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ORIGINAL ARTICLE

Diagnostic value of inducible protein-10 in pulmonary tuberculosis

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KEYWORDS

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Abstract There is increased need for alternative biomarkers in diagnosis, prognosis and follow up of patients with pulmonary tuberculosis and for differentiation between active and latent tuberculosis.

The aim of this work is to evaluate the efficacy of inducible protein-10 (IP-10) as a biomarker in the diagnosis of pulmonary tuberculosis as well as to elucidate its ability in distinguishing between active and latent tuberculosis.

This study was carried out on 20 apparently healthy subjects (group I), 20 active pulmonary tuberculosis (TB) patients (group II) and 20 latent TB patients (group III). They were matched in age and sex. Group II were sub-classified into three subgroups according to the radiological extent of the pulmonary lesion into: (Minimal, moderately advanced and far advanced lesions).

Blood samples were obtained and the determination of serum IP-10 levels by enzyme linked immunosorbent assay methods were done (Sandwich) ELISA.

Tuberculin skin test (TST) was significantly higher in group II and III compared to group I and it was significantly higher in group II compared to group III.

Serum IP-10 level was significantly higher in group II and III as compared with group I and higher in group II compared to group III, and it was also, significantly higher in far advanced lesions and moderately advanced lesions than minimal lesions.

Significant positive correlations were found between serum IP-10 level and both TST and blood lymphocyte%.

IP-10 showed sensitivity 88.9%, specificity 100% and accuracy 95.5% with positive predictive value 100% and negative predictive value – 75% in diagnosis of active pulmonary and latent tuberculosis.

It was concluded that IP = 10 could be used as a diagnostic biomarker in the diagnosis of active pulmonary and latent tuberculosis and it correlates well with disease severity.

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Introduction

Despite the global effort to reduce the burden of tuberculosis (TB), TB is the highest infectious cause of mortality and morbidity worldwide, with 1.7 million deaths and 9.4 million incident cases in 2009 alone. Efforts to reduce the TB burden are linked to the development of rapid diagnostic tests for infection with *Mycobacterium tuberculosis*. The interferon-g (IFN-g) release assay (IGRA), recently developed immunodiagnostic test for TB, is available [1].

Compared with the tuberculin skin test (TST), the IGRA is less influenced by the bacilli Calmette–Guérin (BCG) vaccine and environmental mycobacterial exposure [2]. However, its sensitivity is suboptimal in immunocompromised patients, and its ability to discriminate between active TB and latent TB infection (LTBI) is questionable [3,4].

The sensitivity of the IGRA can be enhanced by using alternative or additional biomarkers. IP-10 is produced primarily by monocytes/macrophages and has a role in trafficking of Th1 lymphocytes to inflamed foci through an interaction with a CXC chemokine receptor. High levels of IP-10 were found in the pleural effusion and lung tuberculosis granuloma. IP-10 expression following stimulation with *M. tuberculosis*-specific antigens is reported to be a promising biomarker with high sensitivity for the immune-diagnosis of TB infection [5,6] (see Fig. 2).

In contrast to IFN-g, IP-10 expression in response to TB-specific antigen was not influenced by the ability to respond to mitogens or by the CD4 cell number in HIV-infected patients [7]. However, there have been discordant results regarding whether IP-10 can distinguish between active TB and LTBI. Plasma levels of IP-10 were higher in active TB than in LTBI and showed a reduction at the end of *M. tuberculosis* treatment. In addition, baseline plasma IP-10 and CFP-10-stimulated IP-10 levels were significantly higher in active TB than in LTBI in patients with rheumatoid arthritis [8]. Conversely, TB-specific antigen-stimulated IP-10 could not distinguish between active TB and LTBI in children diagnosed by IGRA [9].

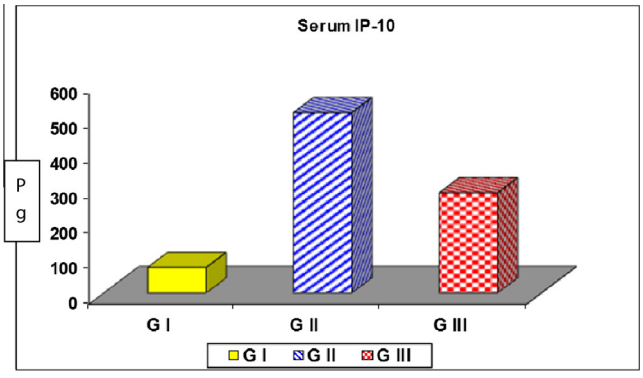

Figure 1 Mean value of Serum IP-10 concentration in pg/ml in the three studied groups.

Subjects and methods

This study had been carried out on 60 subjects admitted in the El-Mahala Chest Hospital, and attending the outpatient clinic of the Chest Department of Tanta University Hospitals, the duration of the study was 18 months. Subjects were classified into three groups (see Table 1).

Group I: Included 20 healthy volunteers with negative tuberculin test, they didn't have any history of contact with active pulmonary tuberculosis patients and they were free of tuberculosis symptoms.

Group II: Included 20 active tuberculous patients with positive sputum examination for acid fast bacilli by Ziehl–Neelsen stain and positive tuberculin test.

Group III: Included 20 latent tuberculous patients with a history of contact with active pulmonary tuberculosis cases

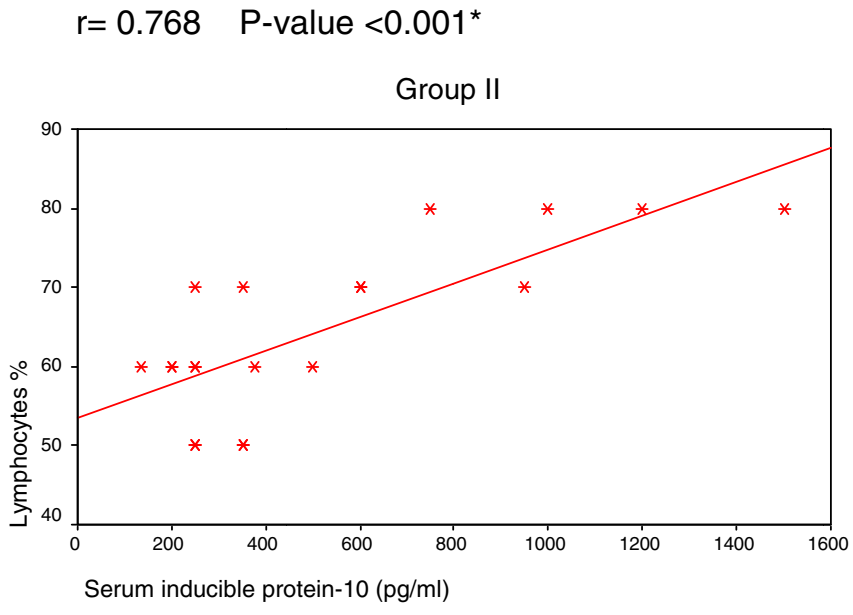

Figure 2 Correlation between serum IP-10 and blood lymphocytes % in the studied groups.