

Magnesium Level in Pulmonary Tuberculosis Patients

Ali Raza Memon¹ Abdul Sattar Khan¹, Faiza Memon¹, Rafiq Ahmed Jalbani¹

¹Department of Biochemistry, Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro, Sindh, Pakistan.

Corresponding Author: Dr. Ali Raza Memon

aliraza_dr@outlook.com

Abstract: Magnesium plays important roles in physiological function of the body organs because magnesium is an essential mineral. Present study was to determine magnesium levels in serum of fifty pulmonary tuberculosis patients and fifty controls magnesium was determined using a Hitachi atomic absorption spectrophotometer (Tokyo, Japan). Magnesium level was significantly decreased in pulmonary tuberculosis patients as compared with the controls. In order to better understand the role of magnesium in pulmonary tuberculosis further clinical studies are required

[Ali Raza Memon, Abdul Sattar Khan, Rafiq Ahmed Jalbani. **Magnesium Level in Pulmonary Tuberculosis Patients.** *Researcher* 2014;6(1):37-38]. (ISSN: 1553-9865). <http://www.sciencepub.net/researcher>. 7

Key words: Magnesium, Pulmonary tuberculosis, Atomic Absorption Spectrophotometer

1. Introduction

Tuberculosis a chronic infective-contagious disease, is caused by *Mycobacterium tuberculosis* and remains an important public health problem whose mechanisms related to a protective immunity in humans is not clear (Laal S, et al: (1979). Magnesium is the eight common element in the crust of earth (Jahnen-Dechent, (2012), fourth most abundant cation in human body and second abundant intracellular cation. It may exist as protein bound, complexed or in free form. It is primarily found within the cell, where it acts as a counter ion for the energy-rich ATP and nuclear acids. It is a cofactor in more than 300 enzymatic reactions. Magnesium critically stabilizes enzymes, including many ATP generating reactions. (Jahnen-Dechent, (2012). It is also key component in various reactions that require kinases and important factor in both cellular and humoral immune reactions (Saris NE, (2000): Sales CR (2006).

It is reported that very little is known about the serum magnesium levels in pulmonary tuberculosis patients. (Jain MK, (1976) the data that are available from such studies are not conclusive to draw definite relation between serum magnesium with pulmonary tuberculosis. Therefore, the purpose of this study is to detect serum magnesium levels in pulmonary tuberculosis patients as compare to controls.

Material And Methods

The study was carried out among three medical units of Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro.

The criterion for selection of these patients was positive findings on clinical examination, radiological, pathological and biochemical investigations.

The serum magnesium was determined by using Hitachi Atomic Absorption Spectrometry (Tokyo, Japan). Blood samples were collected from fifty controls and fifty patients. Each blood sample was centrifuged at 5000 rpm for 20 min. The supernatant of blood serum was used for the analysis of magnesium.

Statistical analysis was carried out with Statistical Package for Social Sciences (SPSS) version 16 All data are expressed as mean \pm standard error of mean (SEM).

Results

Serum magnesium levels in controls and in patients determined to be $1.69 \pm 0.160 \mu\text{g/mL}$ and $1.21 \pm 0.083 \mu\text{g/mL}$ respectively. Serum magnesium was found statistically decreases in patients as compared with the controls. All values are expressed as mean SEM.

Table 1. Serum magnesium levels in patients and controls

Variable Mean \pm SD	Controls	TB Patients
Magnesium($\mu\text{g/mL}$)	1.69 \pm 0.160	1.21 \pm .083

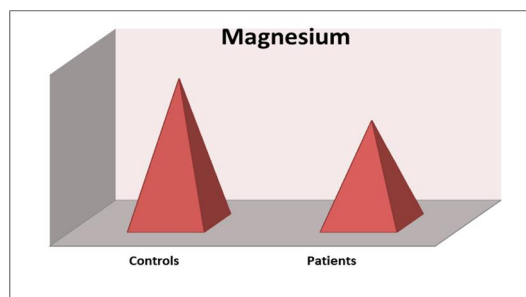


Fig: 1 shows serum magnesium levels in patients as compared to the controls.

Discussion

It is reported that serum magnesium levels in patients with pulmonary tuberculosis is very revealing, changes in the level of serum magnesium have been reported in many diseases such as Hypermagnesaemia has been reported in cases of uncontrolled diabetes, renal failure, hepatitis, cirrhosis, ischaemic heart diseases. (Fox C, (2001): Huskisson E (2007): Touyz RM. (2004).

