

Retrospective evaluation of doxycycline for the treatment of Lyme disease among young children

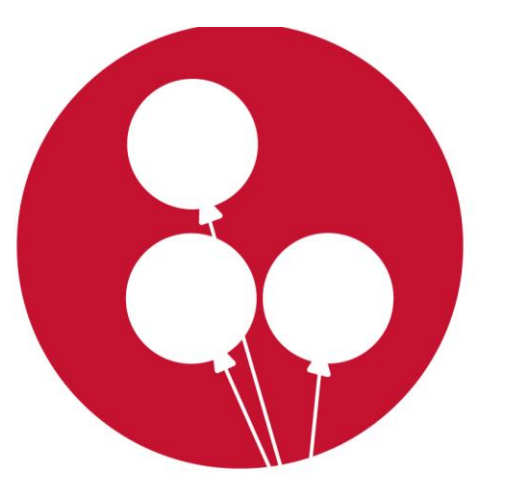
Katie Brown, M.D.¹ and Andrew Handel, M.D., F.A.A.P.²

¹ Department of Pediatrics, Stony Brook Children's Hospital, Stony Brook, NY

² Division of Infectious Diseases, Department of Pediatrics, Stony Brook Children's Hospital, Stony Brook, NY



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Background

Lyme disease is the most common tickborne infection of children (2).

- Doxycycline is the drug-of-choice among adults and adolescents but is rarely used among children <8 years old due to toxicity concerns. Cumulative data demonstrate doxycycline-induced dental staining is rare (1, 2, 3, 4).
- Our institution has used doxycycline in this age group when alternatives cannot be given. No prospective studies have examined the use of doxycycline in this young cohort.
- Study aims: to describe short-term adverse effects and treatment failures among young children receiving oral doxycycline for treatment of Lyme disease.

Methods

- Retrospective chart review
- Inclusion criteria:
 - Patients < 8 years old
 - Treated within the Stony Brook Medicine system from 2010-2020
 - ICD code for Lyme disease (ICD-9: 088.81 or ICD-10: A69.2*) [* wild-card for child-codes]
 - Prescribed doxycycline at the *same* clinical visit.
- Exclusion criteria:
 - Lacking characteristic findings of Lyme disease including single or multiple erythema migrans (EM), facial nerve palsy, carditis, meningitis (headache and/or meningismus with pleocytosis >5 WBC/ μ L), and/or arthritis (1, 2).
 - Alternative diagnosis identified
 - Single-dose doxycycline for post-tick exposure prophylaxis
- Data collected in structured CRF
- Descriptive statistics calculated
- Definitions:
 - Treatment failure: Returned to care within 6 months of treatment due to persistent symptoms

