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Evidence-based Series: Section 1

Magnetic Resonance Imaging Screening of Women at High Risk for Breast Cancer: A Clinical Practice Guideline

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The full Evidence-based Series on MRI Screening is comprised of 3 sections and is available on the CCO website (<http://www.cancercare.on.ca>)
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Section 1: Clinical Practice Guideline
Section 2: Systematic Review
Section 3: Guideline Development and External Review
- Methods and Results

Questions

- What is the effectiveness of adding breast magnetic resonance imaging (MRI) to standard screening (mammography) compared to screening mammography alone?
- Does the addition of breast MRI to standard screening detect breast cancer at an earlier stage?
- What is the optimal frequency of MRI screening?
- Are there subgroups (risk category, age, or breast density) that benefit more from MRI screening than do others?
- What harms are associated with MRI screening, and are there any relative or absolute contraindications to its use?
- In the presence of an abnormal finding seen only on MRI imaging, what is the optimal workup and follow-up after screening?

Target Population

Women at very high risk for breast cancer, 'very high risk' being defined as:

1. Known mutation in BRCA1, BRCA2 or other gene predisposing to a markedly elevated breast cancer risk.
2. Untested first-degree relative of a carrier of such a gene mutation

3. Family history consistent with a hereditary breast cancer syndrome and estimated personal lifetime cancer risk >25%.
4. High-risk marker on prior biopsy (atypical ductal hyperplasia, atypical lobular hyperplasia, lobular carcinoma in situ [LCIS])
5. Radiation therapy to chest (before age 30 and at least eight years previous).

Recommendations

MRI in addition to mammography is recommended for women in target population subgroups 1, 2, and 3 above. There is insufficient evidence to make a recommendation for or against MRI in addition to mammography for target population subgroups 4 and 5 above.

- Twelve studies, four in abstract form, were identified that evaluated MRI in comparison to mammography in women at high risk for breast cancer. These studies all found superior sensitivity for the detection of breast cancer with MRI compared to mammography. MRI was also found by most studies to have inferior specificity to mammography, with higher recall and biopsy rates associated with MRI.
- A meta-analysis of these studies found MRI to have numerically superior discriminatory power overall compared to mammography in determining the true breast cancer status of high-risk women. The summary sensitivity was 80.1% (95% confidence interval [CI] 73.3% to 85.8%) for MRI and 36.8% (95% CI 29.6% to 44.5%) for mammography. The summary specificity was 93.0% (95% CI 92.5% to 93.6%) for MRI and 97.5% (95% CI 97.1% to 97.8%) for mammography. The overall diagnostic odds ratio for MRI was 77.338 (95% CI 29.117 to 205.41) versus 32.003 (14.633 to 69.989) for mammography. Due to the limited number of studies included, a direct statistical comparison of the two modalities was not possible.

Expert Opinion and Qualifying Statements

- While there is insufficient evidence at this time to make a definitive recommendation regarding the appropriate screening frequency, it is the opinion of the Working Group that women should be screened annually, as this was the frequency typical of the identified studies on which the recommendation for screening is based.
- While there is insufficient evidence at this time to make a definitive recommendation regarding the ages of patients who should be screened, it is the opinion of the Working Group that women should be screened annually from 30 to 69 years of age. Age 30 is an appropriate age to begin screening as women at that age with BRCA mutations are at much greater risk of breast cancer than women aged 50 and older in the general population. Age 69 is an appropriate age to end screening because: the relative risk of cancer decreases with age in the population at hereditary risk; mammographic sensitivity increases with age; very few subjects were included in the studies greater than age 69; and the evidence for mortality reduction from screening in the general population is lacking for women older than age 70.
- While there is insufficient evidence at this time to make a definitive recommendation regarding MRI screening in categories 4 and 5, above, of the target population, it is the opinion of the Working Group that the benefits of MRI in terms of increased sensitivity outweigh the potential harms of higher recall rates and biopsy rates for selected women in group 4 from the time the marker is identified to no later than age 69 and for all women in group 5. In the specific case of category 5, it is the opinion of the Working Group that screening should begin at age 30 or eight years after the chest irradiation, whichever is later, as the risk for breast cancer does not increase until eight years after treatment.

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