

Zinc Therapy in Acute Diarrhea

[Sazawal S, Black RE, Bhan MK, Bhandari N, Sinha A, Jalla S. Zinc supplementation in young children with acute diarrhea in India. N Engl J Med 1995, 333: 839-844.]

In developing countries the duration and severity of diarrheal illness are greatest among infants and young children with malnutrition and impaired immune status, both factors that may be associated with zinc deficiency. In children with severe zinc deficiency, diarrhea is common and responds quickly to zinc supplementation. Zinc deficiency can result in growth retardation, especially stunting, and impairment of immune function. Finally, diarrhea leads to excess zinc losses and could contribute to zinc deficiency, especially if the zinc content of the diet is limited.

To evaluate the effects of daily supplementation with 20 mg of elemental zinc on the duration and severity of acute diarrhea, authors conducted a double-blind, randomized controlled trial involving 937 children, 6 to 35 months of age, in New Delhi. Children who were reported to have passed at least four unformed stools in the previous 24 hours and who had diarrhea for less than seven days were selected for inclusion. All the children also received oral rehydration therapy and vitamin supplements.

Among the children who received zinc supplementation, there was a 23% reduction (95% confidence interval, 12% to 32%) in the risk of continued diarrhea. Estimates of the likelihood of recovery according to the day of zinc supplementation revealed a reduction of 7% in the risk of continued diarrhea during days 1 through 3 and a reduction of 38% after day 3. Thus, reduction in the duration of diarrhea became evident on the fourth day after the beginning of supplementation. When zinc supplementation was initiated within three days of the onset of diarrhea, there was a

39% reduction in the proportion of episodes lasting more than seven days. In the zinc supplementation group there was a decrease of 39% in the mean number of watery stools per day and a decrease of 21% in the number of days with watery diarrhea. The reduction in the duration and severity of diarrhea were greater in children with stunted growth (stunting was defined as a 'Z' score of less than -2 for length or height for age (indicating a value more than 2 SD below the median for the reference population) than in those with normal growth.

It was concluded that for infants and young children with acute diarrhea, zinc supplementation results in clinically important reductions in the duration and severity of diarrhea.

Comments

Zinc is often deficient in the diet of Indian children. Our intake of meat or dairy products, which contain zinc is low. Traditional staple foods, such as cereals, legumes, and tubers contain zinc, but the presence of phytates, fiber and lignin reduces its bioavailability. Cow's milk, because of its high levels of casein and calcium, and soy milk, because of its phytate content, may further reduce the absorption of zinc from diet. In contrast, zinc in breast milk is well absorbed. Vegetables and fruits contribute very little to dietary zinc.

This study shows that zinc supplementation reduces the severity and duration of diarrhea among preschool age children. Two earlier studies from New Delhi had documented a significant benefit in Children with acute dehydrating diarrhea and zinc depletion(1) and a borderline significant effect in subjects with persistent diarrhea (2). However, these findings need to be replicated in other settings before recommending routine zinc supplementation in children with acute diarrhea.

Should further studies confirm these findings, number of important questions will

have to be addressed. Should zinc therapy be incorporated into Diarrhea Control Programme? For how many days to give zinc? In what dose? Should all episodes be treated or should only stunted children be the target? Will it be cost-effective? Can some form of zinc be added to the ORS? Further, it may be prudent to remind that diarrhea results in depletion of several macro and micro nutrients and it would be logical to consider replacement of all. The potential adverse effect of zinc supplementation on other micro-nutrients (for example, copper) also needs to be considered.

Dietary modification of the population at large to eliminate zinc deficiency would be an ideal goal but zinc rich foods are expensive. An alternative would be to give zinc supplementation to all children or only to children at high risk. Fortification of foods is an attractive option but technical problems, such as determining how much zinc to add to diets that contain phytates, will have to be overcome. Solution may not be as simple as

adding iodides to the common salt for preventing goiter. Nor, is the vitamin-A type strategy of giving a high dose at 6 monthly interval going to work because there are no stores of zinc in the body, the element needs to be given frequently, perhaps daily(3).

Krishan Chugh,

Department of Pediatrics, Sir Ganga Ram Hospital, New Delhi 110 060.

REFERENCES

1. Sachdev HPS, Mittal NK, Mittal SK, Yadav HS. A controlled trial on utility of oral zinc supplementation in acute dehydrating diarrhea in infants. *J Pediatr Gastroenterol Nutr* 1988, 7: 877-881.
2. Sachdev HPS, Mittal NK, Yadav HS. Oral zinc supplementation in persistent diarrhea in infants. *Ann Trop Paediatr* 1990, 10: 63-69.
3. Penny ME, Lanata CF. Zinc in the management of diarrhea in young children. *N Engl J Med* 1995, 333: 873-874.