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Exploring the complex associations over time among albendazole treatment, cyst evolution, and seizure outcomes in neurocysticercosis (Article)

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Abstract

Objective: To develop a causal model for the occurrence of neurocysticercosis (NC)-related seizures and test hypotheses generated from the model. Methods: We used data from a randomized controlled trial comparing albendazole with placebo among patients newly diagnosed with NC. Based on our causal model, we explored the associations among albendazole treatment, NC cyst evolution, and seizure outcomes over 24 months of follow-up using generalized linear mixed effect models. Results: We included 153 participants, of whom 51% received albendazole. The association between seizure outcomes and treatment over time demonstrated lack of linearity and heterogeneity, requiring the inclusion of time-treatment interaction terms for valid modeling. Participants in the albendazole group had fewer seizures overall and of partial onset at all time points compared with the placebo group, but the difference increased over the first few months following treatment, then decreased over time. Generalized seizures exhibited a more complex association; those in the albendazole group had fewer seizures compared with those in the placebo group for the first few months after treatment, and then the association reversed and those in the placebo arm had fewer seizures. Adjusting for the number of NC cysts in each phase resulted in an attenuation of the strength of association between albendazole and seizure outcomes, consistent with mediation. Among participants in whom all cysts had disappeared (n = 21), none continued to have seizures. Significance: Albendazole treatment is associated with a possible reduction in focal seizures in the short term (3-6 months), perhaps by hastening the resolution of the cysts. However, the effect is not discernible over the long term, because most cysts either calcify or resolve completely, regardless of whether treated with albendazole. The stage of evolution of the cysticercus is an important consideration in the evaluation of albendazole effect on seizure outcome.

SciVal Topic Prominence

Topic: Neurocysticercosis | Cysticercosis | Neurocysticercosis NCC

Prominence percentile: 93.822

Author keywords

albendazole | anthelmintic drugs | epilepsy | neurocysticercosis | randomized clinical trial | seizures

Indexed keywords

EMTREE drug terms: albendazole | carbamazepine | phenytoin | placebo | prednisone

EMTREE medical terms:

adolescent | adult | aged | Article | brain calcification | brain cyst | causal model | child | clinical evaluation | comparative study | controlled study | disease association | double blind procedure | drug dose reduction | drug effect | female | follow up | human | major clinical study | male | neurocysticercosis | outcome assessment | priority journal | randomized controlled trial | seizure | time to treatment | tonic clonic seizure | treatment duration | very elderly

Chemicals and CAS Registry Numbers:

albendazole, 54965-21-8; carbamazepine, 298-46-4, 8047-84-5; phenytoin, 57-41-0, 630-93-3; prednisone, 53-03-2

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