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Orthopaedic Proceedings, Vol. 100-B, No. SUPP_16 | Abstract

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## HEAT STABILITY OF THE ANTIMICROBIAL ACTIVITY OF ANTIBIOTICS AFTER HIGH TEMPERATURE EXPOSURE

B. Tuleubaev, S. Ahmetova, A. Koshanova, A. Rudenko, E. Tashmetov

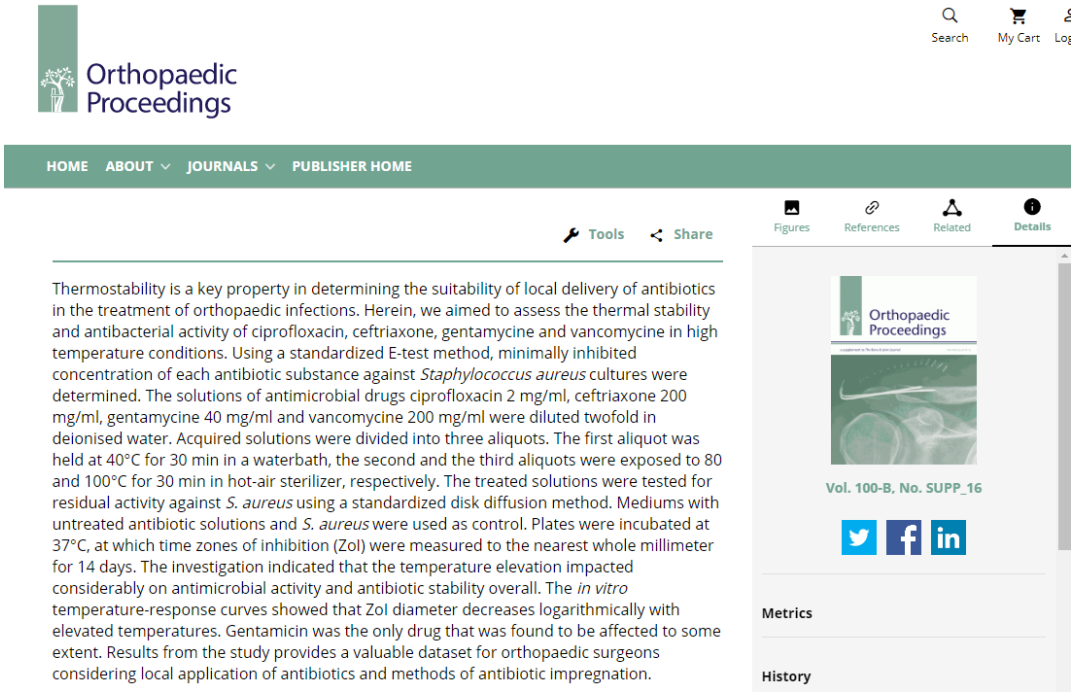
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Thermostability is a key property in determining the suitability of local delivery of antibiotics in the treatment of orthopaedic infections. Herein, we aimed to assess the thermal stability and antibacterial activity of ciprofloxacin, ceftriaxone, gentamycine and vancomycine in high temperature conditions. Using a standardized E-test method, minimally inhibited concentration of each antibiotic substance against *Staphylococcus aureus* cultures were determined. The solutions of antimicrobial drugs ciprofloxacin 2 mg/ml, ceftriaxone 200 mg/ml, gentamycine 40 mg/ml and vancomycine 200 mg/ml were diluted twofold in deionised water. Acquired solutions were divided into three aliquots. The first aliquot was held at 40°C for 30 min in a waterbath, the second and the third aliquots were exposed to 80

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Thermostability is a key property in determining the suitability of local delivery of antibiotics in the treatment of orthopaedic infections. Herein, we aimed to assess the thermal stability and antibacterial activity of ciprofloxacin, ceftriaxone, gentamycine and vancomycine in high temperature conditions. Using a standardized E-test method, minimally inhibited concentration of each antibiotic substance against *Staphylococcus aureus* cultures were determined. The solutions of antimicrobial drugs ciprofloxacin 2 mg/ml, ceftriaxone 200 mg/ml, gentamycine 40 mg/ml and vancomycine 200 mg/ml were diluted twofold in deionised water. Acquired solutions were divided into three aliquots. The first aliquot was held at 40°C for 30 min in a waterbath, the second and the third aliquots were exposed to 80 and 100°C for 30 min in hot-air sterilizer, respectively. The treated solutions were tested for residual activity against *S. aureus* using a standardized disk diffusion method. Mediums with untreated antibiotic solutions and *S. aureus* were used as control. Plates were incubated at 37°C, at which time zones of inhibition (ZoI) were measured to the nearest whole millimeter for 14 days. The investigation indicated that the temperature elevation impacted considerably on antimicrobial activity and antibiotic stability overall. The *in vitro* temperature-response curves showed that ZoI diameter decreases logarithmically with elevated temperatures. Gentamicin was the only drug that was found to be affected to some extent. Results from the study provides a valuable dataset for orthopaedic surgeons considering local application of antibiotics and methods of antibiotic impregnation.

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