

A combination of antibiotics in the bone cement / spacer supports the eradication of infections

Taking into account the time of the infection, the general health of the patient, the bone and soft tissue situation in the joint and the pathogen involved, various alternative surgical treatment protocols come into play. A strategy that retains the prosthesis combined with open surgical debridement, changing the mobile components of the prosthesis and systemic antibiotic therapy is indicated for acute infections. Chronic infections associated with the formation of mature biofilms always require replacement of the prosthesis. Whether this is carried out using a one or two-stage procedure with spacer interval depends primarily on the patient and the bone and soft tissue factors and the experience of the hospital. In both cases, the combination of systemic antibiotic treatment and local administration of antibiotics plays a major role.

Synergistic release and action of certain combinations of antibiotics

Certain combinations of different antibiotic classes (e.g. gentamicin + clindamycin in COPAL® G+C; gentamicin + vancomycin in COPAL® G+V) increase the reciprocal release of the antibiotic from the bone cement surface. When these combinations are used considerably higher antibiotic concentrations can be expected than with the use of individual substances.

At the same time, certain combinations of antibiotics expand the antimicrobial spectrum (e.g. when using gentamicin and clindamycin, the latter also tackles anaerobic bacteria) and amplify their particular antibacterial action.

Development of resistance to combinations of antibiotics is considerably more difficult

Experimental studies and observations in septic revisions have shown that in the least favourable case a bone cement containing only one antibiotic (e.g. gentamicin) can be recolonised, which is often associated with a higher rate of infection. This is due to the possible persistence of high-grade gentamicin-resistant bacteria (e.g. *Staphylococcus epidermidis*) or a 'de novo' infection during extraction of the infected implant or spacer. Because simultaneous resistance to two antibiotics acting differently is much less likely, the use of combinations of antibiotics (such as gentamicin + vancomycin, for instance) counteracts the risk of antibiotic resistance.

Note: Antibiotics dissolve in water

PMMA should not be worked excessively with wet gloves to ensure that the antibiotics contained in the bone cement are not unnecessarily dissolved from the outer layers. For the same reason, irrigation with high volumes of fluid should not be carried out after cementing is complete.

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