant family medical history was denied. The white patches showed bright blue fluorescence under Wood's lamp. No fluorescence was found in the scalp of alopecia. Laboratory tests showed vitamin D deficiency, increase of helper T lymphocyte and cytotoxic T lymphocyte subsets, and decline of cytotoxic T lymphocyte activation subsets. Autoantibodies showed no significant abnormalities. Vitiligo area scoring index (VASI) is 3, and quality of life score (DLQI) is 12. Originally treatment of prednisone 15 mg daily with topical mometasone furoate and calcineurin inhibitor for three months showed poor efficacy. After the exclusion of contra-indications and obtainment of informed consent from her guardians, treatment with upadacitinib 15 mg once daily (0.375mg/kg) in combination with NB-UVB and topical calcineurin inhibitor was started in February 2023. After one month, the extent of white plaques became smaller and pigment grew in the center. Liver and kidney functions, electrolytes, and coagulation were monitored regularly. After two months, we found that her creatine kinase elevates

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to 223 U/L without clinical symptoms. We decided to monitor the level of creatine kinase monthly. Four months later, her creatine kinase automatically decreased to normal. The dose of upadacitinib was tapered after three months. A weekly decrease of 15mg was initiated, that is 15mg/d for six days and stopped for one day. After two months a further reduction of 15mg per week was made on this basis. Gradual reductions were like this, as currently 15 mg every three days. After seven months, the patient had recovered 70% of the lesion area (VASI= 0.75, Figure 1). Hair growth on the alopecia with some white hair (Figure 2). The patient is still being followed up.

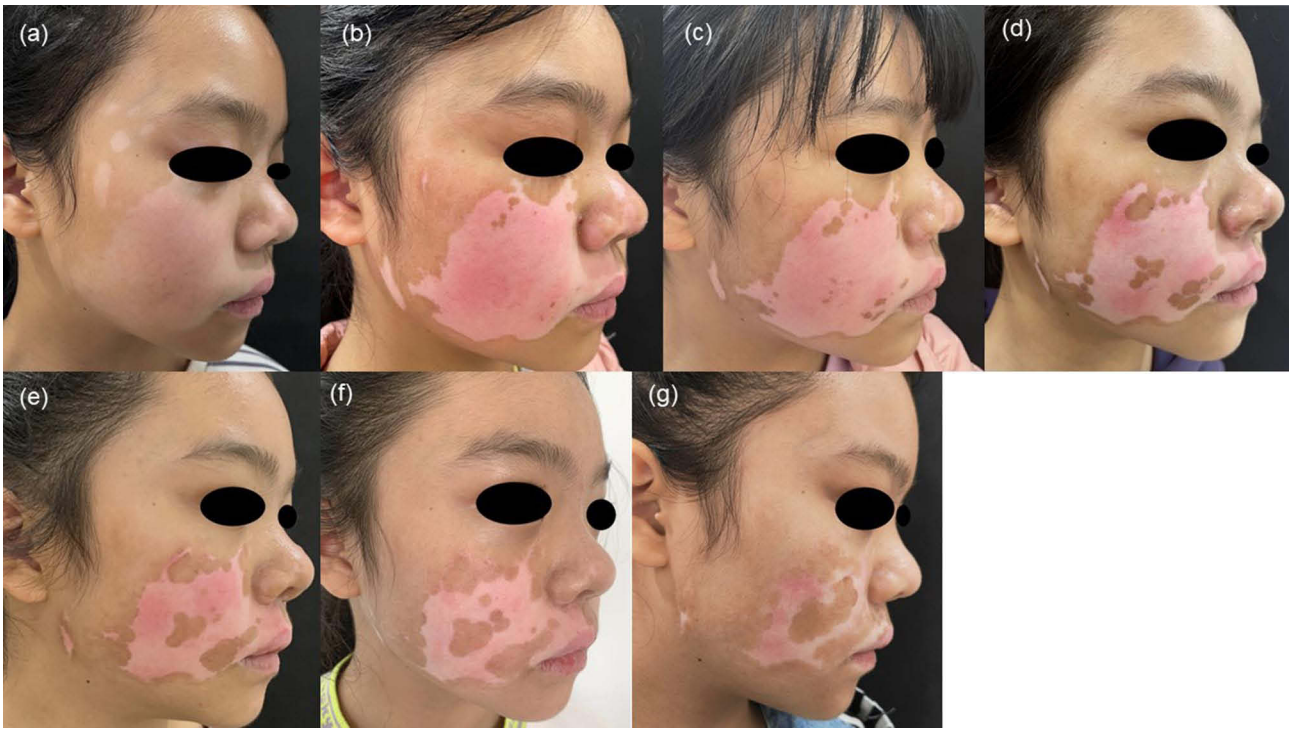

Figure 1 The skin lesions of vitiligo before and after the treatment with upadacitinib and NB-UVB. (**a**) Multiple white patches on the left side of face at baseline. (**b**) One month after treatment, the size of white patches was reduced and repigmentation appeared on the edge. (**c**) Two months after treatment, the white patches were further reduced. (**d**) Three months after treatment, the range of pigment increased obviously. (**e**–**g**) Four, five and seven months after treatment, vitiligo continued to improve, the white spots area was significantly reduced.

