

LEAD DETOXIFYING EFFECT OF ASCORBIC ACID IN SCHOOL CHILDREN

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Lead is one of the toxic metals present in the environment and constant exposure from air, water and food adversely affects the health particularly of children. Lead toxicity has been labelled as a major health problem globally particularly in the developing countries. Lead exhibits toxicity even in low concentrations, producing intellectual and behavioural problems; it impairs learning and concentration ability in children. Recent studies on children in the urban population of Karachi showed that over 70 % of children had body lead levels above the safety limits (1-3). There is hardly any safe and economical remedy available, particularly for chronic lead toxicity. We describe here, the results of a preliminary study carried out on school children after ethical approval from the University, which showed that the ascorbic acid (Vitamin C) has the potential to remove lead from the human body.

Urine samples were collected from a group of 15 school children, ranging from 7 to 12 years, before initiating any treatment. Each volunteer was then given a 500 mg ascorbic acid tablet orally (obtained from the Aga Khan Hospital Pharmacy) after meal every night for two weeks. Urine samples excreted during the night and the following early morning were collected. A measured volume of each urine sample was digested with 10 ml of 65 % concentrated nitric acid and heat application of 110°C, reducing the volume below 50 ml. The volume of the sample after cooling to room temperature was made up to 50 ml with distilled water. Lead concentration in each solution was determined using an Atomic Absorption Spectrometer (Perkin Elmer A Analyst 300) at the Chemistry Laboratory of the Geological Survey of Pakistan, Karachi.

The mean lead concentration in urine, before treatment with ascorbic acid was 0.042 ± 0.019 $\mu\text{g/g}$ (mean \pm SD; n=15). The urinary excretion of lead increased to 0.192 ± 0.076 , 0.146 ± 0.128 and 0.135 ± 0.078 $\mu\text{g/g}$ on the 1st, 2nd and 3rd day of treatment respectively (P < 0.01, paired t-test). The concentration of lead in the pooled urine sample of 4-7th day of the treatment was 0.082 ± 0.037 mg/L and it further dropped to 0.04 ± 0.015 mg/L in the pooled urine sample of week 2, which is close to normal values (P > 0.05). These data are indicative that the treatment with Vitamin C (500 mg) causes increased urinary excretion of lead in the first few days of treatment and brings the urinary lead concentration to normal levels within 2 weeks. This preliminary study points to important public health implication especially for children. Further studies on the larger population including lead estimation in blood are suggested.

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