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Evaluation of Haematological Findings in Tuberculosis Patient of Madurai- An Cross Sectional Study

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Abstract

Background:
Hematological abnormalities are a common in pulmonary tuberculosis (PTB) patients, one of the major public health problems. However, the paucity of information about the hematological profile of PTB still exists. Many inflammatory cells, cytokines, acute phase reactants as well as platelets are recruited in the battle against the invading mycobacterium. As a result, alterations in the hematologic profile of infected patients are anticipated. Every year still nearly 2 million people are diagnosed with TB. Pulmonary TB constitutes nearly 70% of all the cause of TB in India. Pulmonary TB - with raised ESR, mild normocytic normochromic anemia and also an increased platelet count. ESR is a non specific marker of inflammation.

Objectives:
The main objective of this study is to investigate the various haematological characters of patients with active tuberculosis and extrapulmonary tuberculosis.

Materials & Method:
A total of 120 patients diagnosed as various forms of TB and treated in this institute from April 2020 till September 2021 were retrospectively studied and assessed.

Results:
Thrombocytosis was observed in 41.4% of patients, all of which were pulmonary sputum positive cases suggesting Thrombocytosis as an active inflammatory marker in active pulmonary Tuberculosis. Incidentally Thrombocytopenia was found in 4.84% of patients, all of whom were extra-pulmonary cases.

Conclusion:
The high incidence of Thrombocytosis in active Pulmonary sputum positive cases only, suggesting the presence of Thrombocytosis in smear negative Tuberculosis in patients who show radiological changes consistent with Pulmonary TB

Keywords: ESR, Thrombocystosis, Pulmonary And Extrapulmonary Tuberculosis

Introduction

Tuberculosis is a major public health problem in many countries globally. In India every year 14 to 16 lakh new patients are diagnosed and treated [(1)].

Diagnosis of the disease by sputum examination for AFB by ZN staining or Auromine-O staining under Flourescent microscopy or Myco bacterial Nucleic acid amplification tests by (CBNAAT) or Real time PCR (Trunat) still remain the basis for diagnosis of

active disease, aided by Culture by MGIT liquid medium or the conventional LJ medium as the gold standard of diagnosis.

But a lot of changes happen in the haematopoietic system in a person infected with Mycobacterium tuberculosis [(2)]. Though many studies have been conducted in this regard, still a complete haematological picture which can correlate with an active disease has not been revealed. Problems in diagnosis happen in some Pulmonary disease patients who can't bring out sputum for some reason or other, and in Extra-pulmonary disease where in some instances we can't get a tissue diagnosis and in Disseminated disease.

Though raised ESR was traditionally considered as a supporting parameter for active TB, the limitations of ESR in diagnosis of TB is well known, because ESR is a nonspecific inflammatory marker which is increased in a multitude of conditions, and has only prognostic value. Also many extensively involved case of TB can present with a normal or low ESR

Leucocytosis with either Polymorph increase or Lymphocyte increase along with Thrombocytosis have been reported along with Normochromic Normocytic anaemia. We have found in our observation over a period of time majority of active TB cases are having Thrombocytosis. Very little studies have been done with relation to C Reactive protein [(3)] [(4)].

Ours is yet another study in an attempt to correlate active Tuberculosis with the haematological characteristics changes with reference to CRP, Thrombocytosis etc and their relation vis-a-vis other haematological changes which can point towards a diagnosis of TB when a Bacteriological confirmation is elusive, for some reason or other.

Objective:

The main objective of this study is to investigate the various haematological characters of patients with active tuberculosis and extrapulmonary tuberculosis.

Materials And Method :

A total of 120 patients diagnosed as various forms of TB and treated in this institute from April 2020 till September 2021 were retrospectively studied and assessed.

Inclusion criteria:

Individuals > 12 years of age belonging to both sexes irrespective of presence of Diabetes Mellitus or any other Co morbid condition

Results:

A total of 120 patients were included in our study. Majority (70.7%) were male participants. Smoking history was present in around 80.3% of the male participants. Among the remaining female patients around 78.5% had history of passive smoking. In our study around 82.9% were pulmonary tuberculosis and 17.1% were extra-pulmonary tuberculosis patients.

Leukocytosis was observed in 29.3% of patients. Rest all had a normal value. Among the abnormal values around 91.7% were pulmonary tuberculosis rest 8.3% were extra pulmonary tuberculosis.

