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To Study Dermoscopic Findings in Alopecia Areata

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Alopecia areata is a common chronic autoimmune inflammatory disease that involves hair follicles, characterized by hair loss on the scalp and/or body without scarring. Clinically, the disease presents as smooth, patchy hair loss with various patterns - diffuse or reticulate alopecia, ophiasis, ophiasis inversus, alopecia totalis (loss of hair all the scalp), or alopecia universalis (loss of hair all over the body). Clinical diagnosis of AA is made based on typical pattern of hair loss and the presence of characteristic exclamation mark hair in microscopy. Invasive (punch biopsy) techniques are often required in some cases where the clinical diagnosis is not straight forward Biopsy shows peribulbar lymphocytic infiltrates in a "swarm of bee pattern" which is characteristic of the acute stage of the disease.
Dermoscopy is an imaging instrument that immensely magnifies surface features of skin lesions. It works on the principle of illumination and transillumination of skin with different light sources and studying it with a high magnification lens. Dry dermoscopy was done with heine delta 20 dermoscope which was followed by wet dermoscopy. Liquid paraffin was used as the immersion media. It is a noninvasive, repeatable, recordable bedside investigation.
Objective: To study dermoscopic findings in alopecia areata.
Materials and Methods: Study Design: Cross sectional study; Study Area: Skin Outpatient Department, Sree Balaji Medical College and Hospital; Study Population: All patients with hair loss, attending skin OPD, who are clinically diagnosed as Alopecia Areata; Study Method: Observational study; Sample Size: 30.

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Results: Clinically, the disease presents as smooth, patchy hair loss with various patterns**.** Dermoscopy is useful for diagnosis of AA clinically by the presence of cadaverized hairs (black dots), circle hair, coudablity hair, exclamation mark hairs (tapering hairs), broken hairs, yellow dots and clustered short vellus hairs in the hair loss areas. The results wear tabulated.

Keywords: Alopecia areata; dermoscopy; autoimmune inflammatory disease.

1. INTRODUCTION

Alopecia areata is a common chronic autoimmune inflammatory and non-scary disease which involves hair follicles. It is characterized by hair loss on the scalp and/or wherever the hair is present on the body [1]. The chance of occurring is 2% in their lifetime of an individual [2]. The chance of occurring is 40% higher in younger individuals aged below 30 years [3].

Clinically, Alopecia areata is differentiated into patchy alopecia, diffuse alopecia, reticulate alopecia, ophiasis, ophiasis inverses(loss of hair in the shape of wave) alopecia totalis or alopecia universalis (loss of all hairs) and perinevoid [4]. Most commonly around 3% to 30% of patients shows nail changes(diffuse fine nail pitting, longitudinal ridging, thin and brittle finger and toenails, and trachyonychia) [3]. Since it is an autoimmune disorder, sudden hair regrowth may occur at any time within the year of hair loss [1]. The immune system is a major player, with T cells and a collapse of the physiological immune privilege (IP) of the hair follicle (HF) [5] plays a critical role in the pathophysiology of alopecia areata [6]. The HF represents a site of relative IP, because defined regions of its epithelium (bulge, bulb) do not express MHC class I and class II molecules, and because a number of immunoinhibitory cytokines and neuropeptides create an immunoinhibitory milieu. Even the few intraepithelial Langerhans cells found within the HF epithelium below its stem cell region, the bulge, are immunologically impaired, as they fail to express MHC class II [7]. This collapse of immune privilege (IP) of the hair follicle is a cause for autoimmunity to occur, is a widely accepted theory [8]. This IP collapse, which can most effectively be induced by IFN-γ or substance P presumably leads to changes in the quality and quantity of the expressed self-antigen repertoire, rendering HFs, which now ectopically express MHC class I-presented autoantigens, vulnerable to anti-self-immune reactivity.

Clinical diagnosis of Alopecia areata is based on the typical pattern of hair loss, and the presence of characteristic exclamation mark hair in microscopy. In some cases, if clinical features are not the clear invasive method (punch biopsy) may need to be used for diagnosis. The dermoscopic method has been proposed as an alternative to avoid punch biopsy, especially in adolescent girls and children, in which acceptability of punch biopsy may be very low. Many recent studies have explored the utility of noninvasive diagnosis dermoscopy in the diagnosis of Alopecia Areata. Apart from these flow cytometry-based measurement of various inflammatory markers like IFN-γ, IL-13, IL-9, IL-17, and IL-22 cytokines in $CD4^+$and $CD8^+$ T cells have been used to supplement or confirm the clinical diagnosis. Inducible co-stimulator molecule (ICOS) and HLA-DR, which are used to define mid- and long-term T-cell activation are also proposed as potential diagnostic markers in Alopecia areata [9].

