

International Journal Of Medical Science And Clinical Inventions

Volume 2 issue 09 2015 page no. 1284-1287 ISSN: 2348-991X

Available Online At: <http://valleyinternational.net/index.php/our-jou/ijmsci>

To Assess The Efficacy of Acute Phase Reactants & Monocyte: Lymphocyte (M/L) Ratio As A Prognostic Marker In Anti-TB Drug Therapy.

Dr Mirza Asif Baig MD (Pathology)

Former Asst. prof. BLDU's Shri B.M. Patil medical college, Hospital & Research centre Bijapur, Karnataka, INDIA. Email- drasifbaig@yahoo.com

ABSTRACT

Background: In Tuberculosis, acute phase reactants (APR) like C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) has been commonly used for monitoring the treatment. This study was undertaken to assess monocyte lymphocyte ratio (M/L ratio) as a biomarker to see the outcome of therapy and progress of TB. **Results:** The pre-treatment lymphocyte and monocyte count in the study group were significantly different from the control group, while M/L ratio was similar in both the groups post treatment. The mean M/L ratio in cases and controls were 0.3 ± 0.14 and 0.140 ± 0.06 respectively. The M/L ratio significantly decreased after treatment to 0.145 ± 0.07 with p value of < 0.05 . **Conclusion:** Even though ESR & CRP are increased in TB and their level decreases during the course of treatment but both these biomarkers are not specific for TB & are influenced by certain factors. M/L ratio is high in active TB and the ratio gradually reduces during the treatment. M/L ratio is not influenced by other factors. On the basis of this study it can be safely concluded that M/L ratio is better biomarker than ESR and CRP in predicting the activity & hence prognosis of TB during the treatment. **Take home message** - TB is associated with increased M/L ratio, which declines and returns to normal with anti-tuberculous therapy.

Key words: pulmonary tuberculosis; C-reactive protein; ESR, prognosis, monocyte, lymphocyte

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the bacillus Mycobacterium tuberculosis. It typically affects the lungs (pulmonary TB) but can affect other sites as well (extra pulmonary TB). It is the second leading cause of death by infectious diseases after HIV.¹

The WHO cites TB as the single most important fatal infection, with around 8.8 million new cases and 1.4 million deaths per year, 95% in developing countries. Presently there are 2.5 million new cases accounting for one quarter of the total cases worldwide.^{2,3}

Monocytes are the target cells for mycobacterial proliferation whereas lymphocytes provide

resistance to the spread of infection causing mycobacterial clearance so it is reasonable to suggest that monocyte/lymphocyte (M/L) ratio can also be used as a prognostic tool in TB. M/L ratio has already been used as a prognostic marker in various malignancies including colon cancer, non-Hodgkin lymphoma and multiple myeloma.¹

In TB, Acute phase reactants (APR) like C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) has been commonly used for monitoring the treatment. However both have certain limitations & are nonspecific & they are influenced by many factors.¹

The main objective of this study is to assess monocyte lymphocyte ratio (M/L ratio) as a biomarker to see the outcome of therapy and progress of tuberculosis

METHODOLOGY

A total of 250 cases of pulmonary TB were studied. Diagnosis was done on clinical, radiological, sputum microscopy for Ziehl-Neelsen(ZN) stain & sputum culture by Lowenstein Jensen(Lj) medium.

Age matched healthy controls= 100

Acute phase reactants (APR) like ESR & CRP were determined at diagnosis then at 2& after completion of anti-TB therapy. CBC was done in Sysmex XE, 2000i & monocyte: lymphocyte (M/L) ratio was calculated & confirmed by PBS.

Statistical analysis was done and a p value of <0.05 is statistically significant

Table :Comparison of APR & M/L ratio before, during & after treatment.

| Variables | Controls (100) | Cases(250) TB0P value | TB ₂ P value | TB _c P value |
|---------------|----------------|--------------------------|-------------------------|-------------------------|
| ESR (mean±SD) | 8.8± 0.9 | 52 ± 27> 0.05 | 32±3.5>0.05 | 22± 1.7> 0.05 |
| CRP (mg/dl) | 12±04 | 70± 20> 0.05 | 37±11> 0.05 | 19±4.2> 0.05 |
| M/L ratio | 0.140± 0.06 | 0.3± 0.14<0.05 | 0.19±.07<0.05 | 0.145±.07 <0.05 |

ESR was very high at the initial stages (52 ± 27)mm/hr and then slightly lowered during the course of treatment. The p value >0.05 which is stastically insignificant.

