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Case Report

Successful treatment of resistant alopecia totalis with tofacitinib

Sadaf Ahmed Asim, Rajesh Kumar Ludhani, Madiha Sajid

Department of Dermatology, Dow University Hospital Ojha, Karachi.

Abstract Alopecia Areata (AA) is one of the most common autoimmune diseases that causes non-scarring, patchy hair loss. The most severe type of Alopecia areata is alopecia totalis (AT). Affected patients have association of psychological disease and shown decreased quality of life. Despite the fact that there are several treatment options available for AA, most of them do not provide satisfactory results when it comes to AT. Despite the fact that there are a number of treatment options available for AA, the most of them do not provide satisfying results when it comes to AT. The disease is distinguished by the invasion of hair bulbs by activated T lymphocytes cells. The pathophysiology of alopecia areata reveals CD4 cell depletion. AA has hereditary correlations with genes of major his to compatibility complex (MHC). In recent years, multiple series, case reports, and small open-label trials have demonstrated the effectiveness of oral Janus kinase (JAK) inhibitors as a therapy for AT. One of the commonly used JAK inhibitor for the treatment of psoriatic and rheumatoid arthritis is tofacitinib. Here, we present a 21-year-old male patient who had effective treatment for Alopecia totalis with tofacitinib. The patient lost all of his but regained after six months of therapy, and there was no sign of a recurrence. The patient responded favourably to the therapy; by the fourth week, hair had begun to grow, and by the sixth month, complete regrowth had been achieved. There were no significant negative effects reported. For AT, tofacitinib may be a well-tolerated and effective therapy option; however, more research is required to determine its long-term effectiveness.

Key words
Alopecia totalis; Tofacitinib; Hair loss; Janus kinase inhibitor.

Introduction

Alopecia Totalis (AT) is a more extensive subtype of AA characterised by complete loss of hair of the scalp.[1] The prevalence of alopecia totalis is 7-9% of total AA cases.[2] Although the etiopathogenesis of AT is still unknown, dysfunction of the immune system and autophagy of hair follicles initiated by CD8+ T cells are thought to be the main causes of the condition. Patients with AA have higher levels of gene expression in the lesional scalp when it comes to inflammatory indicators such as interleukin [IL]-2, Janus kinase [JAK]3, and IL-15 T helper type (Th) 1 pathway cytokines (interferon [IFN]-γ), and Th2 pathway cytokines (IL-13).[3,4]

In general, topical as well as intralesional steroids is the first line of therapy for the management of mild patchy AA. While systemic steroids are effectively utilised for management of moderate-to-severe AA cases, but they are ineffective for AT cases and have several adverse effects and a high recurrence rate. So the drugs known as Janus kinase (JAK) inhibitors block the action of one or more JAK family enzymes, interfering with the intracellular signalling cascade, whereas one of the commonly used JAK3 inhibitor is tofacitinib. JAK inhibitors are rarely associated with

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Address for correspondence
Dr. Rajesh Kumar T Ludhani
Department of Dermatology,
Dow University Hospital Ojha, Karachi
Email: drrajesh.derma@gmail.com

adverse effects but still they can cause thrombocytopenia, anemia, neutropenia, abnormal lipid profile, infections (including bacterial as well as fungal), reactivation of tuberculosis and herpes zoster.[5-7]

Case report

A 21-year-old man presented with few patches of hair loss on his scalp a year ago that did respond to topical therapies. He has had multiple scalp patches for the past four months. He has seen numerous dermatologists and tried a variety of treatments, such as intralesional steroid injections, clobetasol and minoxidil solutions, systemic steroids and multivitamin supplements, but none of them have shown significant improvement. Seven months after his first appearance, his condition worsened, affecting her entire scalp, eyebrows, moustache and beard area, consistent with alopecia totalis.

There is no significant history of any illness or any similar disease in the family.

His hair loss was evaluated using the Severity of Alopecia Tool (SALT) score. His score on Salt was 100, which suggested his condition was severe. The laboratory work up has been done including complete blood count with differential, hepatic and renal function. Thyroid function tests, fasting lipid profile, screening for Hep B, Hep C, HIV and IGRA test all came out to-be normal. Cardiovascular and malignancy screening were performed which came normal as well.

