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Which is the best treatment for prosthetic joint infections due to *Propionibacterium acnes*: need for further biofilm in vitro and experimental foreign-body in vivo studies?

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Sir—We read with a great interest the recent paper by Jacobs et al. (2015) concerning the treatment of prosthetic joint infections (PJI) caused by *Propionibacterium acnes* and the associated comments (Bayston and Ashraf 2016). The first paper suggests that combination therapy with rifampicin is not more effective than therapy without rifampicin. We demonstrated previously in vitro and in an animal foreign body infection model that the minimal eradication biofilm concentration (MBEC) was the lowest with rifampicin (16 mg/L) alone compared with penicillin G, daptomycin, ceftriaxone, levofloxacin, vancomycin, and clindamycin (Furustrand et al. 2012). However, we have reported the emergence of rifampicin-resistant *P. acnes* strains in vitro (Furustrand et al. 2013) and in vivo (Furustrand et al. 2015). Clindamycin had a higher MBEC (128 mg/L) in our biofilm model. Physicians and microbiologists should keep in mind that clindamycin is a bacteriostatic drug which was not as effective as rifampicin in our experience. Though most non-dermatological *P. acnes* clinical isolates are susceptible to most of the antibiotics, it remains important to perform systematic susceptibility testing. While clindamycin resistance is well known in acne (Ross et al. 2001), between 7% and 9% resistance were reported for *P. acnes* isolates from shoulder surgery (Crane et al. 2013) and orthopedic implant-associated infections (knee, hip or shoulder prostheses) (Khassebaf et al. 2015), respectively.

We also showed that penicillin G and ceftriaxone had low MBEC suggesting that these safe and inexpensive ß-lactams were at least as effective against *P. acnes* biofilm (Bayston et al. 2007). Penicillin G primary treatment for *P. acnes* PJI was thus proposed recently by the Mayo Clinic group (Shah et al. 2015). This suggests that both drugs could be excellent candidates for combination, though ceftriaxone has the advantage of once-a-day administration.

P. acnes implant-associated infections are expected to continue to increase in the future (Portillo et al. 2013, Aubin et al. 2014), and further studies are needed to define an optimal regimen and its duration. From our experience, rifampicin, amoxicillin, ceftriaxone, and levofloxacin but also daptomycin or linezolid (in case of mixed infection with multidrug resistant coagulase negative staphylococci) remain the drugs of choice in combination for 3 months to eradicate a *P. acnes* biofilm device-infection.

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Sir—We are grateful for the comments by Corvec and Aubin. They make important points: rifampicin alone is effective against *P. acnes* biofilms, but emerging resistance, well-known with this drug, is important; and while rifampicin combined with some other drugs is also effective, both penicillin and ceftriaxone are at least as effective and probably superior. Finally, an important clinical point is that ceftriaxone can be given once a day, whereas penicillin needs to be given 4 times a day.

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