

Case Report

Lyme meningo-radicularitis responsive to oral doxycycline therapy in the USA

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The spirochete strains that cause Lyme disease are different between the USA and Europe. This leads not only to a variation in clinical presentations, but it was also thought to alter responsiveness to antibiotic treatment. Unlike in Europe, in the USA there are no head-to-head trials of oral and intravenous antibiotics in the treatment of neuroborreliosis. Guidelines from the American Academy of Neurology (AAN) state that oral doxycycline is probably safe and effective in treating neuroborreliosis without parenchymal involvement, this was mainly extrapolated from European studies data with no reports from North America. To the best of our knowledge, this is the first reported case of Lyme meningo-radicularitis successfully treated with oral doxycycline alone in the USA. This comes in support of the oral doxycycline as an initial and even monotherapy for non-parenchymal Lyme disease of the nervous system in the USA.

INTRODUCTION

The clinical manifestations of neuroborreliosis are different between the USA and Europe perhaps due to different prevalence of spirochete strains. Guidelines published in 2007 by the AAN state that both intravenous ceftriaxone and oral doxycycline are probably effective and safe in treating CNS Lyme without parenchymal involvement (Level B recommendation). To the best of our knowledge, treatment of Lyme radicularitis with oral doxycycline has not been reported previously in the USA.

CASE REPORT

A 61-year-old Caucasian female presented with progressive left leg and lower back pain following 3 weeks of fever and headache. She did not recall any tick bites but lives on a farm in southern Massachusetts. She has never traveled to Europe. Physical examination showed hypoesthesia on the lateral surface of the left leg, weakness on dorsiflexion and inversion of the left foot, diminished ankle and knee reflexes on the left (brisk on the right) and no Babinski signs (Fig. 1). Serology was abnormal for a positive C6 index >5.0 (normal value <0.90) and Lyme IGM western blot (kD 23, kD 41 IgM

bands reactive). The Lyme IgG western blot was negative (kD41, kD45 reactive). Cerebrospinal fluid (CSF) white cell count was 520/cmm (normal range 0–5/cmm) predominantly lymphocytes; protein 120 mg/dl (normal range 15–45 mg/dl) and glucose of 41 mg/dl (normal range 38–85 mg/dl). Lumbo-sacral MRI showed enhancement in multiple roots of the cauda equina and in the thecal sac surrounding the conus medullaris. Due to a history of anaphylaxis to ceftriaxone, she was treated with oral doxycycline for 6 weeks. At follow-up, 7 weeks later, her pain and tingling had almost completely resolved. Examination showed only residual patchy sensory loss on the left leg. Repeat CSF examination was significantly improved (WBC 8 cells; protein 20 mg/dl).

DISCUSSION

We report a case of Lyme radicularitis contracted in the USA that was successfully treated with oral doxycycline only. Lyme disease is a tick borne illness caused by the spirochete, *Borrelia burgdorferi sensu stricto*. The nervous system is involved in 10–15% of patients. The triad of meningitis, cranial neuritis and radiculoneuritis is known in Europe as Garin-Bujadoux-Bannwarth syndrome [1]. The incidence of radiculoneuritis in the USA is ~3% but may be

