

Combination of calcium hydroxyapatite antibiotic carrier with spacers in periprosthetic knee infections

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Introduction

- Two stage revision procedures is the gold standard in management of periprosthetic infections.
- Cement spacers (hand or ready-made) impregnated with antibiotics have long been used to
 - preserve the space created during resection procedure
 - to release antibiotics within the created dead space.

Introduction

- However, the problems related to cement as an antibiotic carrier are well recognised:
 - random porosity
 - bone thermal necrosis
 - unspecified antibiotic delivery rate
 - possible bone damage upon cement removal
 - Ready-made spacers are specific-antibiotic loaded and are applied on bone surface only.

Goals to achieve in the long run

- Improve already existing or invent new and more effective ways of delivering antibiotics to bone
- Compare new AB-delivery systems to the classic cement AB-loaded spacers
- Investigate interactions between these systems and the Bone Biology

Rationale

- The rationale of this study is that calcium hydroxyapatite antibiotic carrier (PerOssal) overlaps the known disadvantages of cement spacers, and leads to better outcome in terms of clinical parameters and re-infection rate when combined with ready-made articulating spacers.

Purpose

- To identify specific clinical and laboratory differences between cases submitted to

conventional two stage revision arthroplasty

VS

cases treated with PerOssal as an additional antibiotic carrier.

Material & Methods

- During 2004 to 2008
- 46 patients (38 females and 8 males)
- mean age 65.3 years (range 32 to 84)

- All patients
 - periprosthetic infection of their TKRs
 - revision using a two-stage revision protocol.

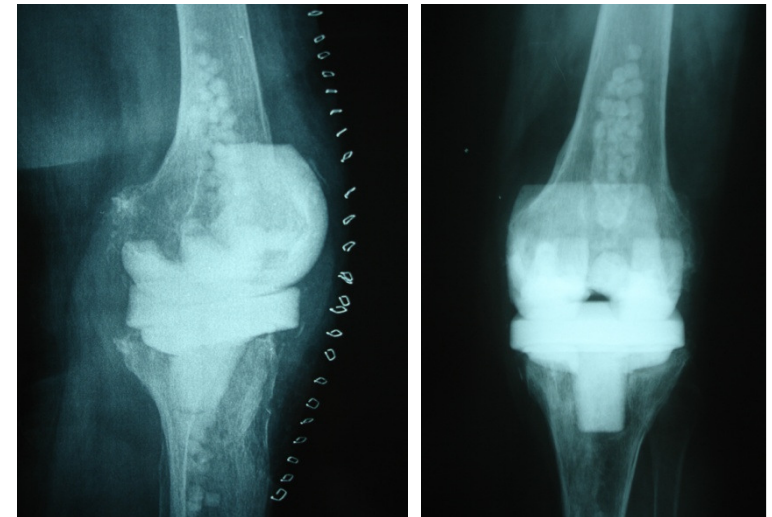
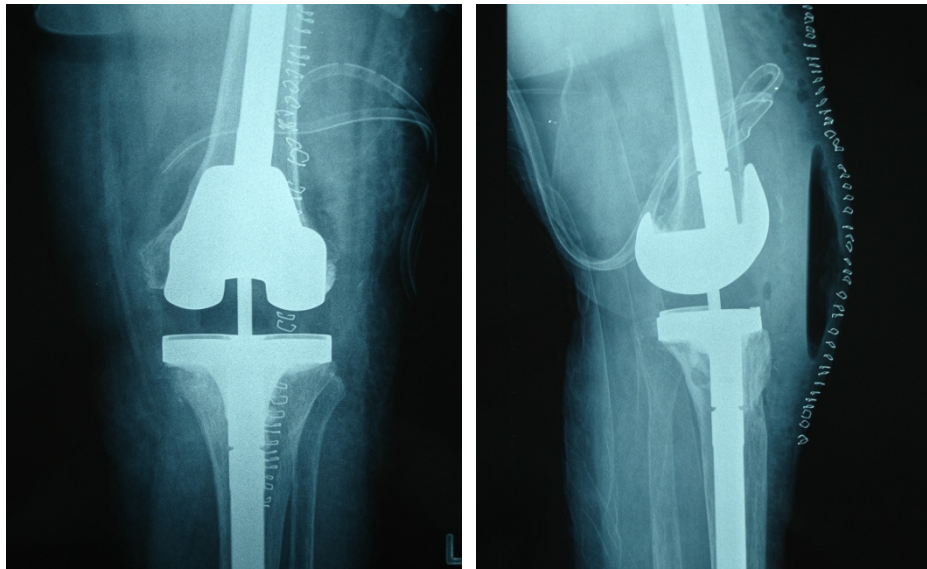
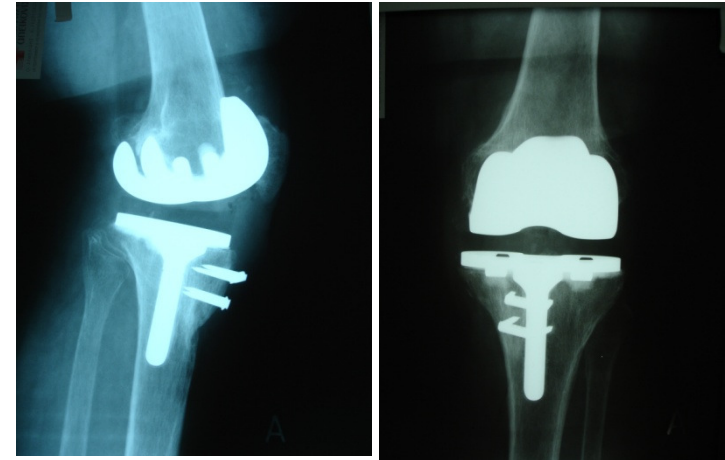
Material & Methods

