TITLE: Concurrent versus Sequential Digital Mammography and MRI for Breast Cancer Screening in High-Risk Patients: Comparative Clinical Effectiveness, Cost-Effectiveness, and Guidelines

DATE: 06 May 2015

RESEARCH QUESTIONS

1. What is the comparative clinical effectiveness of concurrent versus sequential digital mammography and magnetic resonance imaging (MRI) for breast cancer screening in high-risk patients?

2. What is the comparative cost-effectiveness of concurrent versus sequential digital mammography and MRI for breast cancer screening in high-risk patients?

3. What are the evidence-based guidelines regarding the combined use of digital mammography and MRI for breast cancer screening in high-risk patients?

KEY FINDINGS

One economic evaluation was identified regarding the comparative cost-effectiveness of concurrent versus sequential digital mammography and MRI for breast cancer screening in high-risk patients. In addition, two evidence-based guidelines were identified regarding the combined use of digital mammography and MRI for breast cancer screening in high-risk patients.

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. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and April 23, 2015. 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.

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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>Intervention</strong></td>
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<td><strong>Comparator</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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MRI = magnetic resonance imaging.

**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.

One economic evaluation was identified regarding the comparative cost-effectiveness of concurrent versus sequential digital mammography and MRI for breast cancer screening in high-risk patients. In addition, two evidence-based guidelines were identified regarding the combined use of digital mammography and MRI for breast cancer screening in high-risk patients. No relevant health technology assessments, systematic reviews, meta-analyses, randomized controlled trials or non-randomized studies were identified. Furthermore, no relevant evidence regarding the clinical effectiveness of concurrent versus sequential digital mammography and MRI was identified.

Additional references of potential interest are provided in the appendix.

**OVERALL SUMMARY OF FINDINGS**

One economic evaluation\(^1\) was identified regarding the comparative cost-effectiveness of concurrent versus sequential digital mammography and MRI for breast cancer screening in high-risk patients. In addition, two evidence-based guidelines\(^2,3\) were identified regarding the combined use of digital mammography and MRI for breast cancer screening in high-risk patients.
The economic evaluation\(^1\) investigated the cost-effectiveness of various combined screening strategies. The most cost-effective strategies depending on lifetime disease risk are presented in Table 2.

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<th>Lifetime Disease Risk</th>
<th>Most Cost-Effective Strategy</th>
<th>ICER</th>
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<tr>
<td>25%</td>
<td>Stagger MRI and mammography plus CBE annually from age 30 to 74</td>
<td>$58 400/QALY</td>
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<tr>
<td>50%</td>
<td>Stagger MRI and mammography plus CBE bi-annually</td>
<td>$84 400/QALY</td>
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<tr>
<td>75%</td>
<td>Biennial MRI plus mammography and CBE bi-annually</td>
<td>$62 800/QALY</td>
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CBE = clinical breast examination; ICER = incremental cost effectiveness ratio; MRI = magnetic resonance imaging; QALY = quality adjusted life years.

The evidence based guidelines were produced by the Institute for Clinical Systems Improvement (ICSI)\(^2\) and Alberta Health Services.\(^3\) The ICSI guideline states that annual MRI screening should be completed at a six-month offset interval from yearly mammogram in high-risk individuals. The Alberta Health Services guideline\(^3\) states that concurrent MRI and mammography should be performed annually for high-risk patients. In the case of both guidelines, 'high-risk' comprises individuals: with a personal history or family history of deleterious mutations (e.g., BRCA1/2), with a personal lifetime disease risk over 20% to 25% based on family history dependent models, who have received radiation treatment to the chest between the ages of 10 and 30, or who have genetic disorders that increase breast cancer risk.\(^2,3\)

No relevant evidence regarding the clinical effectiveness of concurrent versus sequential digital mammography and MRI was identified; therefore, no summary can be provided.
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
No literature identified.

Economic Evaluations


Guidelines and Recommendations


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APPENDIX – FURTHER INFORMATION:

Non-Randomized Studies – No Comparator


Economic Evaluations

Alternate or Unclear Intervention


Alternate Comparator


Guidelines and Recommendations - Unclear Methodology

See: Our Breast Cancer Screening Guidelines

See: Women Requiring More Intensive Screening, page 3

Additional References

PubMed: PM21935911