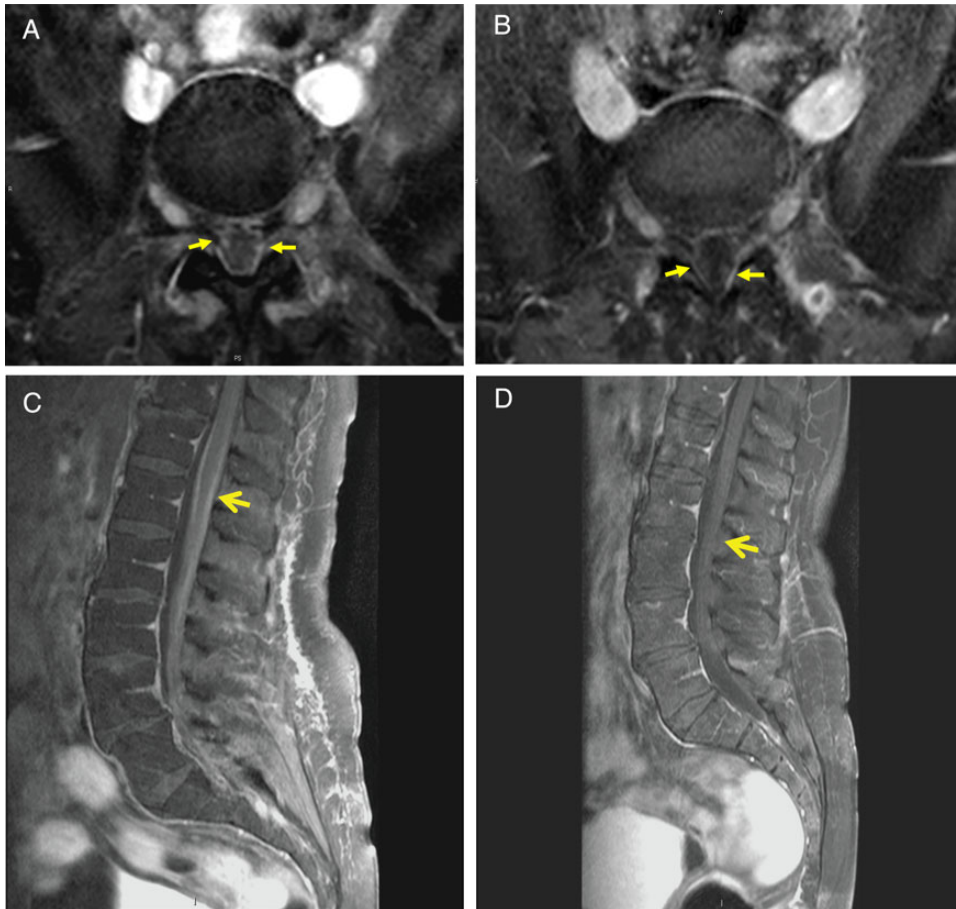


Figure 1: T₁-weighted fat-saturated gadolinium-enhanced MRI of the lumbosacral spine, Before treatment: (A) sagittal with full arrow referring to conus medullaris surface enhancement, (B) axial with dotted arrow referring to intrathecal root enhancement. Five weeks after treatment: (C) sagittal image with full arrow referring to resolution of enhancement and (D) axial image with dotted arrow referring.

under-recognized [1]. Prevalent strains are different in Europe and the USA [2], so it is unclear whether treatment effects might also differ. The CSF concentration of doxycycline after oral administration exceeds the minimum inhibitory concentrations of most strains of *B. burgdorferi* in pharmacological studies [3]. There are no trials from the USA comparing the intravenous and oral routes of administration of antibiotics for neuroborreliosis. Guidelines published in 2007 by the AAN state that both IV ceftriaxone and oral doxycycline are probably effective and safe in treating neuroborreliosis without parenchymal involvement (Level B recommendation) [4]. In Europe, eight comparative studies found a response rate to oral doxycycline that was no different than that of parenteral penicillin or ceftriaxone [4]. None of the studies was blinded, not all were randomized clinical trials [4]. Outcomes were assessed not only by clinical improvement but also by objective serological and CSF data as surrogates for treatment response [5]. In our patient, the response was demonstrated clinically, radiologically and through improvement of CSF results, which is in agreement with previous reports from Europe and adds to our understanding of Lyme disease here in the USA.

In conclusion, oral doxycycline may be sufficient as the initial treatment of neuroborreliosis without parenchymal involvement in the USA. More studies are needed to establish the role of oral doxycycline in the management of North American Lyme disease and to characterize the syndromes for which intravenous antibiotics are required.

REFERENCES

- Halperin J. Nervous system Lyme disease: is there a controversy? *Semin Neurol* 2011;**31**:317–324.
- Crowder C, Matthews H, Schutzer S, Rounds M, Luft B, Nolte O, *et al*. Genotypic variation and mixtures of Lyme *Borrelia* in ixodes ticks from North America and Europe. *PLoS One* 2010;**5**:e10650.
- Karlsson M, Hammers S, Nilsson-Ehle I, Malmberg A, Wretling B. Concentrations of doxycycline and penicillinG in sera and cerebrospinal fluid of patients treated for neuroborreliosis. *Antimicrob Agents Chemother* 1996;**40**:1104–1107.
- Halperin J, Shapiro E, Logigian E, Belman A, Dotevall L, Wormser G, *et al*. Practice parameter: treatment of nervous system Lyme disease (an evidence-based review): report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology* 2007;**69**:91–102.
- Karlsson M, Hammers-Berggren S, Lindquist L, Stiernstedt G, Svenungsson B. Comparison of intravenous penicillinG and oral doxycycline for treatment of Lymeneuroborreliosis. *Neurology* 1994;**44**:1203–1207.