Gabapentin, Celecoxib, and Acetaminophen for the Prevention of Post-Operative Pain: Clinical Effectiveness
SUMMARY OF ABSTRACTS Gabapentin, Celecoxib, and Acetaminophen for the Prevention of Post-Operative Pain

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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 pre-operative administration of gabapentin to reduce post-operative pain following orthopedic surgery?

2. What is the clinical effectiveness of pre-operative administration of celecoxib to reduce post-operative pain following orthopedic surgery?

3. What is the clinical effectiveness of pre-operative administration of acetaminophen to reduce post-operative pain following orthopedic surgery?

Key Findings

Five randomized controlled trials were identified regarding the clinical effectiveness of pre-operative administration of gabapentin, celecoxib, or acetaminophen for patients undergoing orthopedic surgical procedures.

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. No filters were applied to limit the retrieval by study type. The search was also limited to English language documents published between January 1, 2012 and July 25, 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.

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Patients undergoing orthopedic surgical procedures</th>
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<tbody>
<tr>
<td>Interventions</td>
<td>Gabapentin;</td>
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<tr>
<td></td>
<td>Celecoxib;</td>
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<tr>
<td></td>
<td>Acetaminophen;</td>
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<tr>
<td></td>
<td>Alone or in any combination with each other</td>
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<tr>
<td>Comparators</td>
<td>Gabapentin;</td>
</tr>
<tr>
<td></td>
<td>Celecoxib;</td>
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<tr>
<td></td>
<td>Acetaminophen;</td>
</tr>
<tr>
<td></td>
<td>Alone or in any combination with each other</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Clinical effectiveness (e.g. reduced post-operative pain, reduced opioid intake post-op, improved pain control, safety)</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials</td>
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</tbody>
</table>
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.

Five randomized controlled trials were identified regarding the clinical effectiveness of pre-operative administration of gabapentin, celecoxib, or acetaminophen for patients undergoing orthopedic surgical procedures. No relevant health technology assessments, systematic reviews, or meta-analyses were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Five randomized controlled trials were identified regarding the clinical effectiveness of pre-operative administration of gabapentin, celecoxib, or acetaminophen for patients undergoing orthopedic surgical procedures. One randomized controlled trial compared the effectiveness of intravenous (IV) versus oral acetaminophen as part of a multimodal perioperative pain regimen. Patients (n=120) were randomized to receive either IV or oral acetaminophen prior to total joint arthroplasty. The authors concluded that IV delivery of acetaminophen does not provide much benefit in reducing pain or narcotic use compared to oral delivery.

A second randomized controlled trial evaluated the comparative effectiveness of gabapentin versus gabapentin plus celecoxib on pain and the complication rate after laminectomy. Patients (n=114) were randomized to receive either gabapentin, gabapentin plus celecoxib, or placebo. The authors concluded that celecoxib and gabapentin is an effective combination for pain control, with lesser side effects than gabapentin alone.

A third randomized controlled trial assessed the effectiveness of two different dosages of gabapentin as part of a multimodal analgesic regime for total knee arthroscopy. Patients (n=300) were randomized to receive either 1300 mg/d gabapentin, 900 mg/d gabapentin, or placebo daily from 2 hours preoperatively to postoperative day 6. The authors concluded that gabapentin may have a limited (if any) role in this patient population due to little difference in pain and morphine use between the treatment groups and placebo.

A fourth randomized controlled trial aimed to determine if adding gabapentin to celecoxib improves in-hospital rehabilitation and physical function for patients undergoing total knee arthroplasty. Patients (n=212) were randomized to receive celecoxib and either gabapentin or placebo prior to their surgery. The gabapentin group had decreased postoperative analgesic requirements and improved knee range of motion, but did not show improvement in pain or physical function.

A fifth randomized controlled trial evaluated which method of administration (IV versus oral) for paracetamol is the most effective in patients undergoing knee arthroscopy. Patients (n=30) were randomized to receive either 1.0 g oral paracetamol preoperatively or 1.0 g IV paracetamol intraoperatively. The outcomes of interest were plasma paracetamol levels, postoperative pain, need for additional analgesia, and duration of stay in the recovery room. The authors concluded that IV administration of paracetamol was more reliable for achieving effective plasma paracetamol levels.
References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-Analyses

No literature identified.

Randomized Controlled Trials


Appendix — Further Information

Previous CADTH Reports


Systematic Reviews and Meta-Analyses

Alternate Comparator


No Comparator Specified


Randomized Controlled Trials

Alternate Comparator


Alternate Population


Mixed Intervention


Guidelines and Recommendations


Clinical Practice Guidelines – Uncertain Methodology


Review Articles


