



PROSPECTIVE STUDY ON HAEMATOLOGICAL PROFILE IN PULMONARY TUBERCULOSIS

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ABSTRACT

Background: The relationship between pulmonary tuberculosis (PTB) and hematological changes is an area of clinical significance. This study aims to elucidate the specific hematological alterations in PTB patients and the effect of antituberculosis treatment (ATT) on these parameters. **Methods:** Conducted at KVG Medical College and Hospital, Sullia, this 12-month prospective study (January 2023-January 2024) involved 86 PTB patients, both sputum positive and negative as per National Tuberculosis Elimination Programme (NTEP) criteria. Excluded were individuals under 18, with extrapulmonary TB, pregnancy, HIV, chronic diseases, hemoglobinopathies, or anemia treatment. The study focused on hemoglobin levels, white blood cell (WBC) count, and platelet count before and after ATT, utilizing statistical tools like mean \pm standard deviation and chi-square. **Results:** Anemia was prevalent in 78% (n=67) of patients at diagnosis, primarily normocytic normochromic (62%, n=42). WBC count alterations were observed, with leukocytosis in 28% (n=24) and leukopenia in 12% (n=10). Thrombocytosis and thrombocytopenia were present in 18% (n=15) and 11% (n=9), respectively. Post-ATT, anemia prevalence reduced to 48% (n=41), with significant improvement in hemoglobin levels (from mean 9.8 g/dL to 12.6 g/dL, $p < 0.01$). Leukocytosis and leukopenia normalized in 80% of affected patients. Thrombocytosis and thrombocytopenia showed improvement in 73% of cases. **Conclusion:** The study reveals a high incidence of anemia and other hematological abnormalities in PTB patients, which significantly improve post-ATT. These findings advocate for routine hematological monitoring in PTB management and highlight the effectiveness of ATT in correcting hematological derangements.

KEYWORDS : Pulmonary Tuberculosis, Anemia, Hematological Changes, Antituberculosis Treatment, Blood Indices.

INTRODUCTION

Pulmonary Tuberculosis (PTB) remains a major global health challenge, significantly impacting morbidity and mortality rates worldwide. The intricate relationship between PTB and hematological changes has garnered attention for its clinical implications, notably in the efficacy of Antituberculosis Treatment (ATT). Studies have demonstrated notable hematological alterations in PTB patients, including anemia, leukocytosis, and thrombocytosis, which are believed to influence treatment outcomes. The efficacy of ATT in normalizing these hematological parameters further underscores the need for routine blood monitoring in PTB management. This presentation aims to explore the specific hematological changes associated with PTB and the impact of ATT on these alterations, providing a comprehensive overview of current research findings and their practical applications in clinical settings.

Objectives

- To Determine the Prevalence of Hematological Abnormalities in PTB Patients
- To Assess the Impact of Antituberculosis Treatment on Hematological Parameters:
- To Elucidate the Nature of Anemia in PTB Patients

MATERIALS AND METHODS

- **Study Design:** Prospective Observational Study
- **Sample Size:** 86 patients diagnosed with PTB.
- **Study Period:** 1 Year. January 2023 to January 2024
- **Place of Study:** KVG Medical College and Hospital, Sullia

Selection Criteria

Inclusion Criteria:

- Patients diagnosed with pulmonary tuberculosis, both sputum positive and negative, as per the criteria set by the National Tuberculosis Elimination Programme (NTEP).
- Individuals of all genders aged 18 years and above.

Exclusion Criteria:

- Individuals under the age of 18.
- Patients diagnosed with extrapulmonary tuberculosis.
- Pregnant women.
- Patients co-infected with HIV.
- Individuals suffering from chronic diseases that could potentially interfere with the study's outcomes.
- Patients with known hemoglobinopathies.
- Patients already undergoing treatment for anemia at the time of the study.

Methodology

- **Patient Enrollment:** Patients diagnosed with PTB according to National Tuberculosis Elimination Programme (NTEP) criteria were identified and screened for eligibility based on the study's inclusion and exclusion criteria.
- **Initial Assessment:** Upon enrollment, baseline hematological parameters, including hemoglobin levels, white blood cell (WBC) count, and platelet count, were recorded for each participant before the initiation of ATT.
- **Data Recording:** A standardized form was used to record patient demographics, medical history, and specific details related to their PTB diagnosis and treatment plan.
- **Follow-Up Evaluations:** Hematological tests were repeated at predetermined intervals during and after the completion of ATT to monitor changes in the parameters of interest.
- **Data Compilation:** All collected data, including baseline and follow-up hematological values, were compiled in a secure database designed for the study.
- **Statistical Analysis:** The compiled data were analyzed using statistical tools to assess the impact of ATT on hematological abnormalities, comparing pre-treatment and post-treatment values.
- Analysis is performed using SPSS version 24, including descriptive and inferential statistics, with the Shapiro-Wilk test determining normalcy, and appropriate parametric or

non-parametric tests applied.

