

BREAST MRI:

ARE THOSE WHO

NEED IT GETTING IT?

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INTRODUCTION

- Breast MRI is a relatively new tool in the detection and management of breast cancer¹
- Between 2000 and 2009, breast MRI use has **increased more than 20-fold**²
- However, breast MRI is a double-edged sword

ADVANTAGE

- It is **highly sensitive** in detecting breast cancer

DISADVANTAGES

- Its **low specificity** leads to additional exams and procedures. This translates to increased risks and anxiety for patients and increased costs
- **Contrast injection** is required which has its own set of potential complications
- **No randomized trial** has demonstrated any improved survival for patients who undergo breast MRI³

1. Slanetz JP et al. *UpToDate*, August 2015.
 2. Stout et al. *JAMA Intern Med* 174 (1):114-121. 2014.
 3. Bankhead C. *Medpage Today*, November 2013.

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Context

- In 2014, the Breast Cancer Surveillance Consortium (Wernli et al., JAMA Intern Med 174(1):125-132) reported that
 - Only 25% of MRI screening was done for appropriate indications, as defined by the American Cancer Society Guidelines (>20% lifetime risk of breast cancer) (Saslow et al., CA Cancer J Clin 57:75-89. 2007)
 - Conversely, <5% of patients at high-risk of breast cancer received breast MRI
- Preoperative staging MRI offers limited benefit for women, with lengthened investigation times (Houssami et al., J Clin Oncol 32:392-401. 2014; Arnaout et al. JAMA Oncol Sept 24th 2015)
- Waiting list for radiology exams and health costs are constant growing concerns
- Improved patient selection is urgently needed to maximize the benefit of breast MRI (Shelley et al., JAMA Intern Med 174(1):122-124. 2014)

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Area in need of improvement

- In the fall of 2013, given increasing controversy regarding the utilization of breast MRI - particularly as a preoperative staging tool – and lengthy waiting lists for breast MRI at our institution, we decided to perform a clinical audit of breast MRI utilization.

PLAN

Objectives

We sought to determine how breast MRI was being used in our academic center, with the following objectives:

1. To determine the proportion of breast MRI exams performed for different clinical indications
2. To assess the waiting times for breast MRI, specifically for screening exams
3. To review the literature regarding breast MRI indications with our multidisciplinary panel of breast specialists
4. To draw a list of evidence-based clinical indications for breast MRI use that takes into account local capacities for breast MRI

PLAN

Clinical setting

- Our breast imaging center is an academic referral center for radiology clinics in the wider Montreal area
 - 5 fellowship-trained breast imagers
 - Residency and fellowship training program
 - Strong team of clinicians involved in research
 - Regular multidisciplinary rounds
- MRI activity
 - 1600 breast MRI exams are performed annually

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Understanding the problem

In September 2013, we performed a retrospective review of breast MRI use

- Retrieval of all breast MRI performed during the month
- Review of indications for each MRI exam
- Analysis of the breast MRI waiting list
 - Volume of exams
 - Classification of requests as within or exceeding prescribed delays as defined by Quebec provincial guidelines for imaging studies (≤ 90 days for a new patient evaluation, ≤ 30 days for a follow-up evaluation)
 - Weekly scheduling of breast MRI examinations

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Collecting data

- MRI scheduling for breast examinations
 - Weekly, 16 hours in the MRI suite reserved for breast MRI exams
 - ✓ 26 women (30-min time slots) and 2 breast biopsies (90-min each)
- MRI requests awaiting appointment at the end of September 2013
 - 687 breast MRI requests awaiting scheduling
 - 132 exceeded recommended waiting times by ≤ 6 months
 - 58 exceeded recommended waiting times by 6-12 months
 - 66 exceeded recommended waiting times by > 12 months

