Hyperferritinemia in Pulmonary Tuberculosis

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Abstract High ferritin levels have been found to be associated with non infectious as well as infectious causes including tuberculosis. This is one case report of 41 year old male who presented with cough with expectoration. The patient had Multi drug resistant tuberculosis (MDRTB) and type 2 diabetes mellitus. The laboratory findings showed Iron 280 µg/dl, Total iron binding capacity (TIBC) 61 µg/dl, and ferritin 92,945 ng/ml which indicates that iron is an essential nutrient for the survival of the pathogen *Mycobacterium tuberculosis*.

Keywords Ferritin · TIBC · MDRTB

Introduction

Ferritin plays an essential role in iron homeostasis by binding and sequestering intracellular iron. It acts as an acute-phase reactant, and elevated levels are typically associated with both acute and chronic inflammatory conditions [1]. Markedly elevated levels of ferritin have been associated with various non-infectious causes, including malignancies, severe iron overload, and dialysis-dependent chronic renal failure [2, 3]. Infectious causes are disseminated histoplasmosis and pulmonary tuberculosis [4, 5]. Here is one case report of hyperferritinemia seen in pulmonary tuberculosis.

Case Report

A 41 year old male presented with cough with expectoration, facial puffiness and pedal edema since 2 days. Past history is suggestive of type 2 diabetes mellitus and multidrug resistant tuberculosis (MDRTB). Patient was on insulin therapy. On physical examination positive findings were icterus+, pallor+, bilateral crepitation all over lung field, and hepatomegaly. Laboratory findings showed AFB stain +ve, haemoglobin 6.1 gm/dl, platelet count 107000 cells/cmm, ESR 103 mm/hr, AST 3059 U/L, ALT 360U/L, Iron 280 µg/dl, TIBC 61 µg/dl, and ferritin 92,945 ng/ml. Ferritin was estimated by Electro Chemiluminescence assay in a NABL (National accreditation board for testing and calibration laboratories) accredited laboratory. Ferritin estimation was repeated twice in the laboratory. Radiography and ultrasonographic picture of chest were suggestive of bilateral pleural effusion. Patient was diagnosed as multi drug resistant pulmonary tuberculosis (MDRTB), with pleural effusion, hyperferritinemia and started with second line antituberculosis treatment.

Discussion

Iron is an essential nutrient for almost all microbes, including pathogens such as *Mycobacterium tuberculosis*. Iron is one of the crucial elements required for the growth of *M. tuberculosis*. However, excess free iron becomes toxic for the cells because it catalyzes the production of reactive oxygen radicals, leading to oxidative damage. Hence it is essential for the pathogen to have the ability to store intracellular iron in an iron-rich environment and utilize it under iron depletion [6]. *M. tuberculosis* has iron storage protein ferritin. Some studies have reported that

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hyperferritinemia is associated with *M. tuberculosis* [7]. We therefore conclude that *M. tuberculosis* may be the most important cause for severe hyperferritinemia.

Conclusion

This study concludes that infection with *M. tuberculosis* may be associated with very high levels of ferritin.

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