- group A
 - 31 patients (25 females and 6 males)
 - conventional articulating spacer impregnated with Tobramycin was used
- group B
 - 15 patients (13 females, 2 males)
 - a combination of an articulating spacer and PerOssal applied intramedullary as antibiotic carrier was used
 - Antibiotics used in PerOssal beads: Vancomycin, Amicacin, Rifambicin

Case 1: Infected TKR, 72y, female

2-stage Revision

- Implant removal – cement spacer
- PerOssal (contained fashion) in I.M canal sealed by spacer
- Primary wound healing
- Revision 2nd stage at 6mths
- FU 24mths FOD



Case 2: Infected TKR, 65y, female 2-stage Revision

Implant removal –
cement spacer

PerOssal
(contained
fashion) in I.M
canal sealed by
spacer

Primary wound
healing

Revision 2nd stage
at 6mths
FU 18mths FOD



Material & Methods

- All patients were reviewed with laboratory exams (WBC, ESR, CRP) every 7 days
- Joint fluid aspiration prior to re-implantation
- 2 stage revision was performed at mean 8 months post 1st stage (range, 6 to 12 months).

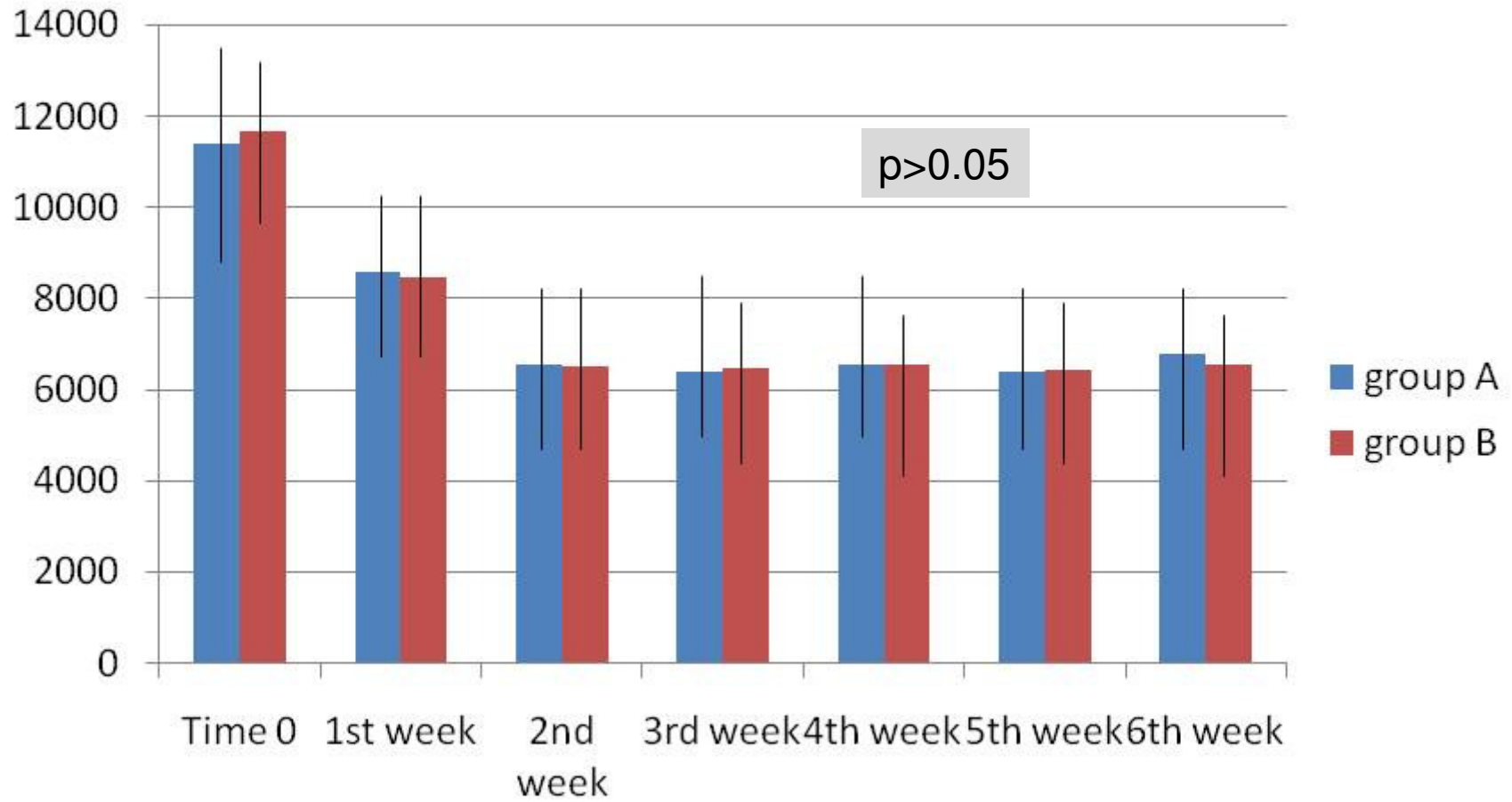
Results

- Mean follow-up of 36 months (range, 8 to 60 months)
- No patient was lost or died.
- WBC count showed no statistically significant differences at any time interval ($p>0.05$).
- ESR showed no statistically significant differences at any time interval ($p>0.05$).

