DR REBEKKA JERJEN (Orcid ID : 0000-0002-7749-1069)

DR LARA TRINDADE DE CARVALHO (Orcid ID : 0000-0001-8540-0983)

Article type : Original Articles

Title: Treatment of alopecia areata in pre-adolescent children with oral tofacitinib: a retrospective study

Word count: 2309

Figures: 1

Tables: 2

Supplementary Tables: 1

Key words: Alopecia areata, tofacitinib, JAK inhibitors, systemic treatment, children, pre-adolescents

Authors:

Dr. Rebekka Jerjen (corresponding author), BMSc (Hons), MChD (Dist)

Affiliation/place of work: Sinclair Dermatology, Melbourne, VIC, Australia

Email: Rebekka.jerjen@gmail.com

ORCID: 0000-0002-7749-1069

Dr. Nekma Meah, MBChB, MRCP (UK), MRCP (Derm)

Affiliation/place of work: Sinclair Dermatology, Melbourne, VIC, Australia

ORCID: 0000-0001-9466-6337

Dr. Lara Trindade de Carvalho, MD

Affiliation/place of work: Sinclair Dermatology, Melbourne, VIC, Australia

Dr. Dmitri Wall, MBBCh, BAO, MRCP (UK)

Affiliation/place of work: Sinclair Dermatology, Melbourne, VIC, Australia

ORCID ID: 0000-0002-0107-4488

Dr. Samantha Eisman, MBChB, MRCP(UK), FCDem(SA), FACD
Affiliation/place of work: Sinclair Dermatology, Melbourne, VIC, Australia
ORCID: 0000-0003-0111-6403

Prof. Rodney Sinclair, MBBS, MD, FACD
Affiliation/place of work: Sinclair Dermatology, East Melbourne, Victoria, Australia
ORCID: 0000-0001-6751-1428

No funding was received for this article

No acknowledgments

Conflict of interests:

RJ, NM and LTC have nothing to disclose.

DW reports receipt of personal fees for consultancy from the chair, National and International Skin Registry Solutions (NISR), Honoraria from Janssen, grants from Pfizer and consultancy with Eli-Lilly, all outside the submitted work.

SE has been principal investigator in clinical trials for Pfizer, AbbVie, Arena Pharmaceuticals, Boston Pharmaceuticals, Bristol-Myers Squibb, Botanix, Dermira, Eli Lilly, LEO Pharma, Novartis, and Regeneron.

RS reports being a member of, on the International advisory board of, and principal investigator in sponsored clinical trial for Pfizer and Eli Lily. He is founder, director and principal investigator in a clinical trial for Samson clinical. He has been/is currently a principal investigator in clinical trials for Jaansen, Sun Pharma, Arena, Demira, Astra Zenica, Novartis, Merck, Sanofi, Abbvie, Galderma, Prinicipia, Reistone Pharma and Aclaris.

Treatment of alopecia areata in pre-adolescent children with oral tofacitinib: a retrospective study

ABSTRACT

Background: Alopecia areata (AA) is an autoimmune hair loss condition that affects people of all ages. Early age of onset and prolonged disease duration indicate poor prognosis. Janus kinase inhibitors are being investigated in phase 3 clinical trials in adolescents and adults with AA.
Objective: To evaluate the use of oral tofacitinib in pre-adolescent patients with AA.
Methods: A retrospective review of case records of all pre-adolescent patients with AA treated with oral tofacitinib in a single center between 2018 and 2019.

Results: Fourteen patients were identified, aged 7 to 11 years. Nine patients experienced clinically significant improvement in their SALT (Severity of Alopecia Tool) score. Three patients achieved complete remission (SALT score of 0), seven (63.6%) achieved over 50% improvement in SALT score from baseline. One patient had no change from baseline, another experienced additional hair loss. After an average of 9 months of treatment, the median SALT score improvement was 67.7%. The improvement was similar in patients with baseline SALT scores greater than 50 and those with baseline SALT scores below 10. Adverse events were mild.

Limitations: The retrospective nature of the data, small sample size, lack of a control group, referral bias to a specialist hair center and concomitant use of other medications including oral minoxidil in all patients.

Conclusion: There is a role for tofacitinib as a systemic therapy in AA and this should be further evaluated in prospective clinical trials in pre-adolescents.

