Natriuretic Peptide testing for Monitoring of Oncology Therapy: Clinical Utility, Cost-Effectiveness, and Guidelines
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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.

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Research Questions

1. What is the clinical utility of natriuretic peptide testing for monitoring of cardiotoxicity of oncology therapy?

2. What is the cost-effectiveness of natriuretic peptide testing for monitoring cardiotoxicity of oncology therapy?

3. What are the guidelines for natriuretic peptide testing for monitoring cardiotoxicity of oncology therapy?

Key Findings

Nine non-randomized studies were identified regarding the clinical utility of natriuretic peptide testing for monitoring of cardiotoxicity of oncology therapy. In addition, two evidence-based guidelines were identified regarding natriuretic peptide testing for monitoring cardiotoxicity of oncology therapy. No relevant economic evaluations were identified.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine’s MeSH (Medical Subject Headings), and keywords. The main search concepts were natriuretic peptide, cardiotoxicology and oncology treatments. No filters were 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 Jan 1, 2014 and July 25, 2019. 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>Population</td>
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| Comparator                  | Q1-2: No natriuretic peptide testing; Other prognostic testing (cardiac troponin T test, echocardiography)  
|                             | Q3: No comparators |
| Outcomes                    | Q1: Clinical utility (e.g., changes to therapy)  
|                             | Q2: Cost-effectiveness  
|                             | Q3: Evidence-based guidelines |
| Study Designs                | Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines |
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, economic evaluations, and evidence-based guidelines.

Nine non-randomized studies\textsuperscript{1, 8} were identified regarding the clinical utility of natriuretic peptide testing for monitoring of cardiotoxicity of oncology therapy. In addition, two evidence-based guidelines\textsuperscript{10, 11} were identified regarding natriuretic peptide testing for monitoring cardiotoxicity of oncology therapy. 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

Nine non-randomized studies\textsuperscript{1, 8} were identified regarding the clinical utility of natriuretic peptide testing for monitoring of cardiotoxicity of oncology therapy. Authors of four non-randomized-studies\textsuperscript{1, 3, 4, 9} found that natriuretic peptide (B-type natriuretic peptide [BNP] or N-terminal pro b-type natriuretic peptide [NT-proBNP]) testing was useful in predicting the development of anthracycline-induced cardiotoxicity or cardiomyopathy. The authors of two of the studies\textsuperscript{3, 9} also found that natriuretic peptide testing had significant correlation in predicting chemotherapy-related mortality.\textsuperscript{3, 9} Authors of two non-randomized studies observed that abnormal or elevated natriuretic peptide levels were associated with chemotherapy-induced cardiotoxicity, and made note of its potential use as an additional tool for early detection of cardiotoxicity risk in cancer patients.\textsuperscript{7, 8} However, authors of three non-randomized studies\textsuperscript{2, 5, 6} found that normal or elevated levels of natriuretic peptide may not be reliable as early predictors of chemotherapy-induced cardiotoxicity.

Guidelines from the American Society of Clinical Oncology recommend screening for serum cardiac biomarkers such as natriuretic peptide during and after chemotherapy treatment in patients at risk for cardiac dysfunction.\textsuperscript{10} Guidelines from the Canadian Cardiovascular Society recommend the serial use of cardiac biomarkers such as BNP for the early detection of cardiotoxicity in cancer patients receiving cardiotoxic chemotherapy implicated in left ventricular dysfunction.\textsuperscript{11}

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.
Randomized Controlled Trials

No literature identified.

Non-Randomized Studies


Economic Evaluations

No literature identified.

Guidelines and Recommendations

   See: Recommendation 4.2 & 5.1.1, bullet 3, pages 895 to 896.

   See: Recommendation 154, page 1408.
Appendix — Further Information

Previous CADTH Reports

12. Recent series of reports on Natriuretic Peptide Testing (in progress)
   https://www.cadth.ca/search?keywords=natriuretic+AND+peptide+AND+testing

Non-Randomized Studies

Alternative Population

   PubMed: PM24821636

Alternative Outcome

   PubMed: PM28570595

Outcome Unspecified


Review Articles

   PubMed: PM30126650

   PubMed: PM29923056

   PubMed: PM29802472

   PubMed: PM28013560


