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To study of serum calcium level in pulmonary tuberculosis patients.

Durgesh Nandini[1], Rachit Saxena[2]

[1]Senior Demonstrator, [2]Assistant Professor

Department of Biochemistry, Government Medical College, Bhilwara.

Correspondance Author: Rachit Saxena, Assistant Professor, Department of Biochemistry, Government Medical College, Bhilwara.

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Abstract

Background- Tuberculosis (TB) is a contagious disease caused by Mycobacterium tuberculosis which is an aerobic non motile bacillus. The tubercle bacilli can ttack any part of the body, most commonly lungs.

Methods- Study was conducted among 30 active pulmonary tuberculosis subjects and 30 healthy volunteers of both genders with same age group 20 - 70 years respectively.

Results- The low level of serum calcium in tuberculosis patient was statistically significant as compared to normal control group.

Conclusion -The mean serum calcium levels were found to be decreased significantly in pulmonary tuberculosis patient. Due to malnutrition and malabsorption associated with tuberculosis resulting hypocalcemia to impaired intestinal absorption of calcium and decreased active metabolites of vitamin D.

Keywords- Calcium, Patients, Pulmonary tuberculosis

Introduction

Tuberculosis (TB) is a contagious disease caused by Mycobacterium tuberculosis which is an aerobic non motile bacillus. The tubercle bacilli can ttack any part of the body, most commonly lungs. It spreads through droplet infection. When infectious people cough, sneeze, talk or spit they propel TB germs known as bacilli into air. Inhalation of very small numbers of these bacilli will lead to M. tuberculosis infection. One third population of the world is infected with M. tuberculosis. The vast majority of these have latent infections. Annually more than 8 million people develop tuberculosis and approximately 1.8 million cases results in death.1 Most of the estimated number of cases in 2010 occurred in Asia (59%) and Africa (26%). India alone accounted for an estimated one quarter (26%) of all TB cases worldwide, and China and India combined accounted for 38%.[1]

Calcium is important macrominerals required for vital functions. Calcium is important for growth and development of bones and teeth, action of enzymes, mediation of hormonal responses, blood coagulation, muscle contractility and normal neuromuscular irritability.[2]

Materials and Methods

Study was conducted among 30 active pulmonary tuberculosis subjects and 30 healthy volunteers of both genders with same age group 20 - 70 years respectively. Patients who had clinical sign and symptoms of active TB including anomalous chest radiography with cavity formation and shadow, lymph nodes deformity, cough more than three weeks, shortness of breath, chest

tenderness, blood in sputum, weakness, tiredness, weight loss, fever, night sweating, loss of appetite and sputum positive test result were incorporated in this study. All subjects and healthy controls were examined, physically including blood pressure, pulse and temperature. All patients and volunteers were interviewed through questionnaire. Serum calcium and sputum smear microscopy were done of all patients and control groups.

Results

Table 1: Shows the mean serum calcium levels in patients and controls.

Serum calcium	Case	Control
Mean	8.12	9.26
SD	0.30	0.60
p-value	<0.05	

The low level of serum calcium in tuberculosis patient was statistically significant as compared to normal control group.

Discussion

Calcium act in body in the form of free ion or bound complexes contribute in variety of functions of body. As bound calcium the most imperative functions is mineralization of skeleton. In skeleton 99% of total body calcium is present in form of calciumphosphate complexes while 1% of total body calcium present in rest parts of body known as nonbone calcium. Nonbone calcium plays a role in extra- and intracellular signaling, nerve impulse transmission, and muscular contraction. The normal range of serum calcium is 8.8 to 10.4 mg/dl (2.2 to 2.6 mM) in which 51% free ions present, 40% are protein-bound complexes and ionic complexes are 9%. Nonionized calcium is bound to a proteins comprise serum albumin and globulin and calmodulin and cellular calcium-binding proteins. Serum calcium phosphate, calcium carbonate, and calcium oxalate are the main ionic complexes[3].

The patients suffering from TB had shown that calcium signaling is altered in macrophages infected by mycobacteria. However, in most reported cases the elevation of calcium ions that normally accompanies phagocytosis of other bacteria or inanimate particles was reduced or absent when mycobacteria were the target. The observations of Jayachandran et al.[4] seem to imply that elevation of calcium ion levels is an essential component of the mechanism whereby the mycobacteria arrest phagosomal maturation.

Conclusion

The mean serum calcium levels were found to be decreased significantly in pulmonary tuberculosis patient. Due to malnutrition and malabsorption associated with tuberculosis resulting hypocalcemia to impaired intestinal absorption of calcium and decreased active metabolites of vitamin D.

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