1.1 Dermoscopy

Dermoscopy is a non-invasive imaging technique which shows the magnified lesions on the surface of the skin. Skin surface microscopy for pigmented lesions was initially described in the first half of the 20^{th} century based on earlier work done on colposcopy for visualisation of the cervical region. A couple of decades later, the use of oil-immersion fluid as an interface to improve skin surface visualisation and the use of the same for the diagnosis of pigmented lesions was described. Large dedicated dermoscopic devices were first used in the late 1980s, and hand-held devices started to be developed for the same in the early 1990s.

Dermoscopy is usually performed with Heine Delta 20 dermoscope, which usually have a magnification of around ×10 to ×20. The same can be used to take photographs by connecting them to a wide variety of cameras. Dermoscopy worked with the principle of illumination and transillumination of skin with different light sources and observed under the high magnifying lens. Most of the light is scattered due to the

reflective property of the stratum cornium. In order to overcome this problem, fluid (liquid paraffin) medium is used as an interface, and a transparent glass contact plate is used for clear vision. Use of cross-polarized light is another method for this purpose. Both the methods allow looking at the clear image of a deeper section of the skin. Advanced dermoscopes are also increasingly available with polarised light allowing contact and non-contact dermoscopy.

The usual findings in dermoscopy assessment of patchy Alopecia areata include exclamation mark hairs and proximal tapering hairs [10]. Even though there are studies assessing the utility of dermoscopy in Alopecia areata, the correlation of dermoscopic features with the severity of disease has not been looked into by many previous studies on AA. Elucidation of dermoscopic features that are highly correlated with severe disease could help in developing dermoscopic predictors of severe disease or poor prognosis [3]. The scarcity of studies on the subject is even more conspicuous on the Indian population. Hence there is a strong need to conduct studies evaluating the correlation between dermoscopy and clinical findings. This may enhance the quality of available evidence on the subject and may aid in evidence-based clinical practice. This is even more essential in resource-poor settings like India, where facilities for advanced and invasive interventions may not be accessible to a large section of the affected patients. Hence the present study was conducted to fill this knowledge gap.