After obtaining signed informed consent, the patient began taking oral tofacitinib at a dose of 5 mg twice day, and oral dexamethasone 0.5mg three tablets once daily in the morning. After eight weeks of therapy, a notable therapeutic response was seen, and hair gradually began to grow again. Throughout therapy, no systemic

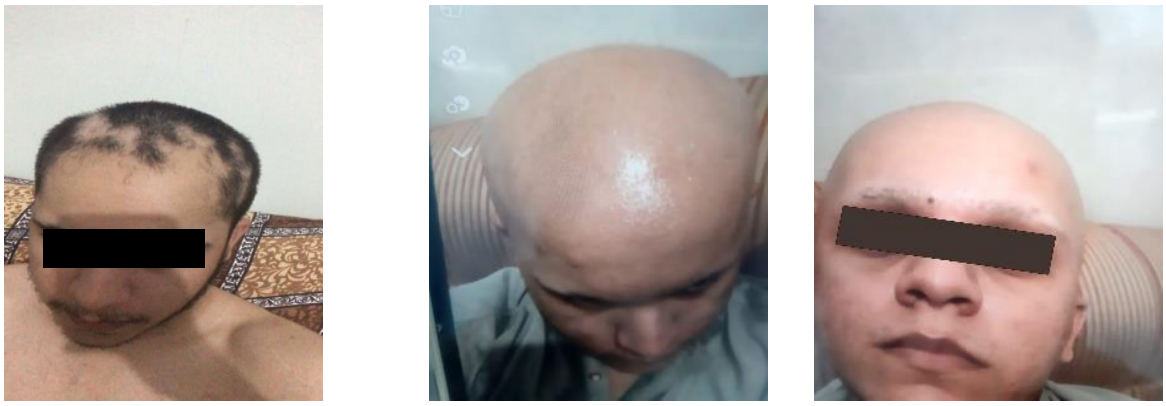

Figure 1 Before treatment.

Figure 2 After treatment.

adverse effects were seen. The SALT scores dramatically dropped to zero 24 weeks after starting tofacitinib therapy, and no side effects were noted during the course of treatment or during follow-up.

Discussion

Alopecia totalis (AT) is a more severe autoimmune disorder of AA that affects scalp hair follicles initiated by CD8+ T lymphocytes cells. However, its specific cause is still unknown. It is hypothesised that oxidative stress, complex immunology, genetics, epigenetics, and a variety of environmental variables contribute to the disease's development.[8,9] Traditional therapies now in use, such as topical minoxidil, immunosuppressive medications, corticosteroids, and contact immunotherapy, have limited benefits and side effects. According to recent researches, JAK inhibitors may be a viable treatment approach for inflammatory disorders.[10,11]

Jakinibs, a class of medications known as inhibitors, block the JAK family enzymes that disrupt by disrupting the JAK-STAT signalling system. Tofacitinib is a specific kinase inhibitor that primarily inhibits JAK3, preventing interferon (IFN)-gamma upregulation in CD8+ lymphocytes. In a mouse model of AA, antibody-mediated inhibition of IFN-γ, IL-2, or IL-15 receptor β inhibited the development of the illness and also decreased the dermal IFN response and the formation of CD8 (+) NKG2D (+) T-cells in the skin.[9] These pharmacological blockers of JAK family enzymes are administered systematically. Downstream effectors of cytokine receptors, IFN-γ and γc, removed the IFN signature that prohibited AA from occurring. The feedback loop is broken, allowing the hair follicles to transition back into the anagen stage.[11-14]

For severe and resistant patients, these studies demonstrate that tofacitinib is well-tolerated, effective, and free of major side effects. However, once therapy is stopped, tofacitinib is not able to sustain a lasting response. Because jakinibs suppress JAK2, they might cause side effects such as thrombocytopenia, neutropenia, and anemia. Tofacitinib-using rheumatoid arthritis patients have abnormal lipid profiles. Infections with bacteria and fungi are additional severe side effects. Reactivation of zoster and tuberculosis infections has been also reported.[11–14]

Our patient's hair progressively came back after receiving tofacitinib therapy, and their SALT scores dramatically dropped. Given our patient's positive reaction to hair growth, tofacitinib may be the best option for AT.[15,16]

Conclusion

Overall, tofacitinib has demonstrated outstanding efficacy in treating AT, making it a potentially excellent choice for AT patients. When the medication was first administered, our patient responded remarkably, showing adequate hair growth and a halt to the disease's development. Currently, the patient is on regular follow-up, and we satisfied with his response to treatment. Furthermore, extensive clinical trials are needed to determine efficacy, safety profile including short-term and long-term adverse effects and disease recurrence.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent.

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Conflict of interest Authors declared no conflict of interest.

Author's contribution

SAA,MK: Identification and management of the case, manuscript writing, has given final approval of the version to be published.

RK: Identification and management of the case, critical review, has given final approval of the version to be published.

MS: Diagnosis and management of the case, critical review, has given final approval of the version to be published.

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