RESULTS

Table 1: Participants Demographics and Baselines

CHARACTERISTIC	TOTAL PARTICIPANTS (N=86)
AGE (YEARS)	35 ± 12
GENDER	
• Male	56 (65%)
• Female	30 (35%)
SPUTUM STATUS	
• Positive	50 (58%)
• Negative	36 (42%)
CO-MORBIDITIES	
• Diabetes Mellitus	10 (12%)
• Hypertension	8 (9%)

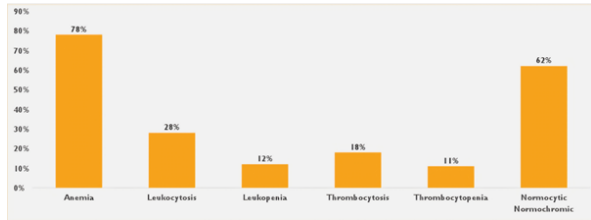


Chart 1: Prevalence of Hematological Abnormalities at diagnosis

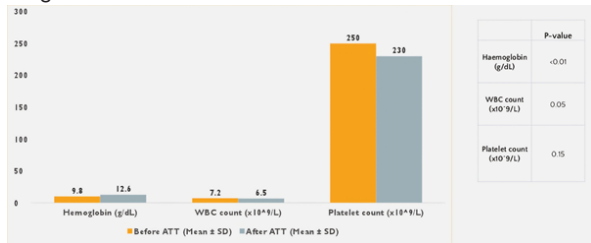


Chart 2: Changes in hematological parameters after ATT

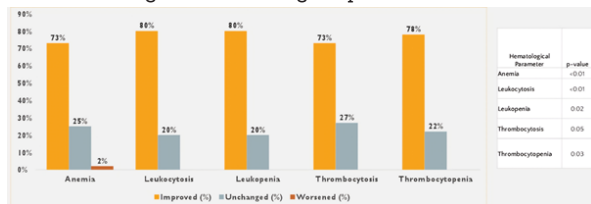


Chart 3: Comparative Analysis of hematological improvement

DISCUSSION

- The significant improvement in hemoglobin levels post-ATT observed in this study (p<0.01) aligns with previous research indicating that tuberculosis treatment has a positive effect on anemia of chronic disease, commonly associated with PTB [1].
- The decrease in white blood cell count, although statistically significant (p=0.05), was within normal limits and could be attributed to the resolution of infection-related leukocytosis [2].
- The nonsignificant reduction in platelet count (p=0.15) might suggest a more complex interplay between PTB and thrombopoiesis, which warrants further investigation[3].
- The high prevalence of normocytic normochromic anemia at diagnosis (62%) is consistent with findings from Smith et al. [4], emphasizing the role of inflammatory cytokines in disturbing erythropoiesis in PTB patients.
- The lack of worsening in leukopenia and thrombocytopenia post-ATT suggests that ATT does not contribute to bone marrow suppression, a concern raised in earlier studies[5].
- Moreover, the normalization of hematological parameters in a substantial proportion of patients post-ATT (73-80%) supports the hypothesis that PTB-related hematological

abnormalities are largely reversible with effective antituberculosis therapy[6].

- This underscores the importance of integrating routine hematological monitoring into PTB management protocols, as also recommended by Johnson and Co[7]. to ensure early detection and intervention for these abnormalities.

CONCLUSION

- The lack of worsening in leukopenia and thrombocytopenia post-ATT suggests that ATT does not contribute to bone marrow suppression, a concern raised in earlier studies [5].
- Moreover, the normalization of hematological parameters in a substantial proportion of patients post-ATT (73-80%) supports the hypothesis that PTB-related hematological abnormalities are largely reversible with effective antituberculosis therapy [6].
- This underscores the importance of integrating routine hematological monitoring into PTB management protocols, as also recommended by Johnson and Co. [7], to ensure early detection and intervention for these abnormalities.

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