Fig. 1. Vellus hair and broken hair

Fig. 2. Vellus hair

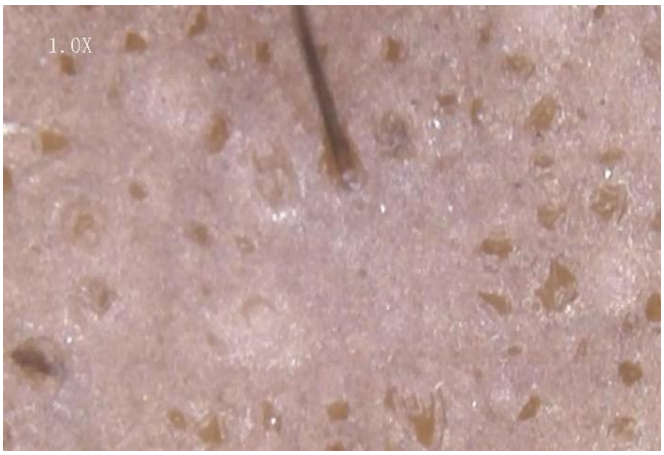

Fig. 3. Yellow dots

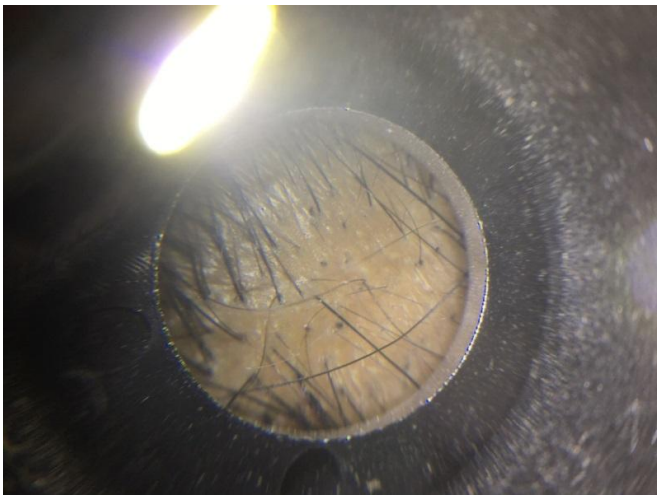

Fig. 4. Black dots

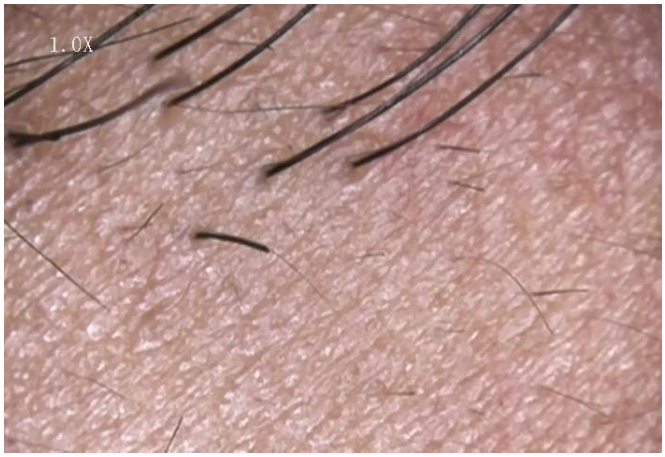

Fig. 5. Broken hair

2. MATERIALS AND METHODS

Study Design: Cross sectional study.

Study Area: Skin Outpatient Department, Sree Balaji Medical College and Hospital.

Study Population: All patients with hair loss, attending skin OPD, who are clinically diagnosed as Alopecia Areata.

Study Method: Observational study.

Sample Size: 30.

3. RESULTS AND DISCUSSION

Our study results show that the mean age was 25.1 ± 11.75 in the study population, the minimum age was 3 and the maximum age was 46 in the study population (95% CI 20.63 to 29.57). Senior, S.C, at al said that the mean age was 26.2 years which is close to our results A similar results are seen in case-control study, conducted by Park, J., et al and Shim, WH., et al. among alopecia patients and reported ,the mean age was 34.0±18.2 and 30 years respectively which is higher than our results.

Our study results shown that, 5 (16.7%) participants were aged up to 9 years, 2 (6.4%) participants were aged 10 to 19 years, 10 (33.30%) participants were aged 20 to 29 years, 10 (33.30%) participants were 30 to 39 years and 3 (10%) participants were 40 and above among our results it is seen that 90% of the study people belong to age below 40 years only 10% belongs to above 40 years similar results were shown in Sharma, V K., et al in his prospective, hospital-based study among 808 patients and concluded that 88% of the study population belonged to below 40years of age which is similar to our results.

Our study results showed that 18 (60%) participants were male remaining 12 (40%) participants were female participants. Similar results were seen in Sharma, V K. et al. in his prospective, hospital-based study and noticed that chance of development of alopecia areata in males having a risk of 2 folds more than females whereas Shim WH et al. noticed that development of alopecia areata is more often to females than males.

Whereas 14 (46.70%) participants had single patch, 9 (30%) participants had multiple patches, totally 76.70% were reported with patches, which is less than 50 per cent in the study conducted by Park, J., et al., 33%, in the same study reported 2.8% of population were reported with ophiasis which is similar to our results with 3 (10%) participants, similarly alopecia universalis (7%), diffuse which is double than our results with (3.30%), 3 (10%) of participants Senila, S.C, et al reported that 68.8% of the study population were reported with patches and similarly 8 patients (25%) had alopecia universalis.

Our results concluded that 24 (80%) participants had no nail involvement and 6 (20%) participants had some nail involvement. Similar results were noticed in Sharma, V K., et al in his perspective, the hospital-based study reveals that 20% of the study population developed in nails.

Among the study population, 10 (33.30%) participants had yellow dots which is one of the symptoms and are reported as a specific finding of Alopecia areta. Similar results are seen in a study conducted by Park, J et al. among 327 patients and reported 34.6% of the study population which is close to our results whereas Shim, WH. et al. in his study concluded that 60% study population had yellow dots which is double than our report and reported 80% in a prospective study to evaluate various dermoscopic patterns by Guttikonda, A et al.