CRP was also very high initially (70± 20) but it gradually reduced. The p value>0.05. This study shows that ESR is unreliable & nonspecific prognostic indicator of TB.ESR was increased in

few healthy controls. CRP & ESR are influenced by a variety of factors but however CRP was found to be more effective than ESR.

M/L ratio proved to be useful prognostic indicator of TB with a p value of <0.05 during the drug therapy. At diagnosis there was monocytosis which gradually declined in due course of treatment.

DISCUSSION

The present study was undertaken because even though ESR & CRP are commonly used prognostic indicators of TB, they are greatly influenced by many factors. Monocytosis is commonly seen in TB & the microorganisms after entering the body is engulfed by alveolar macrophages. Few escape the defense mechanisms & produces chemoattractant substances which then invites other leukocytes and results in unopposed production of monocytes.¹

M/L ratio is more reliable method than APR in assessing prognosis of TB. Many studies conducted in this field showed that monocytosis was very well correlated with the progress and activity of the disease.⁴

Lymphopenia was seen in 40% of patients at the time of diagnosis which later improved with treatment. None of the patient showed lymphocytosis. Lymphopenia is considered to be due to accumulation of lymphocytes at the site of infection leading to decreased number in peripheral blood. There are different studies available mentioning lymphocyte count in TB and the effect of

TB on lymphocyte count is still uncertain. Santiago and colleagues supported lymphocytosis

while Okamura et al proved lymphopenia in their study.^{4,5}

ESR was very high at the initial stages (52 ± 27) and then slightly lowered during the course of treatment. The p value >0.05 which is statistically insignificant.

CRP was also very high initially (70 ± 20) but it gradually reduced. The p value >0.05 . This study shows that ESR is unreliable & nonspecific prognostic indicator of TB. ESR was increased in few healthy controls also. CRP & ESR are influenced by a variety of factors but however CRP was found to be more effective than ESR.

The pre-treatment lymphocyte and monocyte count in the study group were significantly different from the control group, while M/L ratio was similar in both the groups post treatment. M/L ratio proved to be useful prognostic indicator of TB with a p value of <0.05 during the drug therapy. At diagnosis there was monocytosis which gradually declined in due course of treatment. This findings were in agreement with Naranbhai et al.¹

Patients with TB showed that M/L ratio has a predictive role in prognosis of TB. M/L ratio is high in untreated cases and it gradually decreases during the course of treatment. The difference between the M/L ratio during the initial and the later phase of anti-TB therapy is one of the strongest predictor of prognosis and activity of the disease. M/L ratio is not influenced by other factors but ESR and CRP are affected by many factors.

On the basis of present study it can be safely concluded that M/L ratio is better biomarker than

ESR and CRP in predicting the activity & hence prognosis of TB during the treatment

CONCLUSION: Even though ESR & CRP are increased in TB and their level decreases during the course of treatment but both these biomarkers have some drawbacks.

- **CRP & ESR are not specific for TB**
- **Both are influenced by certain factors.**

Even though CRP is a better prognostic biomarker than ESR but these drawbacks limit their use. M/L ratio is high in active TB and the ratio gradually reduces during the treatment. It can be safely concluded that M/L ratio is a better biomarker than ESR and CRP in predicting the activity & hence prognosis of TB during the treatment

CONFLICT OF INTEREST = NONE DECLARED

FUNDING S = NO FUNDING SOURCE

ETHICAL CLEARANCE = TAKEN

REFERENCES

- 1) Sumaira Iqbal, Umbreen Ahmed. Monocyte Lymphocyte Ratio as a Possible

Prognostic Marker in Antituberculous therapy JPMC; 2014;18(2):178-181.

- 2) Shidram Kamate, B. Ramesh, N. "Study of Hematological Profile before and after Completion of Dots Therapy in Pulmonary Tuberculosis". Journal of Evidence Based Medicine and Healthcare; October 2014; Volume 1;(8):962-968.
- 3) WHO fact sheet on tuberculosis. Geneva: World Health Organization; 2012.
- 4) Okamura K, Nagata N, Wakamatsu K, Yonemoto K. Hypoalbuminemia and lymphocytopenia are predictive risk factors for in-hospital mortality in patients with tuberculosis. Internal medicine. 2013;52(4):439-44.
- 5) Ozaki T, Nakahira S, Tani K, Ogushi F, Yasuoka S. Differential cell analysis in bronchoalveolar lavage fluid from pulmonary lesions of patients with tuberculosis. Chest Journal. 1992;102(1):54-59.