INTRODUCTION

Tofacitinib is a selective 1/3 janus kinase inhibitor (JAKi), used to treat a number of inflammatory diseases including rheumatoid arthritis, psoriatic arthritis, psoriasis, atopic dermatitis, systemic lupus, sarcoidosis, vitiligo and alopecia areata (AA).[1,2] Tofacitinib inhibits signaling of numerous cytokines including interferon (IFN)-γ, IL-2, IL-4, IL-7, IL-9, IL-15 and IL-21, thereby attenuating the inflammatory cascade and activation of T cells involved in AA pathogenesis.[3,4]

AA is an autoimmune, non-scaring alopecia with an estimated lifetime prevalence of 2%.[5] Almost half of all patients experience disease onset within the first two decades of life making it the most common cause of hair loss in children.[6] The natural history of AA is variable. Approximately 70% of patients experience an acute episode of AA that presents with one or more circular bald patches that regrow spontaneously within 6-12 months.[7,8] Episodes that persist beyond 12 months are termed chronic alopecia areata (CAA). In CAA, multiple bald patches appear almost continuously over many years and the risk of ultimately developing total scalp (alopecia totalis, AT) or universal scalp and body alopecia (alopecia universalis, AU) is 45%.[7,8]

Early age of onset (<12 years) is associated with an increased risk of developing CAA, and AT/AU.[7] A number of systemic medications have been used with variable success to treat CAA and AT/AU.[9] A common observation is that patients with prolonged disease duration respond poorly to treatments and consequently disease duration >8 years is generally considered an exclusion criterion in AA clinical trials. One possible inference of this is that effective treatment of AA is time critical. As children have a worse prognosis and treatment of AA is time critical, early initiation of treatment may be vital to therapeutic success with JAKi for AA. Furthermore, the well-recognized, significant

negative psychosocial impact of AA on affected children and their caregivers (including risk of suicide) should be considered.[10,11]

METHODS

In this retrospective study, the electronic database (ZedMed) at a specialist hair center (Sinclair Dermatology, Melbourne, Australia), was interrogated to identify all pre-adolescent patients diagnosed with AA who were treated with tofacitinib between March 2018 and April 2020 (aged under 12 years at time of treatment initiation). Clinical and demographic information, including age, sex, weight, disease duration, medical history, family history and prior treatments was collected. Pre-treatment information including laboratory investigations (complete blood count, metabolic panel, fasting lipid panel), infection screen (interferon-gamma release assay (IGRA) for *Mycobacterium tuberculosis*, HIV 1/2 antigen and antibody test, HBsAg, HBsAb, Hepatitis A IgG, Varicella Zoster IgG, EBV VCA IgG, EBV NA IgG, EBV VCA IgM) were recorded.

Severity of AA was assessed using Severity of Alopecia Tool (SALT).[12] A SALT score of 100 corresponds to complete absence of scalp hair and a SALT score of 0 indicates complete hair growth. Response to treatment was assessed after a minimum of 6 months of therapy by calculating the percent change in SALT score from baseline to most recent evaluation. Treatment response was divided into two groups as per previous studies where non-responders had a percentage change in SALT score of <5% and responders had a percentage change in SALT score of ≥5%.[2,13] Responders were further categorized into four groups according to their percentage improvement in SALT score: 5-25% (modest response), 26-50% (moderate response), 51-75% (significant response) and 76-100% (markedly significant response). SALT score of 0 represented complete regrowth. Treatment response was further analyzed according to baseline AA severity (SALT score <50: ≥50).

Adverse events were assessed by laboratory monitoring after 4 weeks of tofacitinib initiation and then every 6 weeks, along with physical examination and review of systems. All patients had parental consent for tofacitinib use and were made aware of off-label nature in AA. This study followed the tenets of the Declaration of Helsinki.

RESULTS

Fourteen pre-adolescent patients (7 females; 7 male) were commenced on tofacitinib during the study period. Patient characteristics are presented in table 1. Patient age at time of initiation of

treatment ranged from 7 to 11 years and the median disease duration prior to treatment was 2.5 years (range: <1-6 years). Four patients had AT, two AU, six patchy AA, one diffuse AA, and one AA limited to the eyebrows. Four patients had concomitant nail disease (brittleness, fragility/trachyonychia and/or pitting) and one patient had a family history of AA. Co-morbidities included atopic disease (n=6), celiac disease (n=1), anxiety (n=1), hypercholesterolemia (n=1) and one patient had autism, attention deficit hyperactivity disorder (ADHD) and an intellectual disability. Previous systemic therapies included prednisolone (n=9), oral minoxidil (OM, n=9), azathioprine (n=1) and cyclosporine (n=2). Previous topical and physical therapies included corticosteroids (n=8), tacrolimus (n=1), tofacitinib (n=2), bimatoprost (n=1), diphenylcyclopropenone (n=2), dithranol (n=1) and intralesional corticosteroids (n=3).