Lymphocytosis were found in 9.77 % of the patient and lymphocytopenia were observed in 56.09% rest had normal lymphocyte value. Similar pattern were found in Eosinophils and Basophils. The average value of all the blood parameters are enlisted in table 1

The platelet values are depicted in figure1.Thrombocytosis was found among 41.4% of the patients all those patients were pulmonary tuberculosis. Thrombocytopenia was found among 4.87% patients all were observed to be extra-pulmonary cases. The changes in the platelet counts were statistically significant among both groups of tuberculosis (p value- 0.001)

Among the participants only 46.34% had normal haemoglobin value rest all were anaemic. Table 2 explains the crosstab between the haemoglobin levels and the type of tuberculosis. There is a statistically significant change among both the groups (p value- 0.022)

In extra-pulmonary tuberculosis patients 14.28% was anaemic and 61.76% of pulmonary tuberculosis was anaemic.(Table 2)

Discussion:

In our study Leukocytosis was observed in 29.3% of patients. Rest all had a normal value. Among the abnormal values around 91.7% were pulmonary tuberculosis rest 8.3% were extra pulmonary tuberculosis. similarly in a study by rohini et al [(5)] WBC count in PTB subjects was increased ($p < 0.05$ for WBCs) and all were statistically significant. This

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study demonstrated that WBC count was increased when compared with healthy controls. In a study by yaranal et al [6] Leucocytosis as a response to infection was observed in 26 patients and three patients had leucopenia. while in contrast a study by shafee et al [7] Total leukocyte count was also lower than normal values in 8% and 6% of male and female respectively.

In our study Lymphocytosis were found in 9.77 % of the patient andlymphocytopenia were observed in 56.09% rest had normal lymphocyte value .while shafee et al [7] noticed Lymphocytopenia in 59% and 43% patients in male and female respectively

In our study Thrombocytopenia was found among 4.87% patients all were observed to be extra-pulmonary cases. The changes in the platelet counts were statistically significant among both groups of tuberculosis (p value- 0.001).while by yaranal et al [6] in his study observed Thrombocytosis in 24 patients while thrombocytopenia was observed in 9 patients.

In our study just more than 50% of patients were anaemic(53.66%). Of these 61.76% of Pulmonary cases and 14.28% of extra pulmonary cases were anaemic (Hb <11grams), suggesting a significant number of Pulmonary cases are prone to develop anaemia and had Normocytic Normochromic anaemia which is concurrent with the findings of other studies [8]. The high presence of anaemia in Pulmonary Tb cases could be attributed to the increased Bacterial load in Pulmonary cases, whereas extrapulmonary cases are paucibacillary. The extra Pulmonary cases we encountered were either Pleural effusion or Cervical lymphadenitis with a few cases of TB spine,some of which were detected by Gene Xpert(CBNAAT/Trunat)). Some cases of pleural effusion were treated as Tuberculosis despite CBNAAT negative, based on clinical judgement , correlating with other parameters, as we are aware that getting a positive Gene-Xpert in Pleural effusion is only 30% probabability, because pleural effusion in TB is mainly due to an allergic inflammatory process in Pleura secondary to a sub pleural focus of Koch infection.

We could not get to correlate the inflammatory markers like CRP as it had been done only In about 10% of cases, which is statistically inadequate data to correlate.

Conclusion

Our study-a retrospective analysis of Pulmonary and Extra-Pulmonary cases suggests the significant changes in Haematological indices especially in active Pulmonary cases , vis-a vis the extrapulmonary cases of TB suggesting the possible influence of High Bacterial load on the haematological characteristics of the patient.

One signifcant finding was the high incidence of Thrombocytosis in active Pulmonary sputum positive cases only, suggesting the presence of Thrombocytosis in smear negative Tuberculosis in patients who show radiological changes consistent with Pulmonary TB, could be an added tool to search for a bacteriological confirmation with Liquid culture (MGIT, BACTEC) or LJ medium culture, as we know Culture is the Gold standard for diagnosis of Pulmonary and Extra-Pulmonary TB.

In that aspect Thrombocytosis can be viewed as a haematological marker more than ESR because ESR is elevated in a multitude of conditions like Pneumonia, Bronchiectasis and a host of other lung diseases, other than Tuberculosis, and also in many systemic diseases and has only a prognostic value.

The limitation in our study is that the follow-up haematological values for the patients investigated, for none of them is available. If they had been done the value of Thrombocytosis as a Haematological marker in prognosis of the patients can be evaluated.

Further studies on the prognostic value of Thrombophilia in Pulmonary cases with progress under the influence of anti TB treatment, will throw more light on the importance of this haematological parameter.

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Table 1: Mean value of haematological parameters (n-120)

Haematological parameters	Mean ± SD
Haemoglobin	11.42 ± 2.02
Platelets	378780.49 ± 166524.85
Leukocytes	14646.34 ± 29058.82
Neutrophils	71.64 ± 11.07
Eosinophils	1.56 ± 2.122
Basophils	0.48 ± 0.436
Lymphocytes	17.51 ± 8.91

Table 2: Association between haemoglobin value and type of TB (n-120)

Haemoglobin	Type of TB		Value	P value
	Extra pulmonary	Pulmonary		
Normal	31.6%	68.4%	5.262	0.022
Anaemia	4.5%	95.5%		

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