

1st International Symposium on "Local Antibiotics in Arthroplasty"

7th - 8th April 2006, Maastricht, The Netherlands

Following the invitation of Professor Geert Walenkamp MD, PhD, Associate Professor and Orthopaedic Surgeon at the University Hospital Maastricht, more than 170 endoprosthetic experts from eight European countries met in Maastricht, The Netherlands. PMMA bone cement as a local carrier of active substance was the main focus of the symposium.

Significant progress with primary hip arthroplasty procedures has been made throughout Europe in recent years, with over 95% of total hip prostheses (THAs) now lasting for ten years. For patients below 50 years of age, according to Dr Steffen Breusch (Edinburgh), implants last for 15 years in 98% of all cases. The level of infection-related revision surgery Europe-wide is between 1-8% of all THAs. There is very considerable variation in the procedures followed, according to the presentations at an international symposium of experts from eight countries.

The occurrence of infection of the patient's new hip depends on hygiene conditions in the operating theatre, and also on the individual's immune status and bacteria population. Older patients and those with other disorders, e.g. diabetes as a metabolic disorder affecting the immune system, and immune-suppressed individuals, are much more likely to suffer infections than healthy younger individuals.

The best infection prevention results were reported by Dr Peter Spierungs, Nijmegen/NL, from the use of vacuum-mixed antibiotic bone cements, including medium-viscosity products (Palamed® G et al) and cooled high-viscosity cements (Palacos® R+G, CMW1, Smartset). Dr Klaus-Dieter Kühn, Division Head of Heraeus Medical in Hanau, emphasised that commercially pre-blended antibiotic bone cement is to be preferred to hand-mixed products. The symposium heard that antibiotic bone cements are used in all European countries at least at the revision surgery stage. In revision procedures for septic loosening, treatment is carried out with COPAL®, a locally-acting cement containing two antibiotics, gentamicin and clindamycin. These two substances have a synergetic bactericidal action on more than 90 % of the bacteria present in the case of joint surgery infections.

The decision on a one- or two-stage revision procedure depends on when the diagnosis is made, the symposium heard. The principal inflammation parameters formulated by the team headed by Dr Paul Gaston, Edinburgh/UK were C-reactive protein (CRP), the sedimentation rate, and a joint fluid culture. Infection can be 90% excluded if one of these inflammation markers is negative, they said.

Signs of chronic infection are pain at rest, increased pain on passive bending at the end of the movement scale, reduced mobility, and a "hot" feeling in the joint, according to Malitzos. The diagnosis is confirmed by CRP, sedimentation rate and an X-ray ("loosening" border), and if necessary, a 24 hour indium-technetium scan.

In cases of early infection, within < 3 weeks of the primary THA, there was a Europe-wide consensus that the prosthesis can either be saved or successfully replaced in a single-stage procedure. The procedure within this period was described: after the detection of bacteria, intraoperative lavage, débridement (removal of infected and

dead bone) and lavage/suction drainage for three days. This is followed by systemic antibiotic therapy. At centres such as the Hamburg Endoklinik, these and also later infections are treated in a single-stage implant replacement procedure, subject to determination of the bacterium and suitable local tissue conditions. The new prosthesis is implanted after lavage and débridement. The primary wound is then sealed following anchoring with antibiotic cement.

The symposium was told that the Hamburg team perform two-stage revision surgery only where the bacterium cannot be determined and anchoring conditions are not sufficiently good. A 10-year healing rate of 91% was reported.

Experts from other countries expressed the view that a two-stage revision procedure is necessary for infections after the first four weeks.

A range of different approaches were described: in Norway the proportions of single-stage and two-stage procedures are approximately the same (33% vs. 35%), according to figures from the national hip replacement register. In Greece and Sweden, two-stage revision surgery with antibiotic treatment during the interim accounts for a large proportion of operative treatments of infected THAs (at least 50%). In France, the UK, the Netherlands and Italy a two-stage revision procedure is preferred in around 90% of cases. Prof. Dr. Geert Walenkamp, who chaired the symposium, emphasised the importance of additional local antimicrobial therapy, such as spacers and PMMAgentamicin chains. In Italy too, for experts such as Dr Carlo Romano and Dr Enzo Meani from Milan, the main focus of infection prevention was on the use of spacers as antibiotics carriers. PMMA chains are not authorised in Italy, delegates were told, and antimicrobial bone cement is used in only 10% of cases.

In France and the UK, vancomycin is mixed with spacers by hand in order to achieve a sufficiently higher bactericidal effect against the increasing levels of staphylococci in those countries. Dr Sebastien Parratte, Marseille, reported that *Staphylococcus aureus* is found in 20-30% of smears from infected joints, and coagulase-negative staphylococci in 30-40% of smears. In Milan, Italy osteoblasts are further supported by locally added growth factors, the symposium was told.

Girdlestone operations have become very rare where these regimes are applied, it was reported. In Sweden and Norway, on the other hand, they still represent a relatively high proportion of procedures, at 18%. Summing up the situation, Dr Michiel Mulier of Louvain, Belgium, said that this intervention reduces the incidence of infection by almost 90%, but that all patients can walk only with assistance, with two crutches being required in 60% of cases. Joint stiffening (arthrodesis) is now required in only 5% of cases of infected implants, delegates were told.

