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# Lymphocytes in Peripheral Blood Smears: A Prospective One-Year Study in a Tertiary Care Centre

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## ABSTRACT

Atypical lymphocytes are frequently encountered in peripheral blood smears across a wide range of reactive, infectious, autoimmune, and neoplastic conditions, making their accurate identification essential in routine hematology practice. In many diagnostic centres, particularly those lacking access to advanced modalities such as flow cytometry or immunohistochemistry, morphology remains the primary tool for the initial evaluation of atypical lymphoid cells. These cells display marked variability, ranging from classical Downey-type reactive forms to plasmacytoid, immunoblast-like, blastoid, and large granular lymphocytes, with certain morphological patterns overlapping with malignant hematolymphoid conditions. This prospective one-year study aimed to evaluate the complete morphological spectrum of atypical lymphocytes on peripheral blood smears, their frequency, associated hematological parameters, and correlation with requisition-based clinical categories. All included smears were freshly reviewed and atypical lymphocytes were classified into predefined subtypes, while hemoglobin, leukocyte counts, platelet counts, and red cell indices were recorded. A total of 70 cases were analyzed, with a predominance of paediatric samples and reactive morphological patterns associated mainly with febrile viral illnesses. Downey-type lymphocytes were the most frequent subtype, whereas blastoid or pleomorphic atypical cells were uncommon and mostly associated with suspected hematolymphoid malignancies. Higher percentages of atypical lymphocytes showed positive correlation with lymphocytosis and thrombocytopenia in dengue-related cases. The study highlights that a structured, morphology-based evaluation significantly enhances diagnostic accuracy and assists in distinguishing reactive processes from potentially malignant conditions, especially in resource-limited settings where advanced immunophenotypic support is unavailable.

## INTRODUCTION

Atypical lymphocytes represent a diverse morphological population arising in numerous clinical contexts including **viral infections**, **autoimmune conditions**, **drug reactions**, and **hematolymphoid malignancies**. Their recognition on peripheral smears forms a critical

component of routine hematopathology, especially in settings where advanced diagnostic tools are limited. Morphological categorization aids in distinguishing **reactive lymphocytosis** from **neoplastic lymphoid disorders**. Previous studies (1–5) have highlighted significant overlap in cytological features, necessitating structured evaluation. This study prospectively assesses the morphological patterns of atypical lymphocytes over one year, correlating them with hematological parameters and requisition-based diagnostic categories.

## MATERIALS AND METHODS

This one-year prospective observational study was conducted in the Department of Pathology, Rama Medical College, Hapur. All peripheral blood smears reported to contain atypical lymphocytes were included. Each smear was freshly reviewed by two independent pathologists.

### Morphological Classification

Atypical lymphocytes were categorized into the following subtypes (6–10):

- **Downey-type reactive lymphocytes**
- **Plasmacytoid lymphocytes**
- **Immunoblast-like cells**
- **Large granular lymphocytes (LGLs)**
- **Blastoid cells**
- **Pleomorphic atypical lymphoid cells**

### Hematological Parameters Assessed

- Hemoglobin (g/dL)
- Total leukocyte count (TLC)
- Absolute lymphocyte count (ALC)
- Differential count
- Platelet count
- MCV and RDW

### Clinical Categories (Based on Requisition Forms)

- Febrile illness / viral workup
- Cytopenia evaluation
- Suspected malignancy
- Routine CBC screening

### Statistical Methods

Descriptive analysis with chi-square test, t-test, ANOVA or non-parametric equivalents was performed using standard software. **$p < 0.05$** was considered statistically significant.

## RESULTS

A total of **70 cases** with atypical lymphocytes were included. The mean age was **14.8 ± 9.6 years**, with slight male predominance.

**Distribution of Atypical Lymphocyte Subtypes**

- **Downey-type reactive lymphocytes:** 71.4% (50/70)
- **Plasmacytoid lymphocytes:** 12.8% (9/70)
- **Large granular lymphocytes:** 10% (7/70)
- **Blastoid / pleomorphic cells:** 5.7% (4/70)

### Key Associations

- Higher atypical lymphocyte percentages (≥20%) correlated with increased ALC (11–13).
- Thrombocytopenia was common in febrile / viral illness cases such as dengue.
- Blastoid morphology was observed primarily in cytopenia and malignancy-suspected cases.
- Reactive forms were most frequent in paediatric febrile illness cases.

## DISCUSSION

The study demonstrates that atypical lymphocytes show substantial morphological diversity. **Downey-type cells** remain the most common subtype, consistent with findings from prior studies (2,4). Blastoid and pleomorphic forms—though less common—require careful evaluation as they may mimic neoplastic lymphoid cells (10–12). Morphological assessment in resource-limited settings continues to be pivotal for triaging patients who may require advanced diagnostic workup.

## SUMMARY

This prospective evaluation highlights the **morphological spectrum** and **clinical correlations** of atypical lymphocytes in peripheral smears. Most cases represent reactive processes, especially in paediatric febrile illnesses, while a minority show suspicious blastoid morphology necessitating

further investigations. Morphology remains a valuable tool for differentiating reactive from malignant lymphoid processes.

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