Black dots are believed to be remnants of hair shafts arising from tapering hairs Among the study population, 11 (36.70%) participants had black dots whereas Park, J., et al reported as 50.5% which is higher that1.5times than our results whereas Shim, WH., et al. reported 42% of the study population have black dots, and 58% were reported by Guttikonda, A et al. with their team contribution. Broken hair is one of the symptoms for alopecia areata, and our study results show that 15 (50%) participants had broken hair where a Park, J., et al. and Guttikonda, A et al. also concluded that 44.4% and 56% of the study population were reported with broken hair respectively. Shim, WH., et al. reported only 2% of patients to have broken hair which is very less than compared to others [7].

Among the study population, 11 (36.70%) participants had short vellus hair whereas Park, J., et al and Shim WH et al. reported 59.8% and 48% respectively which is slightly higher than ours, whereas Guttikonda, A et al. reported 66% that seems to be double than our reports. Among

the study population, 7 (23.30%) participants had exclamation mark hairs', could be observed with the naked eye; however, their characteristic feature of the hair shaft towards the hair follicle is more readily perceived with dermoscopy. Under the dermoscopy which is one of the major findings for the diagnosis of alopecia areata a similar study was conducted by a Park J., et al and revealed that 41% of his study population was reported with exclamatory mark hair.

4. CONCLUSION

In the current study, the average age of the study population was 25.1 ± 11.75, which was ranging between 3 to 46 years. But the majority of the study participants were in their second decade and third decade of life. There was a slight male preponderance, as 60% of the participants were male.

Among the study population, 14 (46.70%) participants had a single patch, 9(30%) participants had multiple patches, 3 (10%) participants had diffuse, 3 (10%) participants had ophiasis, and 1 (3.30%) participant had alopecia universalist:

- Among the study popuslation, 21 (70%) participants had S0, no hair loss, 7 (23.30%) participants had S1, <25% hair loss, 1 (3.30%) participant had S3, 51-75% hair loss and 1 (3.30%) participant had S5, 100% hair loss.
- The proportion of subjects showing B1 (Some hair loss) was 6.70%, and 20% had some nail involvement.
- The mean duration of disease was 4.45 ± 11.75 months in the study population, the minimum two months, and the maximum 12 months in the study population.
- Among the study population, 12 (40%) participants had scalp occipital present. And 18 (60%) participants who never had scalp occipital.
- Among the study population, 16 (53.30%) participants had parietal, and 14 (46.70%) participants who never had parietal.
- Among the study population, 10 (33.30%) participants had vertex, 50% of the participants had temporal, 8 (26.70%) participants had a frontal distribution of the disease.
- Among the study population, 10 (33.30%) participants had yellow dots and 20 (66.70%) participants who never had yellow dots.
- Among the study population, 11 (36.70%) participants had black dots and 19 (63.30%) participants who never had black dots.
- Among the study population, 50% of the participants had broken hair.
- Among the study population, 11 (36.70%) participants had short vellus hairs, and 19 (63.30%) participants had no short vellus hairs.
- Among the study population, 7 (23.30%) participants had exclamatory mark hair.
- Among the study population, 16 (53.30%) participants had a good response, 9 (30%) participants had a minimal response and 5 (16.70%) participants had a poor response to treatment.
- In people with yellow dots group, 5 (23.8%) participants never had S0, 3 (42.9%) participants had S1, 1 (100%) participant had S3, and 1 (100%) participant had S5 (100% hair loss).
- Among the block dots group, 7 (33.3%) participants never had S0, no hair loss, 3 (42.9%) participants had S1, <25% hair loss and 1 (100%) participant had S5, 100% hair loss.
- Among the broken hairs group, 9 (42.9%) participants never had S0, no hair loss, 5 (71.4%) participants had S1, <25% hair loss and 1 (100%) participant had S3, 51-75% hair loss.
- Among the short vellus hairs group, 6 (28.6%) participants never had S0 (no hair loss), and 5 (71.4%) participants had S1 (<25% hair loss), among the exclamatory mark hairs group, 5 (23.8%) participants never had S0 (no hair loss) and 2 (28.6%) participants had S1 (<25% hair loss).

CONSENT

As per international standard or university standard written patients' consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard written ethical permission has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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