Section: DVL

Original Research Article

# CLINICO HISTOLOGICAL STUDY OF ALOPECIA AREATA.

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**ABSTRACT**

**Background:** Alopecia areata (AA) is a chronic, immune-mediated disorder characterized by non-scarring hair loss, significantly affecting patients' psychological well-being and quality of life. This study aims to evaluate the clinical presentations of alopecia areata and correlate them with histological findings to enhance diagnostic accuracy and guide therapeutic decisions.

**Materials and Methods:** A cross-sectional, observational study was conducted at Gandhi Medical College for two and half years. One hundred patients with patchy hair loss were enrolled based on predefined inclusion and exclusion criteria. Clinical evaluations included history taking, dermatological examination, and laboratory investigations. Scalp biopsies were performed for histopathological assessment in selected patients.

**Results:** The majority of patients (42%) were aged 21–30 years, with a male-to-female ratio of 58:42. At onset, 85% presented with a single patch of hair loss, and 75% had a duration of less than six months. Eighty percent were asymptomatic, while 20% reported mild itching. Histopathological examination revealed peribulbar lymphocytic infiltrate in acute cases and increase in telogen hair, decrease in anagen hair indicative of chronic disease in others. Nail involvement was noted in 38% of patients.

**Conclusion:** This study emphasizes the heterogeneous nature of alopecia areata, underscoring the importance of integrated clinical and histopathological evaluations for effective diagnosis and management.

**Keywords:** Alopecia Areata, Histopathology, Clinical study.

## INTRODUCTION

Alopecia areata (AA) is a chronic, immune-mediated disorder characterized by non-scarring hair loss. It primarily affects the scalp but can involve any hair-bearing area of the body. The condition has a variable clinical course, ranging from spontaneous recovery to chronic and relapsing episodes, significantly impacting patients' psychological well-being and quality of life. Despite its global prevalence, the pathogenesis of alopecia areata remains incompletely understood, with genetic, environmental, and autoimmune factors playing contributory roles.[4,6,7]

Histologically, alopecia areata demonstrates a characteristic peribulbar lymphocytic infiltrate, often referred to as a "swarm of bees" pattern, targeting the anagen hair follicles. Over time, these changes can progress to include miniaturization of hair follicles, increased telogen-to-anagen ratio, and perifollicular fibrosis in chronic cases. The histopathological findings are integral to understanding the underlying mechanisms and differentiating alopecia areata from other causes of hair loss.[1,2,3]

Clinically, the presentation of alopecia areata varies from localized patches of hair loss to more severe forms, such as alopecia totalis or universalis. Factors such as age of onset, family history, associated autoimmune diseases, and extent of hair loss influence disease severity and prognosis.[5,7,8] Severe

forms have higher recurrence and causes significant psychosocial distress.[12]

The psychosocial burden of severe alopecia areata is profound, with studies reporting high levels of anxiety, depression, and decreased self-esteem among affected individuals. These challenges underscore the need for a comprehensive approach to diagnosis and management, integrating clinical, histological, and psychosocial perspectives.[12]

This study aims to evaluate the clinical presentations of alopecia areata and correlate them with histological findings to enhance diagnostic accuracy, understand disease progression, and guide therapeutic decisions. By bridging the gap between clinical observations and histopathological insights, this study contributes to better understanding of alopecia areata and its management.

## MATERIALS AND METHODS

This is a cross-sectional, observational study conducted to evaluate the clinical and histological features of alopecia areata (AA) in a cohort of patients presenting with patchy hair loss.

The study was conducted at Gandhi Medical College, a tertiary care center, over a period of two and half years. Ethical approval was obtained from the Institutional Review Board (IRB), and written informed consent was secured from all participants prior to inclusion in the study.

A total of 100 consecutive patients were enrolled in the study based on predefined inclusion and exclusion criteria.

**Inclusion Criteria**

1. Patients presenting with patchy hair loss on the scalp or other hair-bearing areas.
2. Absence of clinical signs of inflammation or scarring over the affected areas.
3. Willingness to undergo clinical examination and diagnostic procedures, including histopathological assessment.

**Exclusion Criteria**

1. Presence of secondary infection in the bald patches.
2. Evidence of scarring over the affected areas.
3. Patients with other dermatological or systemic conditions contributing to hair loss (e.g., discoid lupus erythematosus, lichen planopilaris).

