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What is the role of local antibiotics in prosthesis-associated joint infections?

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Prosthetic Joint Infection (PJI) is a rare pathology of joint replacement surgery. However, as a consequence of the growing number of joint replacement procedures worldwide, the incidence of PJI cases is projected to increase sharply in future. Treatment of PJI is often complex and challenging in multi-morbid patients and in presence of multi-resistant pathogens. In order to prevent bacterial colonization and biofilm formation on the "vulnerable" prosthesis or to support the septic treatment of a PJI, a combination of systemic and local antibiotics has become surgical standard. The best studied and most widely used delivery system for local antibiotics is bone cement (BC). Pharmocokinetic studies have shown that the level of antibiotics released from BC may reach bactericidal *in situ*-concentrations which are 100-1000 fold higher compared to concentrations of systemically administered antibiotics. Typically, this is not associated with a higher burden of systemic side effects. According to several arthroplasty registries the combined use of systemic and local antibiotics may reduce the risk for PJI and/or the incidence of PJI relapses up to 50%. Gentamicin is the prophylactic local antibiotic of choice, because of its broad-spectrum and strict concentration-dependant bactericidal effect. To support eradication of an already established PJI, an antibiogram-adapted combination of two or more antibiotics in a cement spacer should be considered after surgical debridement of the infected tissue. However, not any antibiotic is suitable for using with bone cement. For the microbiologist and orthopedic surgeon it is therefore important to know which basic chemical and physical requirements an antibiotic chosen for admixing to bone cement powder must fulfill. These include often not easily predictable parameters such as water-solubility, heat-stability, no chemical interaction with cement polymerization etc. The available literature does not support concerns on the promotion of relevant bacterial resistance, if the when and how of antibiotic-loaded bone cements are followed.

Biography

Christof Berberich has completed his PhD in Molecular Biology from the University of Heidelberg, Germany. After several years of Postdoctoral research in infectious diseases, he has moved to the health care industry. In his current position as Head of Medical Training at Heraeus Medical GmbH, Germany, he educates surgeons, microbiologists and infectious disease specialists on the appropriate use of antibiotic-loaded bone cement for PJI prophylaxis and treatment support. He has published 28 papers in reputed journals and books and has lectured at more than 150 educational events and congresses.

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