Pre-treatment investigations were performed in all patients. No active or latent infections or other significant metabolic disturbances were found. One patient was noted to have elevated total cholesterol in the context of known familial hypercholesterolemia and was under specialist review.

Patients started tofacitinib at a dose between 2.5-7.5 mg daily (mean 4.1 mg; 0.05-0.2 mg/kg/day). The dose was increased every 1-3 months in patients based on treatment response (presence, absence or plateauing of hair regrowth) and tolerability. The average maximum daily dose was 7.8 mg (range 4-15 mg; 0.06-0.4 mg/kg/day).

Table 2 summarizes the characteristics of responders and non-responders. Eleven patients completed a minimum of 6 months of treatment, with a median treatment duration of 9 months (range 7-38 months). Nine patients (82%) responded to treatment while 2 patients (18%) did not. The patient with eyebrow AA was not included in the treatment response analysis although they experienced 80% regrowth.

The overall median percent change in SALT score was 67.7% (mean 19.1%; range -400-100%). Among the nine responders, median percent change in SALT score was 70% (mean 67.8%; range 5-100%) with 4 patients demonstrating a markedly significant response (change in SALT score; 76-100%), 3 patients achieved a significant response (change in SALT score; 51-75%), 1 patient responding moderately (change in SALT score; 26-50%), and another patient responding modestly (change in SALT score; 5-25%). Overall, 63.6% (7/11) achieved over 50% improvement in SALT score from baseline and 27% (3/11) achieved complete regrowth (SALT score of 0).

With respect to time to response, two patients demonstrated SALT score reduction at 3 months, the majority of responders (6) demonstrated an initial reduction in SALT score at 6 months and the final responder showed a reduction in SALT score at 9 months.

Among the 3 non-responders, 2 patients experienced no regrowth and 1 had worsening hair loss. The treatment duration was shorter (non-responders, median 8 months; responders, median 15 months). Reasons for discontinuation included needle phobia precluding adherence to monitoring investigations (n=1), coronavirus-19 pandemic (COVID-19) concern (n=1) and unilateral lower leg pain after 4 months of treatment (n=1).

Eight patients had severe AA with baseline SALT score ≥50 and 3 patients had mild AA with baseline SALT score <10. There was little difference in the treatment response between these subgroups (see Table 2). Overall, 63% (5/8) of children with severe AA and 67% (2/3) with mild AA achieved over 50% improvement in SALT score from baseline; 25% (2/8) and 33% (1/3) achieved SALT score 0 in each subgroup respectively. Five patients had severe AA with a SALT score >97 at baseline. Among these, 1 achieved complete regrowth (Figure 1), 1 had no regrowth, 1 responded significantly (change in SALT score: 70%), 1 responded moderately (change in SALT score: 34%) and 1 responded modestly (change in SALT score: 5%).

Tofacitinib was used in conjunction with other medications in all patients. All patients received OM. Other concomitant treatments included clarithromycin (n=7) and topical steroids (n=9). Seven patients (1 non-responder and 6 responders) received courses of prednisolone at some point during their treatment with a mean maximum dose of 8.75 mg daily, tapered over a median duration of 12 weeks. Details of concomitant medication are given in supplementary table 1.

Most adverse events were mild, transient and included elevation in AST and ALT (n=5), eosinophilia (n=5), hypercholesterolemia (n=3), elevated urea (n=3), hyperkalemia (n=3), low total protein (n=1), elevated triglycerides (n=1) and one patient had persistent, asymptomatic hyperbilirubinemia. No patients required tofacitinib to be interrupted or ceased due to laboratory abnormalities. One patient ceased tofacitinib due to self-limiting unilateral lower leg pain (diagnosed as reflex sympathetic dystrophy). Blood and X-ray investigation at a local hospital at the time were unremarkable. Though tofacitinib was not considered to be implicated, it was not reintroduced. Three patients experienced mild upper respiratory infections. No other infections occurred. At the time of writing, 7 patients were continuing treatment. Clinical and treatment details of each patient are available in Supplementary Table 1.