**Methodology**

**1. Patient Recruitment and Evaluation**

- Patients meeting the inclusion criteria were identified consecutively from outpatient dermatology clinics.
- A detailed history was obtained, including:
  - Duration and progression of hair loss.
  - Previous episodes of alopecia.
  - Family history of similar conditions or other autoimmune disorders.
  - Associated symptoms such as itching or burning sensation.
  - Precipitating factors.
  - Comorbid conditions (e.g., thyroid dysfunction, vitiligo, or diabetes).
  - Past treatments and their outcomes.

**2. Clinical Examination**

- A thorough dermatological examination was performed to document:
  - Number, size, and distribution of bald patches.
  - Presence of exclamation mark hairs or other characteristic features of AA.
  - Involvement of nails (e.g., pitting, Leukonychia).
  - Scalp condition (e.g., absence of erythema, scaling).
  - Type of Alopecia areata based on Ikeda's classification
- The extent of alopecia was graded using the Severity of Alopecia Tool (SALT) score, when applicable.

**3. Laboratory Investigations**

Routine laboratory investigations were performed to rule out associated systemic conditions and to identify potential contributing factors. These included:

- Complete blood count (CBC).
- Fasting Blood sugar.
- Thyroid function tests.
- Autoimmune markers (e.g., antinuclear antibodies, anti-thyroid antibodies).

**4. Histopathological Examination**

- Scalp biopsy specimens were obtained from the margin of the bald patches under local anesthesia using a 4 mm punch biopsy.
- Vertical sections were made and Specimens were fixed in formalin, processed, and stained with hematoxylin and eosin (H&E).
- Histopathological evaluation focused on:
  - Peribulbar lymphocytic infiltration ("swarm of bees" appearance).
  - Miniaturization of hair follicles.
  - Increased telogen-to-anagen hair follicle ratio.
  - Evidence of follicular dystrophy or fibrosis.

**Statistical Analysis** Clinical and histological data were recorded using a standardized data collection sheet. Descriptive statistics (mean, standard deviation, frequency) were used to summarize demographic and clinical characteristics. Correlation between clinical findings and histopathological features was assessed using appropriate statistical tests (e.g., chi-square test, Pearson correlation). Statistical analysis was performed using SPSS (Version 25.0), with p-values $<0.05$ considered statistically significant.

# RESULTS

**Table 1: Age Distribution**

| Age Group (years) | Number of Patients | Percentage (%) |
|---|---|---|
| <10 | 15 | 15 |
| 11–20 | 22 | 22 |
| 21–30 | 42 | 42 |
| 31–40 | 16 | 16 |
| >40 | 5 | 5 |
| **Total** | **100** | **100** |

The majority of patients (42%) were in the 21–30 years age group, followed by 22% in the 11–20 years group Out of 100 patients, 58% were male, and 42% were female. Alopecia areata onset was more common in females below 10 years of age.

**Table 2: Clinical Presentation in terms of Number of Patches**

| Number of Patches at Onset | Number of Patients | Percentage (%) |
|---|---|---|
| Single Patch | 85 | 85 |
| Multiple Patches | 15 | 15 |
| **Total** | 100 | **100** |

At the onset of the condition, 85% of patients had a single patch, while 15% had multiple patches.

**Table 3: Duration of Condition**

| Duration of Alopecia | Number of Patients | Percentage (%) |
|---|---|---|
| <6 months | 75 | 75 |
| ≥6 months | 25 | 25 |
| **Total** | **100** | **100** |

Most patients (75%) presented with a duration of less than 6 months.80% of patients were asymptomatic and 20% had mild itching,12% had atopy. 35% had a past history of alopecia areata.

**Table 4: Lesion Type and Severity**

| Type of Lesion/Severity | Male | Female | Total | Percentage |
|---|---|---|---|---|
| Single Lesion | 16 | 10 | 26 | 26% |
| Multiple Lesions | 43 | 20 | 63 | 63% |
| Severe Forms | 4 | 7 | 11 | 11 |

**Lesion Type:** 26% had a single lesion, and 63% had multiple lesions. 8% of patients had severe alopecia, including alopecia totalis (1 male.2 female), alopecia universalis (1 male,1 female), Ophiasis (2 female) and extensive alopecia areata (2 male,2 female).