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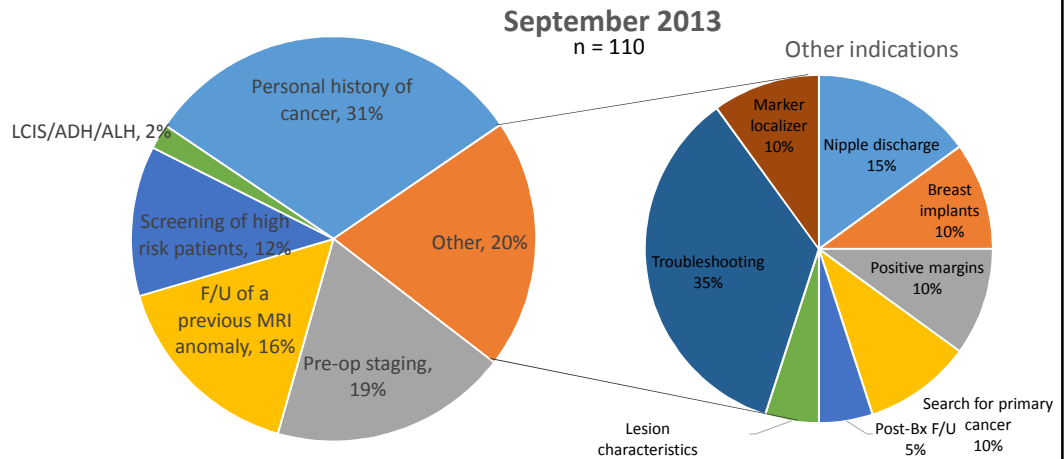
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Indications of breast MRI exams performed



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- > MRI for high risk
- > What is the impact of screening
- > After mastectomy
- > Evidence for indications

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Consensus meeting

After this data collection confirming the need for a change,

- We organised a multidisciplinary half-day scientific session to be held in May 2014, inviting the 28 members of the breast team
 - 21 participants, from all invited fields: 5 radiologists, 4 surgical oncologists, 2 medical oncologists, 2 radiation oncologists, 2 geneticists, 3 breast physicians, 3 radiology residents
 - Formal presentations with review of the literature regarding MRI use for breast cancer staging, high-risk screening and other indications
 - Discussions until a consensus could be reached

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Evidence-supported accepted MRI indications

The multidisciplinary consensus was reached as a scientifically acceptable compromise between published evidence* and MRI availability at our institution

Accepted indications for breast MRI fell into two categories

1. Pre-operative staging (in specific clinical situations)
2. High-risk screening

* An abbreviated bibliography of the sources consulted is available at the end of this presentation.

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MRI use for preoperative cancer staging

Experts concluded there was scientific evidence to **recommend / consider MRI** in the following situations:

- Search for primary breast cancer in woman with metastatic axillary lymph nodes
- Paget's disease of the nipple
- Infiltrating lobular carcinoma (unless mammography and ultrasound evaluations were felt to be radiologically satisfactory)
- Breast cancer in a woman younger than 35 years of age
- Her2+ or triple negative cancers (as part of research protocols)
- Before neoadjuvant chemotherapy (unless MRI would not impact surgical planning)
- Locally advanced breast cancer with suspected pectoralis muscle or skin invasion
- After surgery with positive margins

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MRI use for high-risk screening

Experts concluded there was scientific evidence to recommend **annual MRI screening** for the following women:

- BRCA mutation, or first-degree relative of a family member with BRCA mutation
- Syndromes (as per Saslow et al. CA Cancer J Clin 2007; 57:75-89)
 - Li-Fraumeni (TP53), PTEN (Cowden), Bannayan-Riley, and first degree relatives
- Lifetime risk >20% as calculated by breast cancer risk assessment tool
- Patients with radiation to chest between 10-30 years of age

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MRI use for high-risk screening

Experts recommended that women with a strong family history who have not yet been evaluated in genetics be offered **MRI screening** when they fulfill the following high risk criteria (guidelines of the Australian classification (Austral World J Surg (2010) 34:979-986)

- Mutation identified in the family
- ≥ 3 first or second degree relatives with breast or ovarian cancer (same side of the family)
- ≥ 2 first or second degree relatives with breast or ovarian cancer (same side of the family) + at least 1 of the following risk factors:
 - Bilateral cancer
 - Male breast cancer
 - Diagnosis <40 years of age
 - Breast + ovarian cancer in the same person

STUDY

Defining when to start and stop MRI screening

Experts felt that the ages at which MRI screening should begin and end needed defining

When should screening MRI begin?

