The Future Direction Of Eradication And Prevention Of Orthopaedic Related Infections Using Advanced Therapeutics Methods: A Debate Between Experts

Dr Ashok Johari
Director, ENABLE International Centre for Paediatric Musculoskeletal Care, Mumbai, India.

Considerable amount of research and advances have been made in the field of sterility, improved techniques, better antibiotics and operation theater environment. Despite these advancements, musculoskeletal infections and infection-related complications remain a significant clinical burden. To address this, improvements need to be made in our ability to detect infections, effectively remove wound contamination, eradicate infections, and treat and prevent biofilm formation. Current research is addressing these critical issues. While culture methods are of limited value, culture-independent molecular techniques are being developed to provide informative detection of bacterial contamination and infection. New hardware-coating methods are being developed to minimize the risk of biofilm formation in wounds, and immune stimulation techniques are being developed to prevent open fracture infections. Biofilms are polymicrobial and maintain a "supragenome" that is necessary for the overall biofilm survivability. Because of the metagenomic synergy, bacterial diversity, horizontal gene transfer, and overall genomic diversity associated with biofilms, almost any bacteria is capable of forming a biofilm. All of these factors contribute to the difficulty in treating biofilm infections. Overall, the best approach is to prevent biofilm formation in the first place. Biofilm-prevention studies are conducted on many different types of devices, but recently the group of Williams *et al.* reported an effective antimicrobial coating that was tested in a type IIIB open fracture sheep model. The coating reported in this study was an active release compound that was composed of silicone polymer and an active release antimicrobial agent called cationic steroid antimicrobial-13. They found that their coated fracture fixation devices prevented 100% of infections when challenged with biofilm inocula in the open fracture sheep model, and 100% of the uncoated devices went on to infection. This particular coat shows promise and warrants further investigation.