

Role of Zinc Administration in Improvement of Faltering Growth in Egyptian Children at Risk of Environmental Enteric Dysfunction

Authors : Ghada Mahmoud El Kassas, Maged Atta El Wakeel

Abstract : Background: Environmental enteric dysfunction (EED) is impending trouble that flared up in the last decades to be pervasive in infants and children. EED is asymptomatic villous atrophy of the small bowel that is prevalent in the developing world and is associated with altered intestinal function and integrity. Evidence has suggested that supplementary zinc might ameliorate this damage by reducing gastrointestinal inflammation and may also benefit cognitive development. Objective: We tested whether zinc supplementation improves intestinal integrity, growth, and cognitive function in stunted children predicted to have EED. Methodology: This case-control prospective interventional study was conducted on 120 Egyptian Stunted children aged 1-10 years who recruited from the Nutrition clinic, the National research center, and 100 age and gender-matched healthy children as controls. At the primary phase of the study, Full history taking, clinical examination, and anthropometric measurements were done. Standard deviation score (SDS) for all measurements were calculated. Serum markers as Zonulin, Endotoxin core antibody (EndoCab), highly sensitive C-reactive protein (hsCRP), alpha1-acid glycoprotein (AGP), Tumor necrosis factor (TNF), and fecal markers such as myeloperoxidase (MPO), neopterin (NEO), and alpha-1-anti-trypsin (AAT) (as predictors of EED) were measured. Cognitive development was assessed (Bayley or Wechsler scores). Oral zinc at a dosage of 20 mg/d was supplemented to all cases and followed up for 6 months, after which the 2ry phase of the study included the previous clinical, laboratory, and cognitive assessment. Results: Serum and fecal inflammatory markers were significantly higher in cases compared to controls. Zonulin ($P < 0.01$), (EndoCab) ($P < 0.001$) and (AGP) ($P < 0.03$) markedly decreased in cases at the end of 2ry phase. Also (MPO), (NEO), and (AAT) showed a significant decline in cases at the end of the study ($P < 0.001$ for all). A significant increase in mid-upper arm circumference (MUAC) ($P < 0.01$), weight for age z-score, and skinfold thicknesses ($P < 0.05$ for both) was detected at end of the study, while height was not significantly affected. Cases also showed significant improvement of cognitive function at phase 2 of the study. Conclusion: Intestinal inflammatory state related to EED showed marked recovery after zinc supplementation. As a result, anthropometric and cognitive parameters showed obvious improvement with zinc supplementation.

Keywords : stunting, cognitive function, environmental enteric dysfunction, zinc

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