DISCUSSION

Previous clinical trials and case series have demonstrated the efficacy and safety of tofacitinib in adults with moderate to severe AA.[2,4,14,15] These studies reported 32-58% of adult patients achieved greater than 50% change in SALT score from baseline,[2,15] consistent with the findings in our cohort (63.6%). We found an overall median change in SALT score of 67.7%, which is similar to the change reported in adults (64.7%)[15] but lower than the 93% change reported in a small cohort of adolescent patients.[13] This latter study reported a lower response rate amongst adolescents (69%) than we saw in our pre-adolescents (82%) which is similar to the rate reported in adults of between 64 and 77%.[2,15]

To our knowledge there have been only two previous small case series looking at systemic tofacitinib in preadolescent children with AU/AT.[16,17] These studies used similar tofacitinib doses to our cases (0.13-0.30 mg/kg/day) in groups of four and three patients, respectively. Across both series, 71% (5/7) achieved over 50% improvement in SALT score from baseline compared with 40% (2/5) in our AU/AT patients. The responses in the aforementioned reports ranged from complete regrowth in two patients to 76-99% change in SALT score in 1 patient, 51-75% change in SALT score in 2 patients, 25-50% change in SALT score in 1 patient, and one non-responder (<5% change in SALT score).[16,17] This spectrum of response was demonstrated in our series across more patients with different AA phenotypes and the time to response observed was also similar. When our patients were stratified by baseline SALT score (greater or less than 50), the response rate was similar.

Taken together, our findings are consistent with existing data (amongst adults and adolescents) to support the potential effectiveness of tofacitinib in the preadolescent population. However, our study is limited by several factors: the retrospective nature, small sample size, referral bias to a specialist hair clinic and lack of a control group. The most significant limitation is the use of concomitant medication. Clarithromycin was used to augment the bioavailability of tofacitinib as it inhibits its hepatic metabolism.[18,19] Low doses of oral minoxidil (OM) were given to all patients, though the majority of patients (64%, 9/14) had previously been treated with OM without significant hair regrowth. A study in 1987 demonstrated that OM (5mg twice daily) led to hair regrowth in 20% of patients with AA.[20] Since then, it has been shown to be efficacious and safe in various hair loss disorders, mostly androgenic alopecia.[21] A recent case series reported combination of tofacitinib with OM may be more effective than tofacitinib monotherapy in adults with severe AA.[22] Notably, the doses of OM used were much higher than in our cohort. Furthermore, some patients in our cohort had systemic prednisolone, typically at time of tofacitinib commencement. In our clinical experience and consistent with existing reports, it can take 3-6 months for tofacitinib action to manifest.[13] Thus, prednisolone was initiated to prevent destabilization whilst awaiting tofacitinib to take effect. The concomitant use of prednisolone may be beneficial for patients who do not

demonstrate a sustained response on tofacitinib or in addition to tofacitinib to accelerate hair regrowth. Notably, previous studies have not shown a significant benefit of pulsed prednisolone in the treatment of AT or AU.[23,24]

There is still limited data regarding the long-term safety of tofacitinib in the pediatric population. Recognized common adverse effects seen in adults include infections, typically upper respiratory tract infections (URTI), headaches, gastrointestinal upset and transaminitis.[2,15,25,26] The initial results of a clinical trial studying efficacy of tofacitinib in pediatric patients with juvenile idiopathic arthritis (NCT02592434) has recently provided some insight into safety for children.[27] The doses used in this trial ranged from 0.25-0.8 mg/kg/day which is higher than in our cohort. The most common reported adverse events over the 44-week study period are those aforementioned. Elevated AST and ALT, eosinophilia, hyperkalemia, elevated triglycerides and cholesterol, as seen in our study, were reported. The postulated complications of having elevated cholesterol and triglycerides already in preadolescence include atherosclerosis and premature cardiovascular disease. This could be mitigated with diet and lifestyle recommendations as well as cholesterol lowering medication. Arguably, recurrent courses of systemic corticosteroids during preadolescence and into adulthood will have many more short and long-term side effects. The long-term cardiovascular impact of tofacitinib is currently unclear and further trials exploring long-term safety of tofacitinib in patients with juvenile idiopathic arthritis (NCT01500551) will be informative.

In the absence of sponsored, prospective clinical trials of JAKi in young children, retrospective studies, such as this one, and case series provide useful information to guide clinical practice. A recent international expert consensus study also identified the need to develop a global AA registry to facilitate collection of coherent data regarding existing and emerging therapies to better assess safety and effectiveness.[28] This is particularly important in the preadolescent population, where evidence is limited.

In this study, tofacitinib was well tolerated, 82% of patients experienced some hair regrowth and 63.6% of patients experienced over 50% improvement in their SALT scores. The results indicate a role for tofacitinib as a systemic therapy in AA in the preadolescent population and corroborate findings from prior larger studies in adolescents and adults. Larger prospective studies to ensure long-term safety with use of JAKi in children, as well as patient reported quality of life assessments, are still required.

REFERENCES

1. Kostovic K, Gulin SJ, Mokos ZB, Ceovic R. Tofacitinib, an oral janus kinase inhibitor: perspectives in dermatology. *Curr Med Chem*. 2017;24(11):1158-1167.

