Effect of Single-Dose Anthelmintic Treatment During Pregnancy on an Infant's Response to Immunisation and on Susceptibility to Infectious Diseases in Infancy: a Randomised, Double-Blind, Placebo-Controlled Trial

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Abstract

Helminth infections aff ect the human immune response. We investigated whether prenatal exposure to and treatment of maternal helminth infections aff ects development of an infant's immune response toimmunisations and unrelated infections.Methods In this randomised, double-blind, placebo-controlled trial, we enrolled 2507 women in the second or third trimester of pregnancy who were planning to deliver in Entebbe General Hospital, Entebbe, Uganda. With a computer-generated random number sequence in blocks of 100, we assigned patients to 440 mg albendazole and 40 mg/kg praziquantel (n=628), 440 mg albendazole and a praziquantel-matching placebo (n=625), 40 mg/kg praziquantel and an albendazole-matching placebo (n=626), or an albendazole-matching placebo and praziquantel-matching placebo (n=628). All participants and hospital staff were masked to allocation. Primary outcomes were immune response at age 1 year to BCG, tetanus, and measles immunisation; incidence of infectious diseases during infancy; and vertical HIV transmission. Analysis was by intention-to-treat. This trial is registered, number ISRCTN32849447.Findings Data were available at delivery for 2356 women, with 2345 livebirths; 2115 (90%) of liveborn infants remained in follow-up at 1 year of age. Neither albendazole nor praziquantel treatments aff ected infant response to BCG, tetanus, or measles immunisation. However, in infants of mothers with hookworm infection, albendazole treatment reduced interleukin-5 (geometric mean ratio 0·50, 95% CI 0·30–0·81, interaction p=0·02) and interleukin-13 (0·52, 0·34–0·82, 0·0005) response to tetanus toxoid. The rate per 100 person-years of malaria was 40·9 (95% CI 38·3–43·7), of diarrhoea was 134·1 (129·2–139·2), and of pneumonia was 22·3 (20·4–24·4). We noted no eff ect on infectious disease incidence for albendazole treatment (malaria [hazard ratio 0·95, 95% CI 0·79–1.14], diarrhoea [1·06, 0·96–1·16], pneumonia [1·11, 0·90–1·38]) or praziquantel treatment (malaria [1·00, 0·84–1·20], diarrhoea [1·07, 0·98–1·18],

pneumonia [1·00, 0·80–1·24]). In HIV-exposed infants, 39 (18%) were infected at 6 weeks; vertical transmission was not associated with albendazole (odds ratio 0·70, 95% CI 0·35–1·42) or praziquantel (0·60, 0·29–1·23) treatment.Interpretation These results do not accord with the recently advocated policy of routine antenatal anthelmintic treatment, and the value of such a policy may need to be reviewed.

Key Words: Single-Dose Anthelmintic Treatment; Infants; Immunisation; Infectious Diseases; Randomised; Double-Blind