**Table 5: Distribution of patches**

| Area | Simultaneous | | Alone |
|---|---|---|---|
| Scalp | 77 | | 59 |
| Face | 36 | | 15 |
| Body | 13 | | 2 |

Parietal area was commonest to get involved in scalp with 42% followed by Occipital (36%), Temporal (20%), Frontal (18%) Vertex (11%). Based on Ikeda's classification 78% had common type,16% had atopic type,3% had prehypertensive type and 3 % had autoimmune type.

**Table 6: Regional distribution in face and body.**

| Area | Number of Patients | Percentage (%) |
|---|---|---|
| Beard | 21 | 58 |
| Moustache | 4 | 42 |
| Eyebrows | 7 | 7 |
| Eyelashes | 4 | 4 |
| Upper limbs | 3 | 3 |
| Lower limbs | 6 | 6 |
| Axilla | 1 | 1 |
| Pubic hair | 2 | 2 |
| Trunk | 1 | 1 |

**Table 7: Histopathological Findings**

| Histopathological Feature | Acute Stage | Chronic Stage |
|---|---|---|
| Peribulbar Lymphocytic Infiltrate | Present | Minimal |
| Hair Follicle Changes | Normal | Decreased Anagen, Increased Telogen Hair |
| Follicular Miniaturization | Absent | Present |

**Table 8: Nail Changes and Sex Distribution**

| Nail Changes | Male (n=58) | Female (n=42) | Total (n=100) | p-value |
|---|---|---|---|---|
| Present | 22 (37.9%) | 16 (38.1%) | 38 | 0.98 |
| Absent | 36 (62.1%) | 26 (61.9%) | 62 | |
| **Total** | 58 | 42 | **100** | |

Histopathological examination was done in 20 cases. 12 cases of recent onset of less than 3 months showed perifollicular lymphocytic infiltrate. In 8 cases of longer duration of more than 3 months revealed increase in telogen hair, decrease in anagen and perifollicular infiltrate.

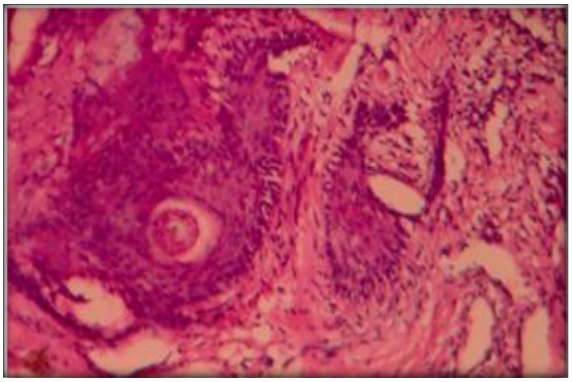

**Figure 1: Alopecia areata -histopathological feature in acute stage. Dense perifollicular lymphocytic infiltrate is seen**

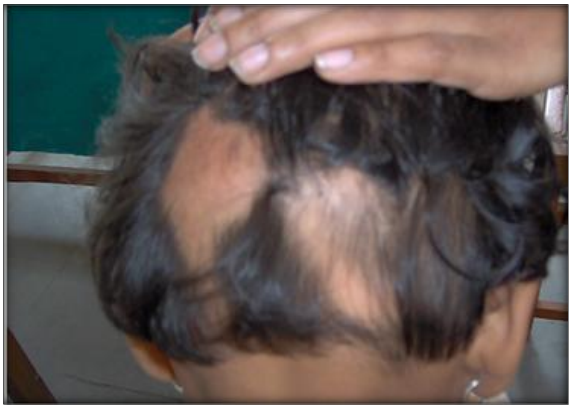

**Figure 2: Alopecia areata with multiple patches**

Nail involvement was more common in patients with severe forms of alopecia as seen in figure 2. Pitting was commonest change (47.4%), Stippled leukonychia (34.2%), Longitudinal bands (26.3%), thinning (15.8%), twenty nail dystrophy was seen in 1 patient. Out of 100 patients 13% had positive family history for alopecia areata,16% had atopy,14% had hypertension and 13% had diabetes. Exclamation mark hair was seen in 26 patients and regrowing hair was grey in 6 patients.