Figure 2 Comparison before and after treatment of alopecia areata with upadacitinib.

Discussion

Traditional treatments for vitiligo include systemic glucocorticoids, topical corticosteroids and calcineurin inhibitors, while for alopecia areata include systemic and topical corticosteroids. Long-term use has a large adverse effect on children. Vitiligo and alopecia areata are both immune-related skin diseases with similar expression abnormalities of immune-mediated signaling pathways. Th1 and CD8+ T cells are all involved in these two diseases, and the expression level of interferon (IFN)-γ revises upwards[6,7] IFN-γ is a Th1 pro-inflammatory cytokine which activates the JAK/STAT pathway to recruit T cells to attack their own normal cells. JAK inhibitors can act on the Th1 pathway to inhibit CD8+T cells from attacking melanocytes and hair follicles, as well as the Th2 pathway. Baricitinib (JAK1/2 inhibitor) has been approved for the treatment of severe alopecia areata in adults. Ritlecitinib (JAK3/TEC inhibitor) received approval for the treatment of severe alopecia areata in adults and adolescents 12 years and older. At present, upadacitinib is in Phase III clinical trials for the treatment of vitiligo as well as alopecia areata. This is the first report of treatment with JAK1 inhibitor of vitiligo combined with alopecia areata in children, which demonstrated favorable efficacy. She experienced a transient increase in creatine kinase during the administration of upadacitinib, but there were no clinical symptoms. Studies indicated that increased creatine kinase with no symptoms is an adverse effect of upadacitinib.[8] It returned to normal spontaneously without any other adverse effects during ten months of follow-up.

Conclusion

In conclusion, upadacitinib has shown ideal efficacy in the patient with vitiligo combined with alopecia areata, and no significant adverse reactions have been found in the pediatric patient. The limitation is that it is only a case report, and further large-scale studies are needed on the efficacy and safety of upadacitinib in the treatment of vitiligo and alopecia areata in children.

Data Sharing Statement

Please contact the corresponding author if required.

Ethical Conduct of Research

The authors state that they have obtained both verbal and written informed consent from the patient and the guardian for the treatment strategy within this case report. The patient and the guardian gave consent to publish the details and images.

Institutional Approval

There is no need of institutional approval.

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Disclosure

The authors declare that they have no conflicts of interest in this work.

References

1. Lyu C, Sun Y. Immunometabolism in the pathogenesis of vitiligo. *Front Immunol*. 2022;13:1055958. doi:10.3389/fimmu.2022.1055958
2. Lee JH, Ju HJ, Seo JM, et al. Comorbidities in patients with vitiligo: a systematic review and meta-analysis. *J Invest Dermatol*. 2023;143(5):777–789.e6. doi:10.1016/j.jid.2022.10.021
3. Flora A, Kozera E, Frew JW. Treatment of alopecia areata with the janus kinase inhibitor upadacitinib: a retrospective cohort study. *J Am Acad Dermatol*. 2023;89(1):137–138. doi:10.1016/j.jaad.2022.12.056
4. Gori N, Cappilli S, Di Stefani A, et al. Assessment of alopecia areata universalis successfully treated with upadacitinib. *Int J Dermatol*. 2023;62(2):e61–e63. doi:10.1111/ijd.16342
5. Su X, Luo R, Ruan S, et al. Efficacy and tolerability of oral upadacitinib monotherapy in patients with recalcitrant vitiligo. *J Am Acad Dermatol*. 2023;28. doi:10.1016/j.jaad.2023.07.1016

6. Guttman-Yassky E, Teixeira HD, Simpson EL, et al. Once-daily upadacitinib versus placebo in adolescents and adults with moderate-to-severe atopic dermatitis (Measure Up 1 and Measure Up 2): results from two replicate double-blind, randomised controlled Phase 3 trials. *Lancet*. 2021;397 (10290):2151–2168. doi:10.1016/S0140-6736(21)00588-29
7. Cunningham KN, Rosmarin D. Vitiligo treatments: review of current therapeutic modalities and JAK inhibitors. *Am J Clin Dermatol*. 2023;24 (2):165–186. doi:10.1007/s40257-022-00752-6
8. Dahabreh D, Jung S, Renert-Yuval Y, et al. Alopecia areata: current treatments and new directions. *Am J Clin Dermatol*. 2023;24(6):895–912. doi:10.1007/s40257-023-00808-1