Magnesium (Mg) is an essential mineral; approximately the total Mg in the body is present intracellularly in soft tissues and bones, variation of serum magnesium can affect the physiological function of humans (Ahsan SK 1997). In the present study of pulmonary tuberculosis patients, serum magnesium levels were found to be markedly decreases in the patients as compared to the controls as shown in table-1 and fig-1. According to Durlach (2002), evaluation of magnesium in plasma or serum appears as a better marker than ionized magnesium in magnesium imbalance, because it is easily available and inexpensive (Durlach (2002).

According to literature regarding serum magnesium levels in cases of pulmonary tuberculosis is very insufficient. Podlesna has studied serum magnesium levels in cases of pulmonary tuberculosis but could not find any significant change. Though, he found hypermagnesaemia in patients of pneumonia to differentiate pneumonia from pulmonary tuberculosis (M.K. JAIN, 2000).

In the present study it was determine that the serum magnesium level in pulmonary tuberculosis related results have been documented in earlier studies conducted by Jain et al (Jain MK, 1976). And O.O. Oladipo et al (O.O. Oladipo et al, 2003). Hypomagnesaemia in malnutrition has been observed in pulmonary tuberculosis patients. Enhancement of magnesium deficiency through magnesium supplement may be effective in pulmonary tuberculosis patients, and achieving better therapeutic results, but further investigation is needed.

Conclusion

It could be conclude that decreased serum magnesium is a constant finding during pulmonary tuberculosis. In order to better understand the role of magnesium in pulmonary tuberculosis further clinical studies are required.

Correspondence to:

Dr. Ali Raza Memon

Lecturer,

Department of Biochemistry, Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro, Sindh, Pakistan.

E mail: aliraza_dr@outlook.com

References

1. Laal S, Samanich KM, Sonnenberg MG, Zolla-Pazner S, Phadtare JM, Belisle JT 1997. Human humoral responses to antigens of *Mycobacterium tuberculosis*: immunodominance of high-molecular-mass antigens. *Clin Diag Lab Immunol* 4: 49-56.
2. Jahnen-Dechent W, Ketteler M. "Magnesium Basics." *Clinical kidney journal*, 2012;5 (suppl:1) pp:13-17.
3. Saris NEL, Mervaala E, Karppanen H, Khawaja JA, Lewen Stem A. "Magnesium on update on physiological, Clinical & analytical aspects." *Clin: chem.: Act.* 2000, 294: pp: 1-2.
4. Sales CR, de Fatima campos, Pedrosa L. "Magnesium and diabetes mellitus their relation" *Clin: Nutr*; 2006, 25: pp: 554-562.
5. Jain MK, Khanuo SK, Chande RD, Jain GC and Bisarya BN. Serum magnesium in pulmonary tuberculosis. *Ind.J. Tuber.* (1976) 23: 177-181
6. Fox C, Ramsoomair D and Carter C. Magnesium: its proven and potential clinical significance. *South Med.J.* (2001) 94: 1195-201
7. Huskisson E, Maggini S and Ruf M. The role of vitamins and minerals in energy metabolism and wellbeing. *J. Int. Med. Res.* (2007) 35: 277-89
8. Touyz RM. Magnesium in clinical medicine. *Front Biosci.* (2004) 9: 1278-93
9. Ahsan SK. Metabolism of magnesium in health and disease. *J. Indian. Med. Assoc.* (1997) 9: 507-10.
10. Durlach J, Pages N, Bac P, Bara M, Guiet- Bara A. Importance of the ratio between Ionized and total Mg in the serum or plasma: new data on the regulation of Mg status and practical importance of total Mg concentration in the investigation of Mg imbalance. *Magnes Res*, 15:203-5,(2002).
11. M.K. JAIN, S.K. KHANUO, R.D, CHANDE, G.C. JAIN and B.N. BISARYA. *Ind. J. Tub*, Vol. XXIII, No. 4
12. Jain MK, Khanuo SK, Chande RD, Jain GC and Bisarya BN. Serum Magnesium in pulmonary tuberculosis. *Ind. J. Tuber* 23: 177-181, (1976).
13. O.O. Oladipo et al. Plasma magnesium in adult asthmatics at the Lagos University teaching hospital, Nigeria. *East African medical journal*, 488-491, (2003).