

# NEUROBORRELIOSIS IN CHILDHOOD: TREATMENT WITH PENICILLIN SODIUM AND CEFTRIAXONE

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## ABSTRACT

Beta-lactam antibiotics like ceftriaxone and penicillin G sodium have been shown to be active against *Borrelia burgdorferi in vitro*. Results of quantitative determinations of both antibiotic substances in cerebrospinal fluid of children are limited. 75 children (median age 96 months, range 10 to 176 months) with probable or definite neuroborreliosis were treated with ceftriaxone (1 x 50-90 mg/kg/day) or penicillin G sodium (4 x 80,000-120,000 I.U./kg/day) intravenously for 14 days. On day ten of therapy levels of penicillin G sodium (1, 1.5, 2, 3, 4, 5, or 6 hours after intravenous administration), and ceftriaxone (1, 2, 4, 6, 12, or 24 hours after intravenous administration) in serum and cerebrospinal fluid were measured using a micro agar diffusion bioassay. Results demonstrate that penicillin G sodium concentrations in cerebrospinal fluid were above minimum inhibitory concentration after five hours, but below the limit of determination in 60% after six hours. All ceftriaxone results in cerebrospinal fluid - even after 24 hours - were above minimum inhibitory concentration.

Penicillin G sodium serum values ranged from 46.6 to 0.1 µg/ml (1 to 6 hours post dose) and ceftriaxone serum values from 261 to 5 µg/ml (1 to 24 hours post dose).

The role of administration intervals in antibiotic therapy of neuroborreliosis in children is discussed.

## KEY WORDS

*neuroborreliosis, antibiotic therapy, cerebrospinal fluid, ceftriaxone, penicillin*

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## INTRODUCTION

Since Lyme Borreliosis (LB) is known to be a self limiting disease in some cases, the efficacy of antibiotic treatment cannot be discussed by looking at the clinical outcome of patients alone. Penicillin G sodium and ceftriaxone, a broad-spectrum b-lactamase-resistant third generation cephalosporine, are demon-

strated to be active against *Borrelia burgdorferi (Bb) in vitro* (1-5). Although it is a bacterial agent, *Bb* spirochetes cause an aseptic type of meningitis.

A low-capacity, facilitated diffusion system at the blood-brain barrier and a transport from cerebrospinal fluid (CSF) back into blood via the choroid plexus have been described for penicillin G sodium and ceftriaxone in case of inflamed menin-