2. Kennedy Crispin M, Ko JM, Craiglow BG, et al. Safety and efficacy of the JAK inhibitor tofacitinib citrate in patients with alopecia areata. *JCI Insight*. 2016;1(15):e89776.

3. Xing L, Dai Z, Jabbari A, et al. Alopecia areata is driven by cytotoxic T lymphocytes and is reversed by JAK inhibition. *Nat Med*. 2014;20(9):1043-1049.

4. Liu LY, King BA. Tofacitinib for the treatment of severe alopecia areata in adults and adolescents. *J Investig Dermatology Symp Proc*. 2018;19(1):S18-S20.

5. Lee HH, Gwillim E, Patel KR, et al. Epidemiology of alopecia areata, ophiasis, totalis, and universalis: A systematic review and meta-analysis. *J Am Acad Dermatol*. 2020;82(3):675-682.

6. Kyriakis KP, Paltatzidou K, Kosma E, Sofouri E, Tadros A, Rachioti E. Alopecia areata prevalence by gender and age. *J Eur Acad Dermatology Venereol*. 2009;23(5):572-573.

7. Ikeda T. A new classification of alopecia areata. *Dermatology*. 1965;131(6):421-445.

8. Cranwell WC, Lai VWY, Photiou L, et al. Treatment of alopecia areata: an Australian expert consensus statement. *Australas J Dermatol*. 2019;60(2):163-170.

9. Lai VWY, Chen G, Gin D, Sinclair R. Systemic treatments for alopecia areata: a systematic review. *Australas J Dermatol*. 2019;60(1):e1-e13.

10. Liu LY, King BA, Craiglow BG. Alopecia areata is associated with impaired health-related quality of life: a survey of affected adults and children and their families. *J Am Acad Dermatol*. 2018;79(3):556-558.e1.

11. Sinclair RD. Alopecia areata and suicide of children. *Med J Aust*. 2014;200(3):145.

12. Olsen E, Hordinsky M, McDonald-Hull S, et al. Alopecia areata investigational assessment guidelines. *J Am Acad Dermatol*. 1999;40(2 Pt 1):242-246.

13. Craiglow BG, Liu LY, King BA. Tofacitinib for the treatment of alopecia areata and variants in adolescents. *J Am Acad Dermatol*. 2017;76(1):29-32.

14. Ibrahim O, Bayart CB, Hogan S, Piliang M, Bergfeld WF. Treatment of alopecia areata with tofacitinib. *JAMA Dermatol*. 2017;153(6):600-602.

15. Liu LY, Craiglow BG, Dai F, King BA. Tofacitinib for the treatment of severe alopecia areata and variants: a study of 90 patients. *J Am Acad Dermatol*. 2017;76(1):22-28.

16. Craiglow BG, King BA. Tofacitinib for the treatment of alopecia areata in preadolescent children. *J Am Acad Dermatol*. 2019;80(2):568-570.

17. Dai YX, Chen CC. Tofacitinib therapy for children with severe alopecia areata. *J Am Acad Dermatol*. 2019;80(4):1164-1166.

18. Xeljanz and Xeljanz XR (tofacitinib) package insert. New York, NY: Pfizer, Inc.; 2019 Dec.

19. Biaxin (clarithromycin) package insert. North Chicago, IL: AbbVie, Inc.; 2019 Sep.

20. Fiedler-Weiss VC, Rumsfield J, Buys CM, West DP, Wendrow A. Evaluation of oral minoxidil in the treatment of alopecia areata. *Arch Dermatol*. 1987;123(11):1488-1490.

21. Randolph M, Tosti A. Oral minoxidil treatment for hair loss: a review of efficacy and safety. *J Am Acad Dermatol*. 2020;S0190-9622(20)32109-5.

22. Wambier CG, Craiglow BG, King BA. Combination tofacitinib and oral minoxidil treatment for severe alopecia areata. *J Am Acad Dermatol*. 2019;S0190-9622(19)32688-X.

23. Friedland R, Tal R, Lapidoth M, Zvulunov A, Amitai D Ben. Pulse corticosteroid therapy for alopecia areata in children: a retrospective study. *Dermatology*. 2013;227(1):37-44.

24. Smith A, Trüeb RM, Theiler M, Hauser V, Weibel L. High relapse rates despite early intervention with intravenous methylprednisolone pulse therapy for severe childhood alopecia areata. *Pediatr Dermatol*. 2015;32(4):481-487.

25. Cohen S, Radominski SC, Gomez-Reino JJ, et al. Analysis of infections and all-cause mortality in phase II, phase III, and long-term extension studies of tofacitinib in patients with rheumatoid arthritis. *Arthritis Rheumatol*. 2014;66(11):2924-2937.

