

Oral Abstracts

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[O97] STABILITY OVER 6 WEEKS OF ANTIBIOTICS IN AQUEOUS SOLUTION AT BODY TEMPERATURE WITH AND WITHOUT INITIAL HEAT TREATMENT MIMICKING CURING BONE CEMENT

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Aim: Thermal stability is a key property determining the suitability of an antibiotic agent for local application. Long-term data describing thermal stability without interference from carrier materials are scarce.

Method: In this study, a total of 38 common antibiotic agents have been maintained at 37 °C in saline solution, and degradation and antibacterial activity assessed over 6 weeks. The impact of an initial supplementary heat exposure mimicking exothermally-curing bone cement has also been tested. Antibiotic degradation was assessed by chromatography coupled to mass spectrometry or immunoassays, as appropriate. Antibacterial activity was determined by Kirby-Bauer disk diffusion assay.

Results: The heat exposure mimicking curing bone cement had minimal effect on stability for most antibiotics, except for gentamicin, which experienced approximately 25% degradation as measured by immunoassay. Beta-lactam antibiotics were found to degrade quite rapidly at 37°C regardless of whether there was an initial heat exposure or not. However some of them maintained relevant concentrations and activity for 2-3 weeks, particularly aztreonam. Excellent long-term stability was observed for aminoglycosides, glycopeptides, tetracyclines and quinolones under both conditions.

Conclusions: This study provides a valuable dataset for orthopaedic surgeons considering local application of antibiotics. For example, tobramycin would be more suitable for application with bone cement than gentamicin, as it was found to be resistant to heat exposure mimicking curing bone cement.