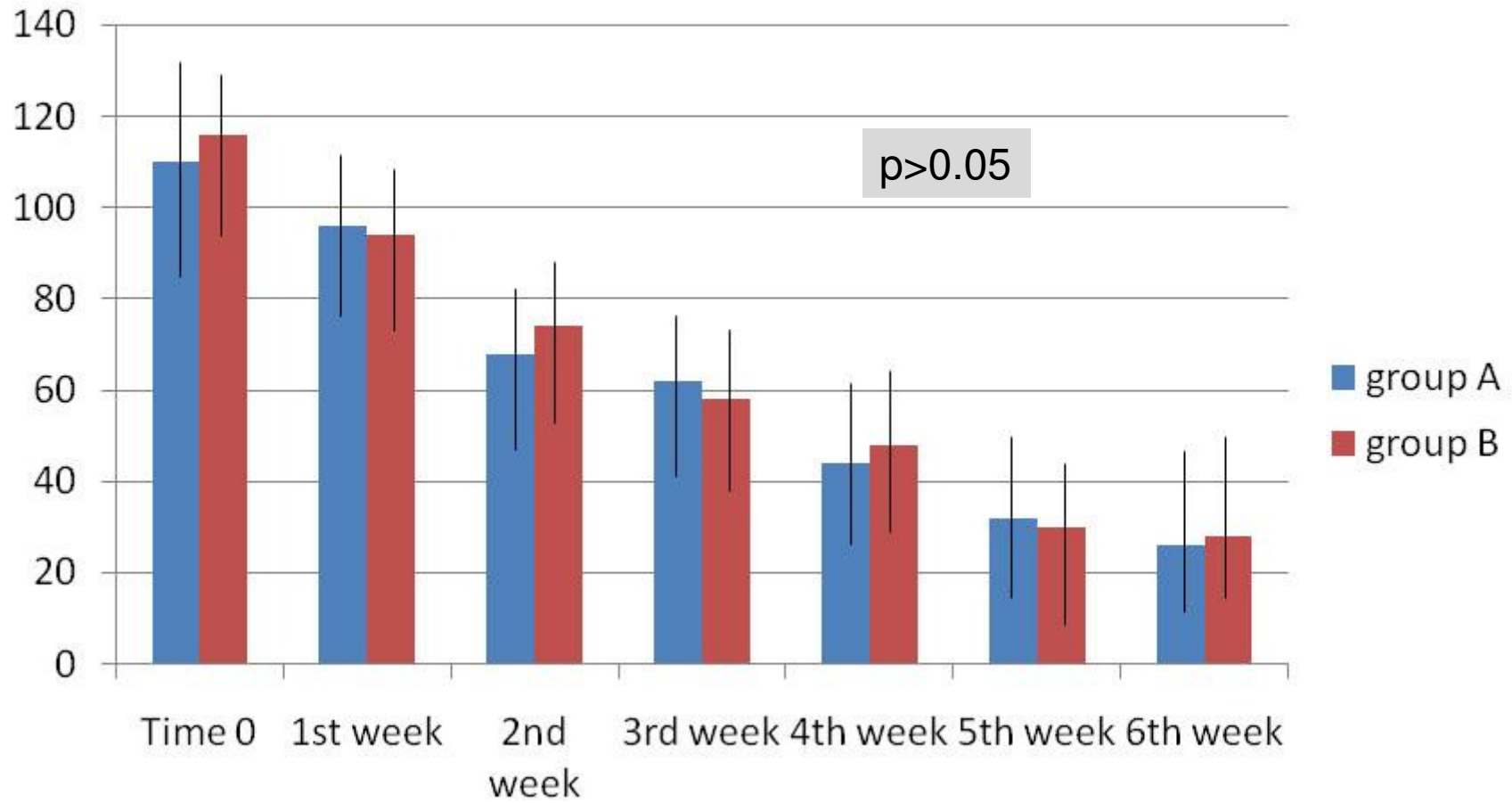
Results

- CRP values had a statistically significant difference between the two groups
 - after the second week postoperatively ($p_{3\text{rd week}} = 0.032$)
 - group B had significantly lower CRP values compared to group A at every check point thereafter ($p_{4\text{th week}} = 0.038$, $p_{5\text{th week}} = 0.031$, $p_{6\text{th week}} = 0.034$).

