

Oral presentation

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The efficacy of antibiotics against *Propionibacterium acnes* biofilm infections on spinal implant material

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Background

Propionibacterium acnes (*P. acnes*), a common anaerobic skin commensal, has been implicated in delayed infection after implantation of spinal instrumentation. Biofilms of this organism have not been demonstrated previously. Spinal instrumentation is used to correct scoliosis in spina bifida.

We investigated the susceptibility of *P. acnes* growing within mature biofilms on titanium discs to Penicillin G alone, and to a combination with Rifampicin. Biofilms were exposed to therapeutic doses of antibiotics modelled on currently recommended treatment regimens.

Materials and methods

Biofilm group

Surgical titanium discs (6 mm dia) were exposed (1 hr) to *P. acnes*, washed and immersed in fresh culture medium at 37°C. The attached bacteria to titanium were allowed to mature for 6 days (biofilms). Subsequently, the discs were retrieved, sonicated and the number of viable bacteria counted by chemiluminescence and culture.

Treated groups

One group of mature biofilms was exposed to Penicillin G alone and the other with combination of Penicillin G with Rifampicin for 96 hrs respectively. Again, the discs were retrieved, sonicated and the number of viable bacteria were counted by chemiluminescence and culture

Results

All *P. acnes* biofilms responded to treatment with a significant reduction in bacterial numbers. Combination therapy was more effective and produced greater reductions (96.6%) of viable bacteria populating the biofilms than penicillin alone, 93.3% ($p < 0.01$). Complete eradication of the biofilm was not achieved in any cases.

Conclusion

P. acnes develop as a biofilm on spinal implant materials.

Antibiotic therapy significantly reduced the bacterial numbers. It remains to be determined whether longer periods of treatment will successfully eradicate the biofilm.