- Start at 25-30 yo if BRCA 1/2 mutation (or first degree relative)
- Start at 20 yo for Li-Fraumeni (TP53) (or first degree relative)
- Start at 30 yo for high risk patients without formal genetic evaluation
- Start 8 years after end of Tx for patients with history of mediastinal radiation therapy

When should screening MRI stop?

- Annual screening MRI may cease at 69 yo for all high risk patients, regardless of breast density

STUDY

High-risk screening after mastectomy

Experts recommended that there be **no regular MRI surveillance** after bilateral mastectomy

- For women with **prophylactic mastectomy** (including removal of the nipple-areola complex)
 - ✓ Clinical surveillance if no reconstruction
 - ✓ **In presence of an autologous graft:** mammography every 18-24 months
 - ✓ **In presence of breast implants:** physical exam only; no imaging follow-up

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High-risk screening after mastectomy

- For women with **therapeutic mastectomy** (including removal of the nipple-areola complex)
 - ✓ Clinical surveillance if no reconstruction
 - ✓ **If reconstruction with an aulogous graft:** annual mammography
 - ✓ **If reconstruction with breast implants:** post-operative mammogram to verify presence of residual tissue and yearly mammography thereafter if present
- For women with **preserved nipple-areola:** annual mammography

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Evidence-supported MRI indications

Experts concluded that, taking into account the availability of breast MRI at our institution, there was **not enough evidence** to recommend annual surveillance with MRI for women with the following risk factors:

- Prior history of breast cancer
- Personal history of lobular neoplasia or atypia (LCIS, ALH, ADH)
- Women with dense breasts

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Insufficient evidence to recommend MRI

Experts agreed that screening MRI will not be offered to **women at moderate risk** based on family history, before a formal calculation of their lifetime risk

- The following criteria serve as reference to define moderate risk (guidelines of the Australian classification (Austral World J Surg (2010) 34:979-986))
 - 1 or 2 first-degree relative with breast cancer before 50 years of age (same side of the family) and without high risk factors
 - 2 first- or second-degree relatives with breast or ovarian cancer (same side of the family) without high risk factors

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Distributing the new guidelines for MRI use

- Conclusions from our exchanges were summarized in a written document and approved by all members of the breast team before final approval
- This new consensus was made available to physicians referring to our academic center
 - It was e-mailed to all physicians involved in breast care at our institution
 - A print-out of the consensus was made easily accessible to clinicians and radiologists at their clinics and work stations

ACT

Informing referring physicians of the new guidelines

- A letter informing referring physicians of a rejected request for their patient's MRI was sent out in addition to the summarized recommendations from our consensus meeting
- It was made clear to all referring physicians that these guidelines aim to standardize our institution's use of breast MRI, but *should not replace the physician's clinical judgement*
- It was decided that all breast MRI requests asked before the consensus meeting would be honoured, without questioning their indication

ACT

Improving the prescription form

INITIAL PRESCRIPTION FORM

Indications

- Breast cancer
 - Bi-Rads 5 lesion (awaiting confirmation)
 - Recent diagnosis – evaluate extension
 - Previous diagnosis – date: _____
- Screening – high risk for breast cancer
- Evaluation of chemotherapy response
- Search for primary cancer
- Positive margins post-tumorectomy
- Short term MRI follow-up (BIRADS 3)
- Problem-solving: mammographic / US anomaly
- Nipple discharge
- Breast implants
- Post-biopsy follow-up
- Other: _____

POST CONSENSUS

Indications

- Preoperative staging (as per May 2014 consensus)
- Evaluation of chemotherapy response
- Short-term follow-up (BIRADS 3 and post MRI biopsy)
- Problem-solving after mammo/US
- Nipple discharge
- Screening high risk women (eg. BRCA + 1st degree relatives)
- Screening other women at increased risk
- Breast implant evaluation

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- Screening other women at increased risk
- Breast implant evaluation

Clearly referring to the consensus guidelines simplified the prescription form while reaffirming our determination in respecting its conclusions

