



## Safety and effectiveness of amoxicillin in the treatment of inflammatory acne<sup>☆☆☆</sup>

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### ABSTRACT

Acne is a common skin disease that predominantly affects teenagers and young adults. Systemic antibiotic therapy, including tetracyclines, macrolides, and trimethoprim-sulfamethoxazole, is indicated in moderate-to-severe inflammatory disease. However, in certain cases, these antibiotics and other commonly prescribed treatments including oral contraceptives, spironolactone, and isotretinoin may be prohibited, especially in cases of pregnancy and drug intolerance. In this retrospective study, we assessed the safety and efficacy of systemic amoxicillin, which has a favorable tolerability profile and compatibility with pregnancy in the treatment of inflammatory acne.

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Acne is a common disease of the pilosebaceous unit, predominantly affecting teenagers and young adults. First-line treatment strategies are aimed at its pathogenetic mechanisms, including keratinocyte hyperproliferation, seborrhea, colonization of follicular ducts by *Propionibacterium acnes*, and inflammation (James, 2005). Systemic antibiotic therapy, when prescribed in combination with topical retinoids, benzoyl peroxide, hormonal therapy, and/or topical antibiotics, is indicated for moderate-to-severe inflammatory acne, typically in the form of tetracyclines, macrolides, and trimethoprim-sulfamethoxazole (Zaenglein et al., 2016). However, in certain cases, these antibiotics and other commonly prescribed treatments including oral contraceptives, spironolactone, and isotretinoin may be prohibited. These cases often involve pregnancy, drug intolerance, allergy, cost, and/or patient preference. In this retrospective study, we assessed the safety and efficacy of systemic amoxicillin—an antibiotic with a favorable tolerability profile and compatibility with pregnancy—in the treatment of inflammatory acne.

This study was approved by the institutional review board and was carried out in compliance with the Health Insurance Portability and Accountability Act. We conducted a retrospective chart review of 26 patients treated with amoxicillin for inflammatory acne be-

tween September 2012 and March 2016 (Table 1). The mean age was 28.4 years (range, 20–52 years). A total of 22 patients (84.6%) had reported a previous treatment failure with a systemic antibiotics, including doxycycline (11 patients), minocycline (9 patients), trimethoprim-sulfamethoxazole (3 patients), and cephalexin (1 patient). Of note, some patients failed more than one antibiotic. Three patients (11.5%) reported a sulfonamide allergy, and three (11.5%) reported previous antibiotic-related side effects including gastrointestinal distress (doxycycline, 2 patients) and dizziness (minocycline, 1 patient).

Prior to receiving amoxicillin, all patients had received topical medications, hormonal therapy, and/or isotretinoin, which were deemed unsatisfactory after a minimum of 12 weeks. These medications were not changed at the initiation of amoxicillin and included topical retinoids (15 patients), oral contraceptives (8 patients), isotretinoin (7 patients), azelaic acid (3 patients), and spironolactone (3 patients). No patients received amoxicillin as monotherapy. The prescribed daily dose of amoxicillin was either 1000 mg (14 patients) or 1500 mg (12 patients) depending on disease severity. Pretreatment severity and post-treatment response were evaluated by a board-certified dermatologist using the Comprehensive Acne Severity Scale, a validated grading system that incorporates disease severity on the face, chest, and back (Tan et al., 2007) approximately every 12 weeks.

The median treatment time was 36.5 weeks. The post-treatment assessment demonstrated that 22 patients (84.6%) achieved a

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**Table 1**

## Baseline demographics

Total patients treated (n)	26
Female patients (%)	12 (46.2%)
Mean patient age (SD)	28.4 (7.2)
Patients on 1000 mg daily dose (%)	14 (53.8%)
Patients on 1500 mg daily dose (%)	12 (46.2%)
Median CASS score on face (range)	2 (0–4)
Median CASS score on chest (range)	1 (0–4)
Median CASS score on back (range)	1 (0–4)

CASS, Comprehensive Acne Severity Scale; SD, standard deviation

**Table 2**

## Post-treatment outcomes\*

Cases with improvement on face (%)	23 (82.1%)
Mean improvement in CASS on face (SD)	–1.8 (1.4)
Cases with improvement on chest (%)	24 (85.7%)
Mean improvement in CASS on chest (SD)	–0.5 (0.8)
Cases with improvement on back (%)	20 (71.4%)
Mean improvement in CASS on back (SD)	–0.6 (1.0)

CASS, Comprehensive Acne Severity Scale; SD, standard deviation

\* Outcomes are inclusive of cases that had no disease involvement of the respective treatment area at baseline.

positive treatment response at the first scheduled follow-up visit, which was approximately 90 days from amoxicillin initiation (mean: 82.8 days); three patients (11.5%) had no improvement, and one patient (3.8%) worsened with amoxicillin therapy. The post-treatment results are outlined in Table 2. Subsequently, 17 patients (77.3%) who achieved a positive response continued treatment with antibiotics, with a plan to taper and transition to hormonal and/or topical treatments. Gastrointestinal disturbance provoked cessation in two patients (9.1%) and subjective dissatisfaction with treatment outcome was reported by three patients (13.6%) despite objective improvement by clinician assessment. No other side effects were observed. The remaining four patients (15.4%) had no objective improvement. Among the patients who received 1000 mg of amoxicillin daily, 12 (85.7%) showed improvement at the first follow-up visit. Comparably, 10 (83.3%) showed improvement among those who received 1500 mg daily. No advanced statistical analysis was performed on the data; therefore, the collection sheet and tables served as the primary sources to draw conclusions.

In this retrospective series, 84.6% of patients demonstrated clinical improvement in inflammatory acne with systemic amoxicillin prescribed in addition to topical and hormonal treatments. We recommend systemic antibiotics only in moderate-to-severe acne and in cases in which other regimens are poorly tolerated or contraindicated. Of note, the tetracycline class is considered first-line with doxycycline and minocycline demonstrating comparable efficacy (Garner et al., 2012). However, in addition to its contraindication in pregnancy, this antibiotic class is associated with adverse effects, including gastrointestinal distress and photosensitivity (doxycycline), and dizziness, tinnitus, and cutaneous pigment deposition (minocycline).

Limited data support the use of azithromycin (Fernandez-Obregon, 2000), cephalexin (Fenner et al., 2008), and trimethoprim-sulfamethoxazole (Jen, 1980; Turowski and James, 2007) as second-line agents but they may be considered in patients who are intolerant of tetracyclines or with refractory disease. Limiting antibiotic use to the shortest possible duration is critical and may be facilitated with concomitant use of retinoids, benzoyl peroxide, and/or hormonal therapy or a retinoid/benzoyl peroxide regimen (Zaenglein et al., 2016). In patients for whom prolonged antibiotic therapy is required, regular follow-up and reassessment are paramount. Nonetheless, amoxicillin may represent a valuable second-line treatment option in inflammatory acne that warrants prospective exploration for its tolerability profile and pregnancy category B classification.

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