TITLE: Autologous Blood Reinfusion System for Orthopedic Surgery: Clinical and Cost-Effectiveness

DATE: 15 December 2014

RESEARCH QUESTIONS

1. What is the evidence for the clinical effectiveness of OrthoPAT autologous blood reinfusion system for patients undergoing orthopedic surgery?

2. What is the evidence for the cost-effectiveness of OrthoPAT autologous blood reinfusion system for patients undergoing orthopedic surgery?

KEY FINDINGS

Two systematic reviews were identified regarding autologous blood transfusion for patients undergoing orthopedic surgery. One non-randomized study and one economic evaluation were identified specifically regarding the use of OrthoPAT for autologous blood reinfusion for patients undergoing orthopedic surgery.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 12), 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 where applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and December 1, 2014. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.
SELECTION CRITERIA

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

<table>
<thead>
<tr>
<th>Table 1: Selection Criteria</th>
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<tbody>
<tr>
<td><strong>Population</strong></td>
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<td>Patients undergoing the following orthopedic surgeries: revision total hip or knee; primary total hip or knee replacement; spinal surgery, orthopedic multi-trauma surgery</td>
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<td><strong>Intervention</strong></td>
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<td>OrthoPAT (a peri-operative autologous blood reinfusion system)</td>
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<td><strong>Comparator</strong></td>
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<td>Allogenic blood transfusion; use of traditional cell saver (used intra-operatively); or no comparator</td>
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<td><strong>Outcomes</strong></td>
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<td>Benefits (e.g., elimination of post-operative risks associated with allogenic blood transfusion such as infection, cardiovascular events, fluid overload, immune dysfunction/modulation; potential shorter length of hospital stay; reinfusion before 6 hrs preserves the nitric oxide and potentially prevents vasoconstriction, compared with autologous blood that is stored for many days)</td>
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<td>Harms</td>
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<td>Cost effectiveness</td>
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<tr>
<td><strong>Study Designs</strong></td>
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<tr>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations</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.

Two systematic reviews were identified regarding autologous blood transfusion for patients undergoing orthopedic surgery. One non-randomized study and one economic evaluation were identified specifically regarding the use of OrthoPAT for autologous blood reinfusion for patients undergoing orthopedic surgery.

Randomized controlled trials regarding autologous blood transfusion, but not specifically mention OrthoPAT, are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

Two systematic reviews regarding autologous blood transfusion were identified. Neither specifically mention OrthoPAT in the abstract, however, they were included as they summarize the literature regarding autologous blood transfusion in patients undergoing orthopedic surgery. Additionally, randomized controlled trials regarding autologous blood transfusion, but not specifically mentioning OrthoPAT, are provided in the appendix.

The systematic reviews evaluated autologous blood transfusion in patients undergoing hip\(^1\) or knee\(^1,2\) arthroplasty. Autologous blood transfusions reduced: post-operative blood transfusions,\(^2\) the need for allogeneic blood transfusion,\(^1\) hospital costs,\(^1\) and hospital length of stay.\(^2\)
One randomized study\textsuperscript{3} specifically evaluated the clinical and cost effectiveness of OrthoPAT for total knee arthroplasty. Regarding the need for allogeneic blood transfusion, this study did not find a statistically significant difference between controls and OrthoPAT, and found costs to be higher for OrthoPAT.\textsuperscript{3}

A separate economic evaluation\textsuperscript{4} compared OrthoPAT, unwashed shed blood, and allogeneic blood in patients undergoing hip or knee arthroplasty. This study found OrthoPAT to be more costly than both unwashed shed blood and allogeneic blood.\textsuperscript{4}
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses


Non-Randomized Studies


Economic Evaluations


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APPENDIX – FURTHER INFORMATION:

Randomized Controlled Trials – OrthoPAT Not Specified in the Abstract


