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Mini Review

Alteration of Platelets Indices in Pulmonary Tuberculosis Patient

Kolomi Muhammad Lawan and Avinash Kumar*

Department of Medical Lab Technology, Mewar University, India

***Corresponding Author:** Avinash Kumar, Assistant Professor, Department of Medical Lab Technology, Mewar University, Chittorgarh, Rajasthan, India.

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Abstract

New platelet functions on immunity and inflammation as well as thrombosis have recently emerged as a result of advances from an automated full blood count (CBC) analyser. One of the fastest and easiest tests to confirm platelet function is the platelet indices. Such platelet indices include the width of the platelet (PDW), mean platelet volume (MPV), and platelet crit. World Health Organization (WHO) reported that about 8.6 million cases of *Mycobacterium tuberculosis* were estimated to have occurred in 2012 alone most of which were recorded in Asia and Africa, with India and China responsible for 38% of the total number of cases. Thus, this article was instigated to update on platelet indices and their roles in diagnosis of pulmonary tuberculosis.

Keywords: Platelet Indices; Pulmonary; Tuberculosis; Thrombocytosis; Plateletcrit; Instigated

Introduction

The role of Platelet in haemostasis is well known in the field of medical research. However, new roles are emerging recently due to innovations of automated complete blood count (CBC) analyzer [18]; some of these roles are platelet roles on immunity and inflammation as well as thrombosis. Some of the fastest and simplest checks to validate platelet function [1,2] is the platelet indices. Platelet indices include the width of the platelet (PDW), mean platelet volume (MPV) and plateletcrite. The mean platelet volume (MPV) is said to be useful index of platelet activation as it's reflect the size of the platelet [2].

About one-fourth of the world's population has been infected with *Mycobacterium tuberculosis* that is to say one new infection occur at every second [3,4]. However, many infections with *Mycobacterium tuberculosis* are asymptomatic and not all infection with *Mycobacterium tuberculosis* that can cause tuberculosis disease. There were 13.7 million chronic active tuberculosis cases in 2007 alone [5] and 10 million new cases were recorded in 2017, with new number of deaths raising to 1.6 million, mostly in developing countries.

Epidemiology of *Mycobacterium tuberculosis*

According to the World Health Organization (WHO), about 8.6 million cases of *Mycobacterium tuberculosis* were estimated to have occurred in 2012, most cases are estimated to be in Asia and Africa, with India and China responsible for 38% of the total number of cases [6].

Twelve million cases of tuberculosis were recorded in 2012, corresponding to about 169 cases per 100,000 populations. The prevalence of tuberculosis is decreasing globally since the early 1990s and these decrease is mainly attributed to introduction of the Directly Observed Treatment, Short-course (DOTS) strategy which underlining bacteriological diagnosis and chemotherapy with observation of treatment and may contributed to the reduction of chronic and untreated cases, and duration of illness as well [6].

The mortality rate of tuberculosis was estimated at 1.3 million deaths in 2012. A drop in the mortality rate of tuberculosis is recorded by 45% worldwide since 1990 [6].

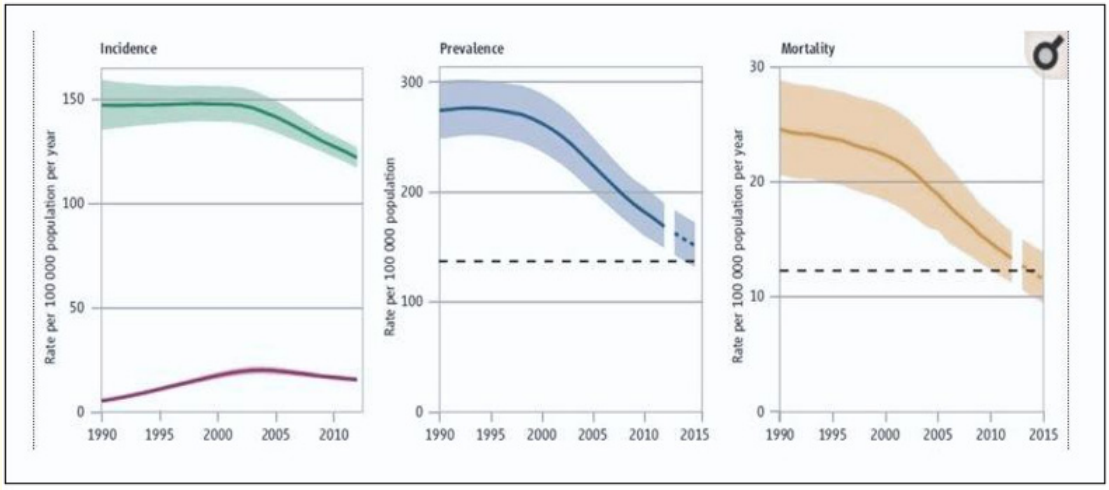

Figure 1: Global trends in estimated rates of TB incidence, prevalence and mortality 1990 - 2012 and forecast TB prevalence and mortality rates 2013 - 2015 [7].

Platelet indices

Plateletcrit (PCT) is the Platelet count and Platelet volume arithmetic product, which is positively associated with platelet. Reduction of platelets and PCT suggests at the same time that platelets were extensively consumed. Mean Platelet Volume (MPV) is the measure of platelet volume. Bone marrow produces a large number of immature platelets, which are larger in volume than mature platelets, when platelets are consumed heavily. Therefore, both the newly formed platelets with large volume and mature platelets with limited volume that were present concurrently in the blood at the time, this lead to increase in both MPV and PDW (coefficient of PLT variation) correspondingly [14,15].

Blood cell counters have used values for platelets in the laboratory routine for many years. Such parameters include platelet script (PCT), platelet distribution width (PDW), and platelet mean volume (MPV). Many studies were conducted in other to establish clinical correlations to support their application; the clinical application to diagnosis of these platelet indices is not fully understood due to difficulty in determination of their reference values, standardization and methodology [8,9]. A lot of variables interfere with value of platelet indices and this lead to the suggestion that each laboratory should establish its own reference values by some researchers [10].

Recent results suggest that MPV increased coincidentally with interleukin-6 and C-reactive protein in septic premature babies, and the spike was correlated with sepsis severity [11]. Furthermore, some reports suggest that elevated PDW and MPV have been successful diagnostic predictors for ascitic fluid infection in patients with cirrhosis and ascites [12]. Another research showed that elevated PDW and MPV in patients with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary involvement is linked with a greater risk of in-hospital cardiovascular adverse events [13]. All these evidence shows that in a series of diseases platelet indices can be used as indicators [16,17].

Conclusion

While very few studies have been performed on platelet indices and their role in the diagnosis of pulmonary tuberculosis, current studies indicate a strong association in advanced stage pulmonary tuberculosis between increase in platelet counts and increase in C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). The role of platelet indices on pulmonary tuberculosis cannot be clarified due to low number of subjects recruited in the studies carried out so far, thus there is need for further study. There is also need for research on platelet indices and its diagnosis in other infectious disease such as pneumonia, HIV, hepatitis etc.

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Conflict of Interest

All the authors declared that there are no conflicts of interest associated with this publication.

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