26. Bachelez H, Van De Kerkhof PCM, Strohal R, et al. Tofacitinib versus etanercept or placebo in moderate-to-severe chronic plaque psoriasis: a phase 3 randomised non-inferiority trial. *Lancet*. 2015;386(9993):552-561.

27. Efficacy study of tofacitinib in pediatric JIA population. ClinicalTrials.gov Identifier: NCT02592434. https://clinicaltrials.gov/ct2/show/results/NCT02592434?term=NCT02592434&draw=2&rank=1&view=results. Published 2020. Accessed May 1, 2020.

28. Meah N, Wall D, York K, et al. The Alopecia Areata Consensus of Experts (ACE) study: results of an international expert opinion on treatments for alopecia areata. *J Am Acad Dermatol*. 2020;83(1):123-130.

	All patients, n=14	Patients who completed minimum 6 months treatment, n= 11			
		Responders, n=9	Non-responders, n=2	Patients with baseline SALT≥50, n=8	Patients with baseline SALT<50, n=3
Age, y, median (range)	9.5 (7-11)	9 (7-11)	8 (8)	9 (7-11)	8 (7-11)
Sex, n (%)					
Male	7 (50)	4 (44)	1 (50)	4 (50)	2 (67)
Female	7 (50)	5 (56)	1 (50)	4 (50)	1 (33)
Age of AA onset, y, median (range)	6 (2-10)	6 (3-10)	4.5 (2-7)	5.5 (3-8)	6 (2-10)
Duration of disease, y, median (range)	2.5 (<1-6)	3 (1-6)	3.5 (1-6)	3.5 (1-6)	1 (1-6)
Subtype, n (%)					
Patchy AA	6 (43)	5 (56)	1 (50)	3 (37.5)	3 (100)
Diffuse AA	1 (7)	0	0	0	0
AT	4 (29)	2 (22)	1 (50)	3 (37.5)	0
AU	2 (14)	2 (22)	0	2 (25)	0
Eyebrow only	1 (7)	*Patient with eyebrow only AA not included*			
Nail disease, n (%)	4 (29)	2 (22)	1 (50)	2 (25)	1 (33)
Autoimmune comorbidities, n (%)	1* (7)	1* (10)	0 (0)	1* (12.5)	0
Atopic disease, n (%)	6 (43)	3 (30)	2 (100)	4 (50)	1 (33)

Family history of AA, n (%)	1 (7)	1 (1)	0 (0)	1 (12.5)	0

Table 1: Patient characteristics

* Coeliac disease

Abbreviations: AA, Alopecia Areata; AT, Alopecia Totalis; AU, Alopecia Universalis; y, years.

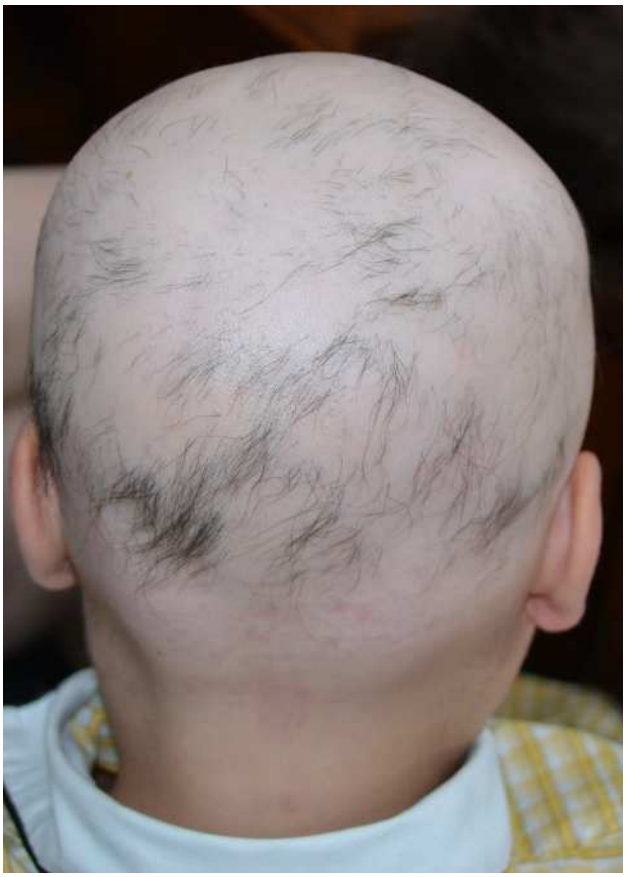
Table 2: Clinical characteristics and outcomes for all patients who completed minimum 6 months treatment*

