Antibiotic susceptibility patterns of *Propionibacterium acnes* isolated from orthopedic implant-associated infections

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### Objectives

*Propionibacterium acnes* is mainly found on the skin of humans as part of the normal flora. However, it is an opportunistic pathogen that is involved in the development of a number of inflammatory skin diseases such as acne vulgaris and psoriasis and has also been associated with i.e. infections related to foreign-body materials, such as prosthetic joints and catheters. Prosthetic joint infections (PJIs) caused by *P. acnes* has proved to be a larger fraction of the total number of PJIs than previously assumed and the symptoms are often developed several months after surgery. Much is still unclear about the mechanisms of how *P. acnes* cause PJIs and the optimal treatment for PJIs caused by *P. acnes* has not yet been established, thus knowledge of the antimicrobial susceptibility patterns of *P. acnes* is of great value in everyday clinical practice.

### Results

All isolates (n=55) were susceptible to the antibiotics tested, with the exception of 100% resistance to metronidazole, five (9.1%) isolates displaying decreased susceptibility to clindamycin, and one (1.8%) to moxifloxacin. The results of the synergy tests are shown in table 1. Briefly, none of the antimicrobial combinations displayed a synergistic effect; however, nine (16%) isolates displayed an antagonistic effect for various antimicrobial combinations. The majority of the antimicrobial combinations had an indifferent effect on the isolates of *P. acnes*. The combination of rifampicin and benzylpenicillin was found to exert an additive effect on nearly half of the isolates.

### Material and method

In the present study, Etest was used to investigate the antimicrobial susceptibility of 55 clinical isolates of *P. acnes* obtained from PJIs of the knee, hip and shoulder to eight antibiotics; benzylpenicillin, clindamycin, metronidazole, fusidic acid, doxycycline, moxifloxacin, linezolid and rifampicin. Synergy testing was also performed, using Etest, on rifampicin in combination with each of the remaining antibiotics. The fractional inhibitory concentration (FIC) index was used to determine whether each specific combination of antibiotics resulted in a synergistic, additive, indifferent, or antagonistic effect.

### Conclusion

*P. acnes*, when isolated from PJIs, do not appear to have developed resistance to the most common antibiotics and rifampicin seems to be a valid treatment option in combination with i.e. clindamycin or benzylpenicillin.

**Table 1.** Antimicrobial synergy testing of 55 clinical isolates of *P. acnes* from orthopaedic device infections by Etest.