Absorbable Delivery Products for Treatment of Patients with Periprosthetic Infections: Clinical and Cost-Effectiveness
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Acknowledgments:

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada’s health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.
Research Questions

1. What is the clinical effectiveness of the surgical implantation of absorbable delivery products for local antibiotic treatment of osteomyelitis in the treatment of patients with periprosthetic infections?

2. What is the cost-effectiveness of the surgical implantation of absorbable delivery products for local antibiotic treatment of osteomyelitis in the treatment of patients with periprosthetic infections?

Key Findings

One randomized control trial and four non-randomized studies were identified regarding absorbable delivery products for the treatment of patients with periprosthetic infections.

Methods

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, and economic studies. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2012 and March 26, 2017. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

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<th>Table 1: Selection Criteria</th>
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<td><strong>Population</strong></td>
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<td><strong>Outcomes</strong></td>
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<td><strong>Study Designs</strong></td>
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Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

One randomized control trial and four non-randomized control trials were identified regarding absorbable delivery products for the treatment of patients with periprosthetic infections. No relevant health technology assessments, systematic reviews, meta-analyses, or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One randomized controlled trial (RCT)\(^1\) and four non-randomized studies\(^2\text{-}^5\) were identified regarding absorbable delivery products for the treatment of patients with periprosthetic infections.

The identified RCT examined the use of Defensive Antibacterial Coating (DAC), a resorbable hydrogel coating for the prevention of infection during closed fracture internal osteosynthesis.\(^1\) The group who received antibiotic-loading DAC had reduced post-surgical infection rates when compared to the control group who received no DAC; however, wound healing, clinical scores, laboratory tests, and radiographic findings were not significantly different between the two groups. No adverse events or side effects were noted with the use of the DAC.\(^1\)

Four non-randomized studies\(^2\text{-}^5\) were identified, two of which used bio-degradable beads in infection treatment\(^2\text{-}^4\) and one of which used bio-degradable sponges.\(^5\) Three studies\(^2\text{-}^4\) examined calcium sulphate as the bio-composite. Two of these studies solely used calcium sulphate\(^2\text{-}^4\) and the third used a calcium sulphate/hydroxyapatite mixture.\(^3\) Two of the studies investigated the use of absorbable delivery products in revision or primary arthroplasty,\(^4\text{-}^5\) one in chronic osteomyelitis,\(^3\) and one in vascular graft prosthetics.\(^2\)

In vascular graft prosthetics, bio-absorbable calcium sulphate beads successfully suppressed infection, preserved the graft, and contributed to the salvaging of limbs in a cohort of six patients.\(^2\) Bio-absorbable calcium sulphate beads used in revision arthroplasty were reported in another study; however, the results were not reported directly in the abstract text.\(^4\) The authors recommended the measurement of serum calcium levels after the implantation of calcium sulphate beads.\(^4\) A calcium sulphate/hydroxyapatite mixture was used in patients with chronic osteomyelitis, with infection being eradicated in 96 out of 100 patients in one procedure.\(^3\) Adverse events were not common, with only three fractures, six wound leaks, and three unrelated deaths occurring after follow up.\(^3\) Finally, the authors of the last study used a gentamicin loaded sponge to treat infection after hip arthroplasty, observing that 25 of 34 patients with a deep infection were treated successfully with the biodegradable sponge, with no permanent complications in any patient.\(^5\)
References Summarized

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials


Non-Randomized Studies


Economic Evaluations
No literature identified.
Appendix — Further Information

Systematic Reviews – Animal Models


Non-Randomized Studies

Alternate Populations


Review Articles


Additional References