	Overall, n=11	**Responders, n=9**	**Non-responders, n=2**	**Patients with baseline SALT≥50, n=8**	**Patients with baseline SALT<50, n=3**
Initial SALT score – median; mean (range)	74; 64.7 (6-100)	74; 67.4 (6.2-100)	53; 53 (6-100)	99; 86.6 (60-100)	6.2; 6.4 (6-7)
Most recent SALT score – median; mean (range)	26; 33.4 (0-100)	18; 26.3 (0-95)	65; 65 (30-100)	28; 41.9 (0-100)	2; 10.7 (0-30)
% change in SALT score (%)-median; mean (range)	67.7; 19.1 (-400-100)	70; 67.8 (5-100)	-200; -200 (-400-0)	63.7; 55.3 (0-100)	67.7; -77.4 (-400-100)
% change in SALT score of <5%, n (%)	2 (18)	-	2 (100)	1 (12.5)	1 (33)
% change in SALT score: 5-25%, n (%)	1 (9)	1 (11)	-	1 (12.5)	0
% change in SALT score: 26-50%, n (%)	1 (9)	1 (11)	-	1 (12.5)	0
% change in SALT score: 51-75%, n (%)	3 (27)	3 (33)	-	2 (25)	1 (33)
% change in SALT score: 76-100%, n (%)	4 (36)	4 (44)	-	3 (37.5)	1 (33)
Treatment duration, m – median; mean	9; 14.7 (7-38)	15; 16.2 (7-38)	8; 8 (7-9)	12; 15.4 (8-38)	7; 13.0 (7-25)

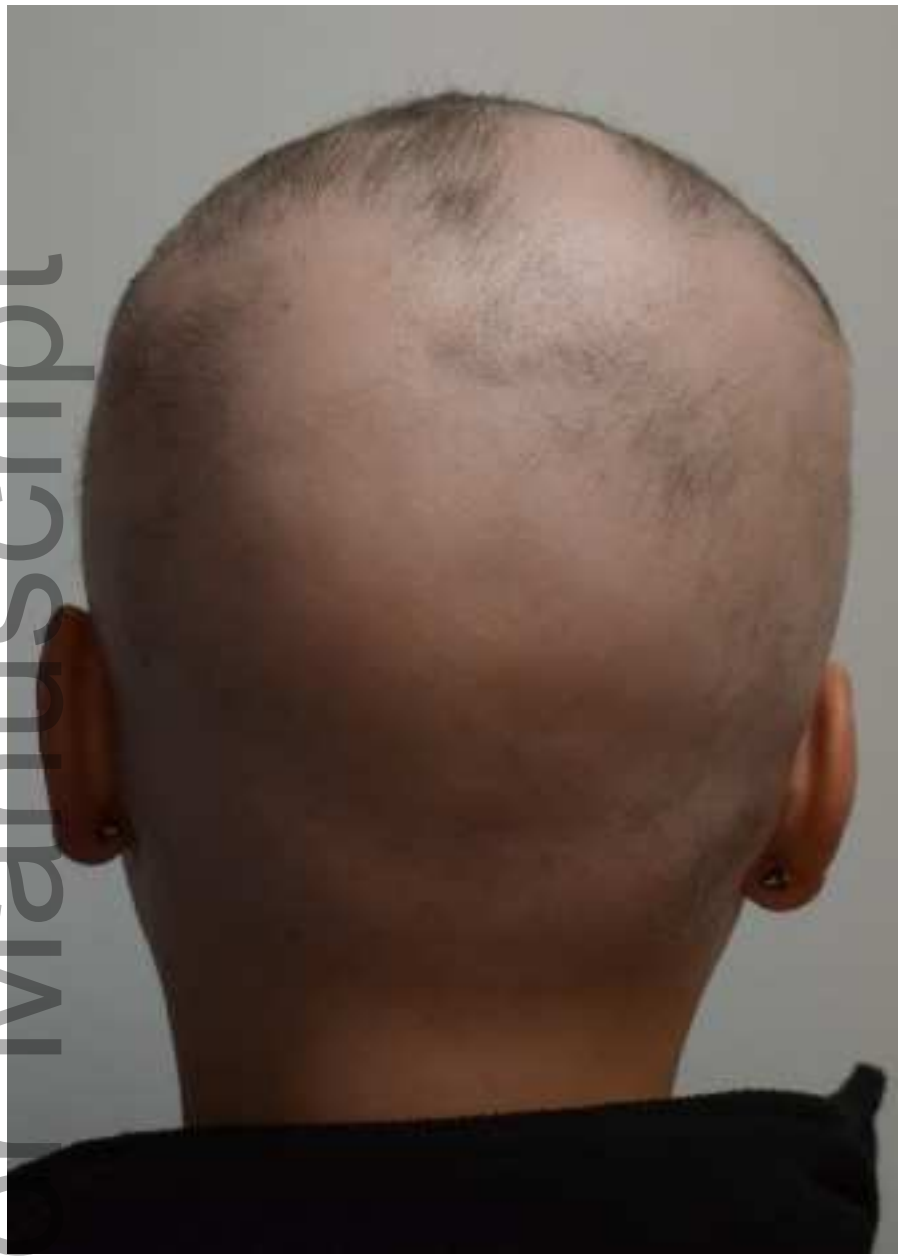
(range)					