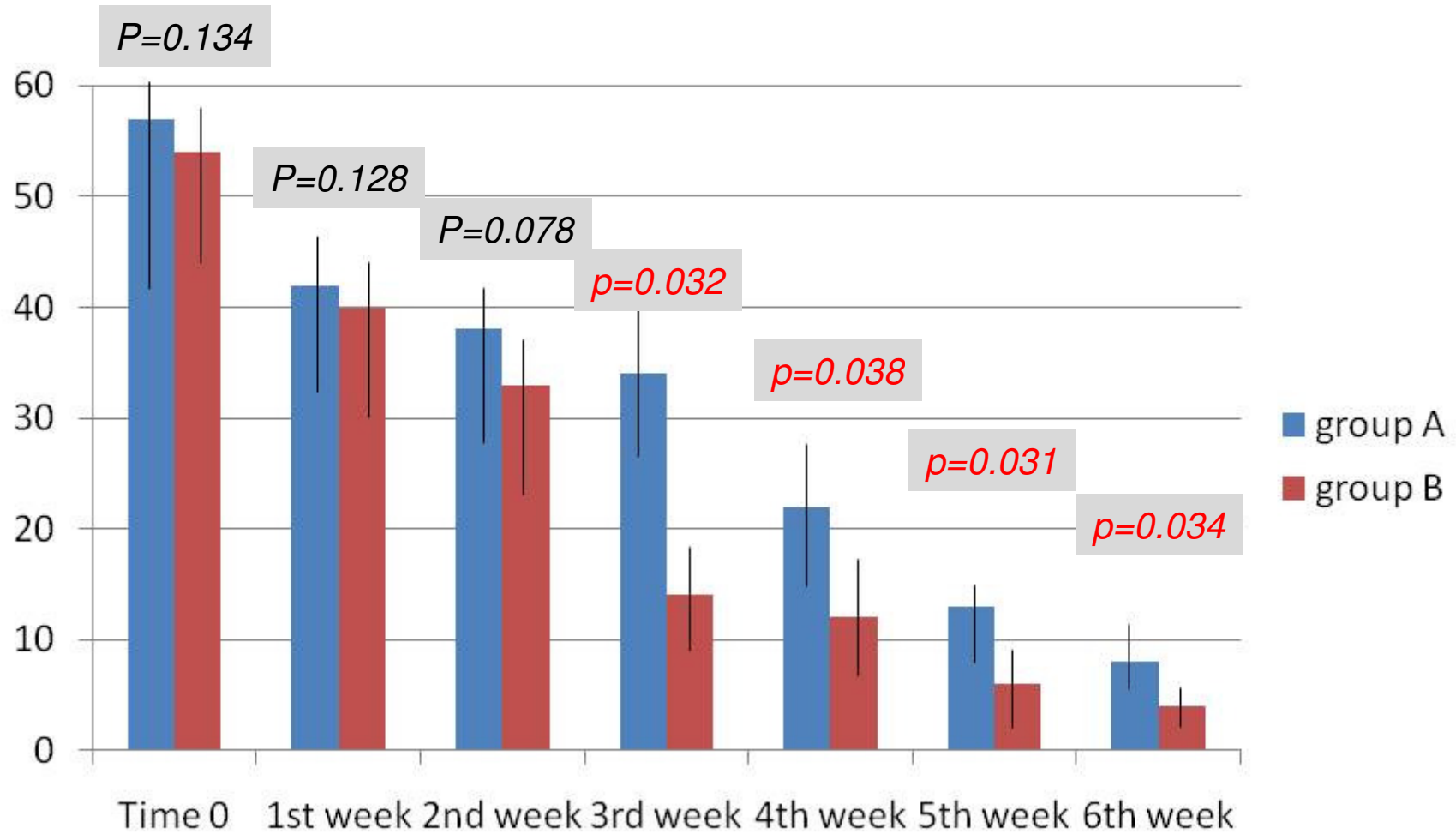
WBC



ESR



CRP



Results

- Re-infection rate was 16.12% in group A and 6.6% in group B ($p=0.192$), All cases showing the same microorganism as of the initial surgery
- No adverse effects were shown with the use of PerOssal
- No evidence of PerOssal induced osseointegration or osseointegration was found at reimplantation (2nd Stage)
- No bone loss noted at PerOssal removal

Take-home Messages

- PerOssal can be used as an additional antibiotic carrier in cases of periprosthetic infections of TKR.
- It is associated with more rapid reduction of CRP levels, probably due to
 - greater porosity
 - bacteria-specific antibiotic delivery comparing to impregnated cement
 - and absorption via the medullary canal.
- Therefore safe shortening of the waiting period between revision stages might be possible

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However,

larger series of patients are needed to reveal potential differences in the re-infection rates as indicated by our study and for investigation of this potentially Bone- friendly behaviour of PerOssal or similar delivery systems.

Thank you!