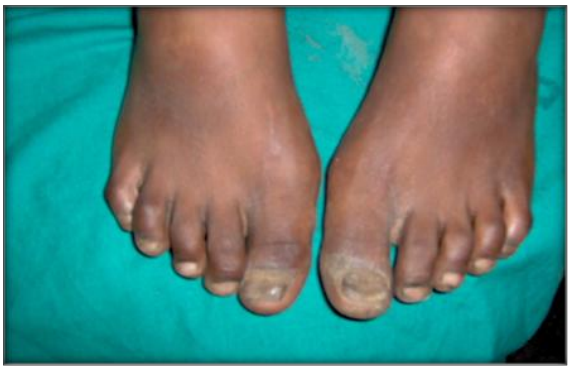

**Figure 2: Twenty nail dystrophy associated with alopecia areata**

## DISCUSSION

This study provides a comprehensive analysis of the clinico-histological features of alopecia areata (AA) in a cohort of 100 patients.

The predominance of patients in the 21–30 years age group (42%) aligns with the understanding that alopecia areata commonly affects young adults. This is comparable with the study conducted by V. K. Sharma[8,9] et al. and Jain et al.(16) which showed 32.3% and 31.5% incidence respectively. The male-to-female ratio observed (58% male, 42% female) is consistent with some studies, though literature indicates variability in sex distribution across different populations. Notably, the higher incidence of onset in females below 10 years of age in the present study (21.4%) warrants further investigation to understand potential gender-related susceptibility factors in early-onset AA as similar finding was observed in other studies.[8,9,15]

A significant majority (85%) of patients presented with a single patch of hair loss at onset, and 75% had a disease duration of less than six months. These findings are indicative of the acute presentation of AA in most cases. The asymptomatic nature of the condition in 80% of patients, with only 20% reporting mild itching, underscores the typically non-inflammatory presentation of AA, corroborating existing clinical descriptions.[7,9,10]

The study found that 12% of patients had a history of atopy, and 35% reported a past history of AA. Association of alopecia areata with atopy was observed in multiple studies.[9,10] In our study no correlation was found between personal history of atopy with severity and age of onset of alopecia areata. Additionally 13% had a family history of alopecia areata more so with severe disease, suggesting a genetic predisposition, which is well-documented in the literature.[8] Hypertension (14%) and Diabetes (13%) occurred more frequently in

family members than in patients themselves. These findings highlight the importance of a thorough personal and family history in the assessment of patients with alopecia areata. While 26% of patients had a single lesion, a notable 63% presented with multiple lesions. Severe forms of AA, including alopecia total is and universalis, were observed in 11% of patients. Parietal area was common area involved in scalp and beard was involved more in face. Similar finding was observed in the study by Gopal.M et al. This distribution emphasizes the variable clinical spectrum of AA, ranging from localized to extensive hair loss.[5]

Nail involvement was observed in 38% of patients, with pitting being the most common manifestation. Significant Correlation was found between severity of alopecia areata and presence of nail changes in our study. This is comparable with the study by Gandhi et al.[13] which showed nail involvement in 44% and pitting being common. This is consistent with previous studies that have reported nail changes in AA patients, suggesting that nail examination should be an integral part of the clinical assessment.

A study by Catherine M [1,4] highlighted that the histopathological features of AA vary with the acuity of hair loss in the area biopsied, with acute disease commonly showing a dense peribulbar lymphocytic infiltrate. This aligns with histopathological findings in our study wherein peribulbar lymphocytic infiltrate was seen in 12 out of 20 cases with duration of disease less than 3 months., a hallmark feature of AA. In chronic cases, there was a decrease in anagen hair and an increase in telogen hair, along with follicular miniaturization. Additionally, a descriptive studies on the histopathological features of alopecias emphasized the importance of scalp biopsies in distinguishing between noncicatricial and cicatricial alopecias supporting the relevance of histopathological evaluation in our study.[1,2,3,14]

**Limitations and future directions**

While this study provides valuable insights, it is limited by its cross-sectional design and doesn't include dermoscopy findings, treatment response and the lack of long-term follow-up. Future studies with larger sample sizes and longitudinal follow-up are required for better understanding of the natural history of AA and the factors influencing disease progression and response to treatment.

## CONCLUSION

This study emphasizes the heterogeneous nature of alopecia areata, highlighting the importance of comprehensive clinical and histopathological evaluation in the diagnosis of the condition. The findings are consistent with existing literature and contribute to the knowledge on the clinico-histological spectrum of AA.

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