Results

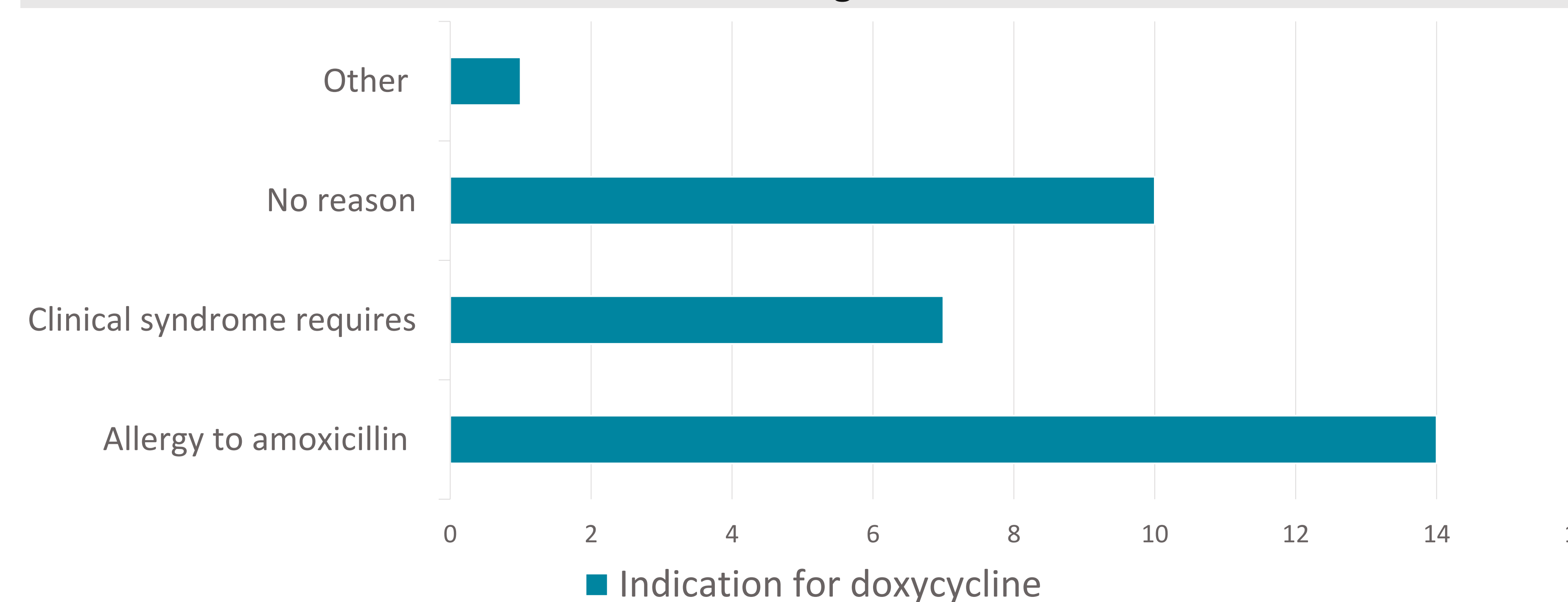
32 charts met inclusion criteria

- Average age: 5.1 years (range 1-7 years old)
- Sex: 66% male
- Majority presented with a single EM (see Table for presenting symptoms)
- Initial antibiotic included doxycycline (63%)
 - 37% initially received a beta-lactam, which was then transitioned to doxycycline
- Rationale for doxycycline (Figure):
 - Beta-lactam allergy or intolerance (47%)
 - Required for treatment of clinical syndrome (such as CNS disease) (22%)
 - No reason given (32%)
- Adverse reactions: 3 patients (9.3%)
 - Nausea/vomiting requiring doxycycline cessation: 2 patients
 - Refusal to take medication by mouth: 1 patient
- Treatment failure: 0/29 who completed doxycycline course

Table. Presenting symptoms of children <8 years old treated with doxycycline for Lyme disease. Total percent exceeds 100% due to patients presenting with multiple symptoms. Percent calculation based on all included patients (n = 32).

Lyme disease signs/symptoms	N (%)
Single erythema migrans	22 (69%)
Multiple erythema migrans	3 (9%)
Carditis	0 (0%)
Facial nerve palsy	6 (19%)
Meningitis	4 (13%)
Arthritis	2 (6%)

Figure. Reason for doxycycline prescription among 32 patients. The 1 patient in the 'Other' category vomited cefuroxime and was then switched to doxycycline. Lyme disease syndrome requirement consisted of CNS Lyme disease manifestations such as facial nerve palsy and/or meningitis.



Conclusions

In this small cohort of young children with Lyme disease:

- Doxycycline was generally well-tolerated.
- No unexpected short-term adverse effects.
- No treatment failures identified.

As there are no prospective data evaluating doxycycline in this population and future randomized trials are unlikely, the data presented provides reassurance that doxycycline is effective and safe in the short-term for this indication.

Limitations

Study limitations should be noted:

- Small sample size (32 patients)
- Single-center study
- Patients may have sought care for treatment failure outside of our institution
- EM rashes were not confirmed with skin biopsy PCR for *B. burgdorferi*
- Retrospective study designs prevents systematic evaluation of infection signs and symptoms
- Dental staining, the major concern with doxycycline, was not evaluated

Future Directions

Evaluating doxycycline outcomes and adverse reactions in this population through a multicenter prospective observational study would strengthen conclusions and allow for specific assessment of long-term dental staining

References

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