ORIGINAL

Importance of Serum Zinc in Pulmonary Tuberculosis of Childhood.

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Abstract:

The level of zinc in serum gives valuable information about activity of pulmonary tuberculosis, because low serum level of it has been found in active pulmonary tuberculosis and more or less normal in inactive pulmonary tuberculosis.

Introduction:

With the advent of more and more know-how for managing some common diseases in the developing countries like India, tuberculosis remains one of the main community health problems. Innumerable conditions like poor hygiene, poverty, low socio-economic condition, overcrowding, malnutrition and population explosion contribute to high incidence of tuberculosis in the developing countries. One out of every 50 Indians suffers from this disease. Zinc, being one of the important micro-nutrients needed for metabolism, has been studied by various workers in the context of nutritional disease condition and tuberculosis. Attempts have been

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made to find out by atomic-absorption spectro-photometry method, whether zinc plays any distinctive role in pathophysiological process of pulmonary tuberculosis or not, or in other words whether it has any place in clinical practice of medicine or not.

Materials and Methods:

140 cases in the age groups of 9 months to 12 years were selected from the children out-patient and inpatient department of Paediatrics of P. M. C. H., Patna. Diagnosis of pulmonary tuberculosis was made in 100 cases by history of contact, clinical examination, E. S. R. estimation, M. T., B. C. G. test, sputum examination (Examination of fasting abdominal wash in the very young cases) for A. F. B. and X-ray of chest. Routine investigations were done in Post-graduate clinical laboratory of the Upgraded Paediatrics Department of P. M. C. H., Patna. Serum level of zinc was estimated in the Geochemical laboratory of Geology department of Patna University by Atomic-absorption Spectrophotometry. Patients with severe degree of malnutrition (4th degree) and hepato-splenomegaly were excluded from the present study. 40 normal cases were taken up for study to serve as control.

Observation:

Table showing serum zinc level $\mu\text{g}/\text{dl}$. in control and pulmonary tuberculosis cases.

Type of cases.	No. of cases.	Range	Mean	Standard deviation $\pm$	P-Value
Control	40	94-175	130.95	22.53	
Active pulmonary tuberculosis.	83	61-105	79.87	12.00	<0.001
Inactive pulmonary tuberculosis	17	98-155	130.35	12.94	>0.001

Discussion:

Total 100 cases of Pulmonary tuberculosis and 40 control cases were studied in present series. The range of serum zinc level between 61-105 $\mu\text{g}/\text{dl}$. with its mean value of 79.87 S.D. ± 12 was found in 83 cases of active pulmonary tuberculosis and with a range of 98-155 $\mu\text{g}/\text{dl}$

and a mean value of $130.35 \text{ S.D.} \pm 12.94$ was found in 17 cases of inactive pulmonary tuberculosis. When compared to the control range level of $94-175 \text{ ugm/dl}$ with its mean value of $130.35 \text{ S.D.} \pm 22.53$ in control group of 40 cases, it gives an idea of significantly low level of serum zinc in cases of active pulmonary tuberculosis. More or less similar level have been seen both in control as well as inactive pulmonary tuberculosis cases.

The above findings are in conformity with those of Halsted et al¹ and Sharda et al who observed low level of serum zinc and its altered level of as an evidence of activity of pulmonary tuberculosis. They also supported the view that more or less normal level of zinc was found in inactive pulmonary tuberculosis in comparison to the control group. Bodgen also found low level of serum zinc as evidence of active state of pulmonary tuberculosis.

Significantly low level of serum zinc in active state of pulmonary tuberculosis may be due to the following factors as also suggested by Sharda et al², Bodgen³ and Prasad⁴.

- (1) Leucocyte endogenous mediator, a hormone like substance secreted by Leucocytes, causes redistribution of zinc from serum to other parts of the body.
- (2) Zinc is utilized by the mycobacterium tuberculosis for their growth.
- (3) Zinc has been found to be accumulated at the site of lesion by tubercle bacilli.
- (4) There is altered excretory pattern of zinc in the active state of pulmonary tuberculosis.
- (5) There may be an altered absorption of zinc from the G. I. T. along with low intake of it due to diminished appetite in active pulmonary tuberculosis.

Summary and Conclusion:

Due to utilization of zinc by the proliferating mycobacterium tuberculosis, the serum level of zinc is significantly lowered. This low level of serum zinc indicates a clue for identifying the activity of pulmonary tuberculosis.

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