

### 12 Best Papers

#### [O120] SINGLE-STAGE TREATMENT OF CHRONIC OSTEOMYELITIS WITH A GENTAMICIN-LOADED, CALCIUM SULPHATE / HYDROXYAPATITE BIOCOMPOSITE: A PROSPECTIVE SERIES OF 100 CASES

Martin McNally<sup>1</sup>, Jamie Ferguson<sup>1</sup>, Michael Diefenbeck<sup>2</sup>, Adrian Lau<sup>1</sup>, David Stubbs<sup>1</sup>, Matthew Scarborough<sup>1</sup>, Alex Ramsden<sup>1</sup>, Bridget Atkins<sup>1</sup>

<sup>1</sup>Nuffield Orthopaedic Centre, Oxford University Hospitals, Oxford, United Kingdom

<sup>2</sup>Scientific Consulting in Orthopaedic Surgery, Hamburg, Germany

**Aim:** Eradication of infection in chronic osteomyelitis requires effective dead space management after debridement. Residual bacteria in biofilm may be resistant to normal levels of systemic antibiotic penetrating bone and will contribute to recurrence of osteomyelitis. This study evaluated a new antibiotic-loaded biocomposite in the eradication of chronic infection from bone defects.

**Patients and Method:** We report a prospective study of 100 patients with Cierny and Mader types III and IV chronic osteomyelitis, in 105 bones. Osteomyelitis followed open fracture or ORIF of closed fractures in 71%. Nine had concomitant septic arthritis. 80% had co-morbidities (Cierny-Mader Class B hosts). Ten had infected non-unions.

All patients were treated by a multidisciplinary team with a single-stage protocol including; debridement, multiple sampling, culture-specific systemic antibiotics, stabilisation, dead space filling with Cerament G™ and immediate primary skin closure.

Stabilisation was required in 21 cases and 5 required joint fusion as part of the initial surgery. Plastic surgical skin closure was needed in 23 cases (18 free flaps).

Patients were followed up for a minimum of one year (mean 19.5 months; 12-34).

**Results:** Staphylococci were the commonest organism (41.8%), with MRSA in six patients. *Proteus mirabilis* and *Pseudomonas spp* were more common in polymicrobial infection, often with a gram-positive organism (usually *Staphylococcus aureus*). Sixteen patients cultured organisms which were shown to be gentamicin resistant using EUCAST breakpoints. Gentamicin resistance was just as likely to be present in patients with haematogenous infections (3/19; 15.8%) as in post-trauma (13/81; 16%) (Chi-square:  $p=0.978$ ) Gentamicin resistant organisms were more likely to be found in polymicrobial infections (9/21; 42.8%) than in single isolates (7/79; 8.9%) (Chi-square:  $p<0.001$ ). Infection was eradicated in 96% with a single procedure and all four recurrences were successfully managed with repeat surgery. All 5 fusions healed and 8/10 non-unions healed with the primary surgery alone. Adverse events were uncommon, with 3 fractures, 6 wound leaks and 3 deaths, unrelated to the infection or surgery. Outcome was not dependant on C-M host class, aetiology of infection, microbial culture, wound leakage or presence of non-union.

**Conclusions:** This protocol, facilitated by the absorbable local antibiotic, was effective in the treatment of C-M types III and IV chronic osteomyelitis. The single-stage approach with high bioavailability local antibiotics is a robust management strategy, applicable across a wide range of patients, including those with significant co-morbidities. It offers a more patient-friendly treatment compared to other published treatment options.