

Oral presentation

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Antibiotics for eradication of propionibacterium acnes biofilms

Waheed Ashraf*, Bryar Nuradeen and Roger Bayston

Address: BRIG, Divn Orthopaedic & Accident Surgery, C Floor West Block QMC, Nottingham, NG7 2UH, UK

Email: Waheed Ashraf* - waheed.ashraf@nottingham.ac.uk

* Corresponding author

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Background

Propionibacterium acnes is a member of the normal flora of the skin, but it has been implicated in infections in cerebrospinal fluid shunts and spinal instrumentation e.g. for scoliosis. Though *P. acnes* are fully susceptible to a range of common antibiotics, treatment of infections is very difficult. Recently we demonstrated that *P. acnes* can develop biofilms in such infections and this explains the poor treatment responses and frequent relapses. We have now explored the use of three antibiotics to eradicate *P. acnes* biofilms on biomaterials. Penicillin is often used but more advanced antibiotics have been suggested to improve the outcome. Linezolid penetrates tissues (including the blood – CSF barrier) and is active against *P. acnes*, and could be expected to eradicate it from shunts and from spinal hardware. However, the performance of such antibiotics is often improved by the addition of rifampicin, which penetrates equally well. We therefore investigated the activity of these antimicrobials in eradication of *P. acnes* biofilms and on relapse rates, in an *in vitro* system.

Materials and methods

Sterile titanium discs were coated with human plasma conditioning film and exposed to *P. acnes*, after which they were incubated anaerobically for biofilms to form. The series of discs with biofilms were then exposed to penicillin, linezolid and linezolid + rifampicin for either 7 or 14 days. Further discs were exposed then left for 9 days with no antibiotic to detect "relapse". Presence of bacteria was detected after sonication by chemiluminescence and culture.

Results

Penicillin eradicated *P. acnes* from all samples after both 7 and 14 days; 30% relapsed after 7 days but none after 14 days treatment. Linezolid eradicated only 30% after 7 days but 100% after 14 days; all relapsed after 7 days and 77% after 14 days. Linezolid + rifampicin eradicated 50% after 7 days and 100% after 14 days; 23% relapsed after 7 days but none after 14 days.

Conclusion

Despite apparent eradication the relapse rates were disappointing. Penicillin appears to be the agent of choice, for 14 days, for *P. acnes* infection of spinal hardware but in view of its poor penetration into the CSF a combination of linezolid and rifampicin might be suitable for shunt infections. Linezolid alone gave poor results.