Susceptibility of Contemporary Propionibacterium acnes to Fusidic Acid

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Introduction

Propionibacterium acnes is often found in bone and joint infections, either in combination with staphylococci or as a single pathogen (1). Repeated culture is often necessary to rule out the chance that it is a contaminant. P. acnes is an anaerobic-aerotolerant Gram-positive bacillus that resides in subcutaneous glands and hair follicles of the skin (1). P. acnes can form biofilms in bone and joint infections.

Penicillin G and cefuroxime are considered antibiotics of first choice, with vancomycin and daptomycin as alternatives in case of β-lactam allergy or antimicrobial resistance. Clindamycin, tetracycline, and levofloxacin are oral alternatives. Rifampin is often used to overcome biofilm penetration and is considered active against P. acnes. Although considered an anaerobe, P. acnes is intrinsically resistant to metronidazole. Aminoglycosides generally have weak activity against P. acnes.

Fusidic acid (sodium fusidate, CEM-102) is in development for bone and joint infections, including prosthetic joint infections. The in vitro activity of fusidic acid against Propionibacterium species, including P. acnes was reported in the 1970s (2). This study examined the susceptibility of contemporary strains of P. acnes to fusidic acid.

Materials and Methods

Drugs. MICs of the following drugs were determined: azithromycin (USP, Lot# G), cefdinir (Sigma, Lot# 5178824), cefixime (USP, Lot# 88234), doxycycline (Sigma, Lot# 5198004), levofloxacin (Sigma, Lot# BCF73044), linezolid (Sigma, Lot# 1178902), penicillin (Sigma, Lot# BCF83681), trimethoprim/sulfamethoxazole (Sigma, Lot# 1178902 and BCF83681), and vancomycin (Sigma, Lot# 1178902). Drugs were diluted and dispensed for testing per recommendations in CLSI M100-S22. Stocks solutions of sodium fusidate were prepared on each day of testing.

Organisms. MICs of sodium fusidate and comparator drugs were determined for 51 clinical strains of P. acnes cultured from normally sterile body sites (e.g., bone, blood, joints) of patients at the University of Rochester Medical Center, Rochester, NY, in calendar years 2011 and 2012.

M. D. Hardy et al. was responsible for drug susceptibility testing of P. acnes isolates. The institutional review board of the University of Rochester Medical Center, Rochester, NY approved the study. All patients included in this study had received surgical treatment of bone or joint infections with preoperative and postoperative cultures.

Results

The range of MICs, MICs for 50% of strains and MICs for 90% of strains for all drugs are presented in Table 1. The frequency distributions of MICs of each drug for all strains are presented in Table 2.