

# Corticosteroids for alopecia areata in children

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## Abstract

**Question** In my family practice, several children have presented with alopecia areata. Families are worried about the ongoing hair loss and have been trying several natural health products. I understand that corticosteroids are also considered to treat this condition. Which corticosteroid treatments can I consider and how beneficial are they?

**Answer** Alopecia areata is a source of considerable distress to those affected, and although there are many treatment options available, none have been clinically proven to be consistently effective. Steroids are commonly prescribed and can result in hair regrowth. Topical steroids are most commonly used in children, but intralesional, oral, and even intravenous steroids are available, with varying levels of efficacy.

**A**lopecia areata (AA), the most frequent cause of hair loss due to inflammation, has a global prevalence of 0.1% to 0.2% and is still not fully understood.<sup>1</sup> The prevailing theory is that it is caused by an autoimmune reaction against hair follicles by CD8<sup>+</sup> cytotoxic T cells.<sup>2</sup> Most of those with AA (66%) are younger than 30 years of age<sup>1</sup> and 60% of patients present with their first patch of AA before the age of 20.<sup>3</sup> A study of more than 70 000 pediatric dermatology patients (1 to 17 years old) from Florida and Ohio reported an AA prevalence of 0.9%, which represented 18% of all patients with AA.<sup>4</sup> About half of AA patients will have spontaneous hair regrowth within a year.<sup>5</sup>

## Effect on quality of life

A study measuring health-related quality of life reported that 78% of children with AA (4 to 16 years old) had a mean (SD) Children's Dermatology Life Quality Index (CDLQI) score of 6.3 (5.9).<sup>6</sup> The mean (SD) CDLQI score for healthy control participants is 0.4 (0.7), with higher scores suggesting a lower quality of life.<sup>7</sup> Higher CDLQI scores also correlated with higher scores on depression screening using the Patient Health Questionnaire-9 modified for adolescents ( $r=0.417$ ,  $P=.0196$ ), although it is unclear whether the AA was the cause of depression.<sup>6</sup> Family members of children with AA had a mean (SD) score of 6.7 (6.1) on the Family Dermatology Life Quality Index, suggesting that AA negatively affects people in the child's circle of care.<sup>6</sup> Furthermore, a Turkish matched-control study of 74 children with AA (8 to 18 years old) reported significantly higher levels of anxiety, as measured by the State-Trait Anxiety Inventory for Children, compared with healthy control participants ( $P<.001$ ).<sup>8</sup> Additionally, 14% to 25% of patients with AA progress to alopecia totalis, a total loss of scalp hair, or alopecia universalis, a total loss of scalp and body hair.<sup>9</sup> As less severe presentations of hair loss typically respond better to therapy,<sup>9</sup> it is prudent to treat the condition early to maximize patients' chances of hair recovery.

## Available treatments

A range of treatments is available for AA of any severity. However, there are limited randomized controlled trials (RCTs), especially in pediatric patients, to document any long-term efficacy.<sup>10</sup> Treatments include topical minoxidil (an antihypertensive vasodilator), topical bimatoprost (a prostaglandin F<sub>2α</sub> analogue normally used to treat glaucoma), immunosuppressive medications like azathioprine and cyclosporine, and topical immunotherapy.<sup>11</sup> Corticosteroids are also commonly used and can be injected directly into lesions (intralesional) or given orally, intravenously, or topically, depending on the severity of the condition.<sup>11</sup> Clinicians are more likely to use topical corticosteroids than intralesional treatment in children, as topical treatments are better tolerated.<sup>5,9</sup>

## Corticosteroid treatment

In 2012, the British Association of Dermatologists' guidelines for managing AA recommended that children be treated similar to adults,<sup>9</sup> although children receive lower doses to reduce side effects.<sup>12-14</sup> Simply not treating the hair loss is a valid option if the patient is content with it, as there is often spontaneous regrowth in about half of AA patients.<sup>5</sup>

If treatment is desired, intralesional corticosteroids, usually triamcinolone acetonide (TAC), are often used as a first-line therapy for limited disease in adults.<sup>15</sup> A 2015 double-blind placebo-controlled pilot study of TAC in 4 adults recommended an injection volume of 8 mL per month, with a concentration of 2.5 mg/mL.<sup>16</sup> One study that included 68 patients younger than 20 years of age (total of 219 patients) reported greater than 50% improvement in hair regrowth in 82% of all patients with limited AA after intralesional TAC treatment.<sup>17</sup> However, reversible skin atrophy is a consistent side effect of TAC use,<sup>9</sup> with the aforementioned pilot study in 4 adults reporting 5 incidents.<sup>16</sup> The use of intralesional corticosteroids is limited in children, owing to the pain and their fear of injections, but these can be mitigated with the use of smaller needles, distraction, or topical anesthetic creams.<sup>5</sup>