*Patient with eyebrow AA (n=1) and patients who completed less than 6 months of treatment (n=2) were excluded from this analysis

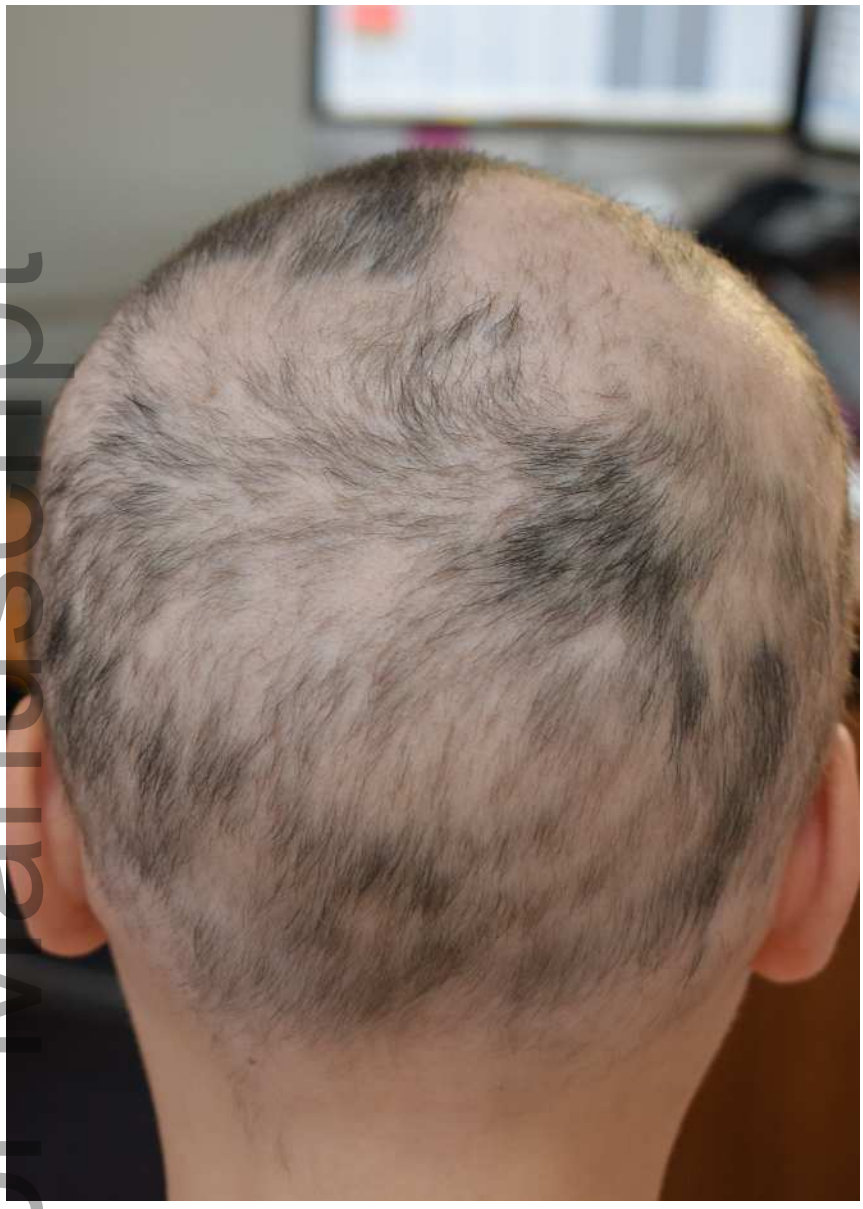
Abbreviations: SALT, Severity of Alopecia Tool; m, months.



pde_14422_f1a.jpg



pde_14422_f1b.jpg



pde_14422_f1c.jpg

pde_14422_f1d.jpg