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POST CONSENSUS

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- Preoperative staging (as per May 2014 consensus)
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- Problem-solving after mammo/US
- Nipple discharge
- Screening high risk women (eg. BRCA + 1st degree relatives)
- Screening other women at increased risk
- Breast implant evaluation

Separating women with proven genetic susceptibility from other women « at risk » allowed for improved scheduling

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Improving the prescription form

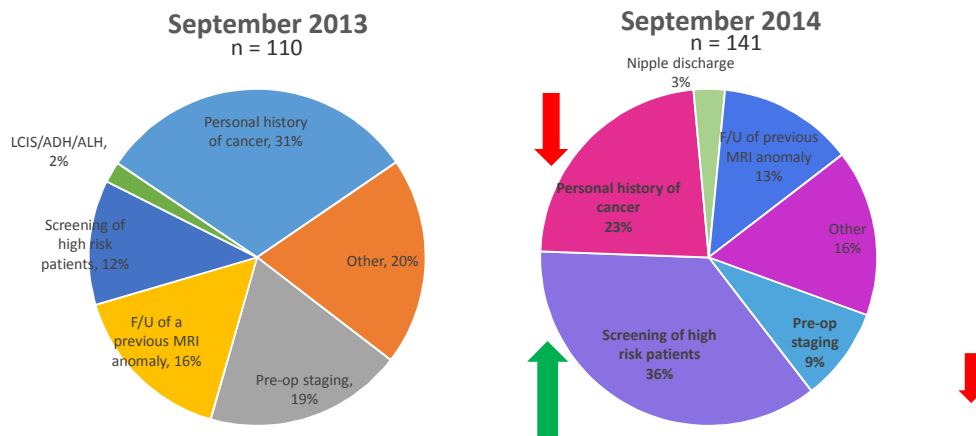
In addition, **guidelines for exam priority** were established and clearly detailed as part of the prescription form:

Unless there exist specific circumstances,

- Preoperative staging and evaluation of chemotherapy response are first priority evaluations (P1)
- Short-term follow-up, problem-solving after mammo/US and nipple discharge are moderate priority evaluations (P2)
- Screening high risk women (eg. BRCA + 1st degree relatives) requests receive next priority rating (P3)
- Screening other women at increased risk and breast implant evaluation are last priority examinations (P4)

1 year post implantation

Impact of the new consensus on indications for breast MRI



2 year post implantation

Impact of the new consensus on waiting times for breast MRI

	Sept 2013	Sept 2014	Sept 2015
Total number of breast MRI requests awaiting examination	687	612	301
Requests within recommended waiting times (< 90 days)	167	145	126
Requests exceeding waiting times by < 6 months	132	58	66
Requests exceeding waiting times by 6-12 months	58	146*	71
Requests exceeding waiting times by > 12 months	66	59*	8
Delay before next non-urgent breast MRI availability	320 days	250 days	176 days

* Because our delay for non-urgent MRI in 2013 was close to a year (320 days), the impact of the new guidelines was not fully evident until the 2-year post implementation cycle.

2 year post implantation

Impact on breast imaging department

- With better patient selection and a slight increase in the MRI time allocation for breast exams (from 16 to 19 hours), breast MRI exams awaiting scheduling largely decreased, from 320 to 176 days.
 - Urgent evaluations can be obtained in a timely manner.
- Evidence-based utilization of breast MRI has positively impacted other activities of the breast imaging service
 - Decreasing the proportion of exams performed for preoperative staging has led to a decrease in the frequency of MRI-detected enhancing lesions that require second-look evaluations before surgical management
 - ✓ Fewer second-look evaluations with ultrasound (+/- mammography)
 - ✓ Fewer MRI biopsies

CONCLUSION

- A multidisciplinary approach allowed for important changes to be made at our institution in terms of breast MRI use, with high compliance by all
- Evidence-based MRI utilization has improved the care of women requiring MRI evaluation
 - ✓ Preoperative staging is more efficiently used
 - ✓ High-risk women get timely screening MRI
- Continuous adjustments to MRI use will be performed as evidence becomes available so that our institution constantly adheres to state-of-the-art utilization

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