Oral corticosteroids are another treatment, with doses varying from 0.8 mg/kg of prednisone daily (during a 6-week period) to 5 mg of dexamethasone twice weekly (for a minimum of 12 weeks).<sup>12,13</sup> A study of 32 patients (9 to 59 years of age) taking a 6-week course of prednisone reported that half (47%) of the patients experienced 25% hair regrowth and one-quarter (25%) experienced 75% hair regrowth.<sup>12</sup> Another study of 26 patients (including 5 aged 10 to 18 years) with severe AA combined oral-dose prednisone (20 mg/day) with methotrexate (15 to 20 mg/week), an immunosuppressant.<sup>18</sup> Of the study participants, 25 had at least partial hair regrowth (>50%) after 3 to 6 months of treatment.<sup>18</sup> However, there are often side effects to taking oral corticosteroids.<sup>19</sup> One study of 23 adult patients treated with oral prednisolone reported 55% of patients experienced side effects compared with 13% in the placebo group ( $P < .05$ ).<sup>20</sup> Patients can also relapse within 4 to 9 weeks of stopping the treatment.<sup>19</sup> Side effects from oral corticosteroid use include weight gain and acneiform eruption, among others.<sup>11</sup> More studies are needed to determine the long-term efficacy of oral corticosteroid therapy.

Corticosteroids can also be given intravenously and are used for moderate to severe cases of AA.<sup>11</sup> A 2013 retrospective study described 24 children (2 to 17 years old) treated with 3 daily 8-mg/kg intravenous methylprednisolone injections (up to 500 mg/dose) once a month (treatment period ranged from 2 to 10 months).<sup>21</sup> Although 13 of 16 of those who responded to treatment relapsed and required a second course of methylprednisolone or other steroids, 9 patients completely recovered.<sup>21</sup> Relapse was defined as either mild (a 10% loss of scalp hair) or severe (loss of all regrown hair or worse).<sup>21</sup> A 2012 retrospective study of 30 AA patients, which included 8 children receiving 10 to 20 mg/kg methylprednisolone daily for 3 days, reported that only 10 of 30 patients had some degree of hair regrowth by the end of the study.<sup>14</sup> Nine of these patients relapsed at least once, 6 of whom eventually had a full recovery either spontaneously (4 patients) or with topical steroids (2 patients). One of the 10 initial responders had no regrowth even after a second course of methylprednisolone. Only 3 of 8 children in the study had mild to no evidence of AA at follow-up. Side effects included nausea and vomiting, headache, flushing, and transient hyperglycemia, among others.<sup>14</sup> Despite some positive response, intravenous treatment cannot be recommended without further studies.

In an RCT of 34 adults with moderate to severe AA, application of a topical 0.05% clobetasol propionate foam resulted in better scalp hair growth at 89% of the treated sites compared with 11% of sites treated with the application of placebo (regrowth rate was evaluated with a semiquantitative regrowth score;  $P = .0001$ ).<sup>22</sup> In a 2015 retrospective study, topical 0.05% clobetasol propionate was administered concomitantly with pulses (ie, intermittent high doses) of oral dexamethasone in a group of 65 children (2 to 18 years of age) where 43% had multiple patches of alopecia on their scalp.<sup>23</sup> By

the end of therapy, which ranged from 6 to 12 months depending on how the children's AA responded, 57% of the children had more than 75% hair regrowth, with 74% of these children experiencing complete hair regrowth.<sup>23</sup> Side effects noted were headache, which resolved with acetaminophen, and scalp atrophy, which resolved 2 months after discontinuing treatment.<sup>23</sup>

### Future directions

Current research into novel therapies to treat AA include Janus kinase (JAK) inhibitors like tofacitinib, which is a pan-JAK inhibitor but most strongly inhibits JAK3, and ruxolitinib, which most strongly inhibits JAK1 and JAK2.<sup>2</sup> Tofacitinib is approved by the US Food and Drug Administration to treat rheumatoid arthritis, and ruxolitinib is approved for myelofibrosis and polycythemia vera.<sup>2</sup> Alopecia areata is thought to be caused by an autoimmune reaction against hair follicles by T cells, and JAK inhibitors suppress parts of the JAK-STAT (signal transducer and activator of transcription) pathway, which might participate in this reaction.<sup>2</sup> A 2017 study whose participants included 13 adolescents (12 to 17 years of age) applying a topical 2% tofacitinib ointment reported a mean 61% improvement in hair growth using the Severity of Alopecia Tool (SALT).<sup>24</sup> A SALT score of 100 indicates a complete absence of scalp hair, while a score of 0 indicates full hair growth.<sup>24</sup> Adverse effects included headaches (3 patients), upper respiratory infections (4 patients), and increases in liver transaminase levels (4 patients); all of which returned to normal.<sup>24</sup>

Another proposed treatment is the use of platelet-rich plasma, which has been offered to reduce acne scarring, to promote wound healing, and to reduce swelling in fat transplantation.<sup>25</sup> One study reported a substantial increase in the expression of  $\beta$ -catenin, which is involved in the growth of hair follicle cells, after treatment of dermal papillae with platelet-rich plasma.<sup>26</sup> One RCT reported a significant increase in hair growth ( $P < .001$ ) when compared with TAC or placebo as assessed by dermatologists using the SALT score.<sup>25</sup> However, this is a treatment with no proven efficacy; more research is needed.

### Conclusion

Alopecia areata is poorly understood and impairs quality of life. No effective treatment is available in children. Topical steroids, specifically 0.05% clobetasol propionate, are most commonly used in children, as they are the least painful treatment and provide moderate improvement in hair regrowth. Future therapies might include JAK inhibitors. 🌿

#### Competing interests

None declared

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