RADIOLOGY

Improving Breast MRI Wait Times:
A Model for Transitioning Newly Implemented Diagnostic Imaging Procedures into Routine Clinical Operation

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Disclosures

- None

Background

- Breast MRI utilization has increased over the last decade
  - Stout et al found a 16x increase in breast MRI volume between 2000 and 2011[1]

- Clinical demand for breast MRI had increased beyond our institution's capacity to perform the study in a timely fashion
  - Prohibitively long wait times
  - Range: 60-80 days for routine breast MRI in mid-2014

1. Stout NK, et al. JAMA Intern Med 2014; 174: 114-121

Background

- Potential effects of long breast MRI wait times:
  - Patient anxiety
  - Referring physician frustration
  - Delayed diagnosis
  - Loss of revenue as patients seek care elsewhere

- Shorter perceived and actual wait times correlate with higher patient satisfaction scores[2]

2. Holbrook A, et al. JACR 2016; 13: 505-509

Purpose

- Quality improvement effort to increase patient access to breast MRI while maintaining examination image quality

Materials and Methods

- IRB approval waived for this HIPAA-compliant quality improvement initiative
- Prospective longitudinal project conducted 12/2014 – 3/2016
- Quality initiative team included:
  - Breast imaging radiologist
  - MRI manager and supervisor
  - Lead breast MRI technologist
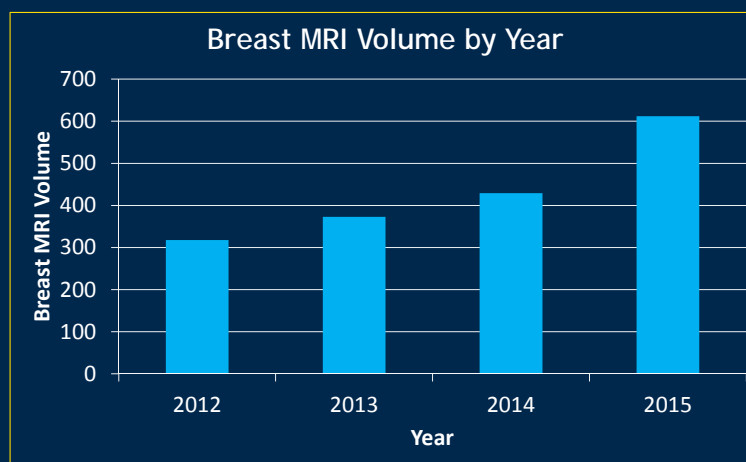
Materials and Methods

- Wait times, scheduling grids, and radiologist/technologist staffing models were reviewed to identify root causes

- Wait time tracking:
  - Bi-weekly wait times were tracked before and during QI project as root causes were identified
  - Bi-weekly wait times were tracked before and after implementation of action plans

- Wait time defined as length of time from order placement to third available breast MRI slot (institutional standard)

- Recall rates for additional MR imaging were recorded

Plan: Investigate Contributing Factors

Institutional breast MRI volume increasing

- From 2013→2015: Breast MRI volume was up 64%

Breast MRI Volume by Year

(Bar chart: Breast MRI Volume on y-axis (0 to 700), Year on x-axis)
- 2012: ~315
- 2013: ~375
- 2014: ~430
- 2015: ~610

Plan: Investigate Contributing Factors

Limited access on MRI scheduling grid

1. Breast MR at our institution is performed on 3T (a limited resource compared to 1.5 T)

2. At its inception, breast MRI was only offered during business hours on weekdays to ensure exam quality and radiologist availability

3. Limited number of MRI technologists trained to scan breast MRI

   – At the beginning of the QI effort, only 3% (3/89) of the MRI technologists were trained to position patients and acquire breast MRI

Root Causes of Breast MRI Wait Times

- Root causes identified:

  1. Too few MRI technologists trained to perform breast MR
  2. Requirement to have radiologist physically present for quality assurance

- Root causes prevented adding appointments after routine weekday hours of operation

Do: Action Items to Decrease Wait Times

- Develop a plan to train additional MRI technologists in breast MRI across afternoon/evening and weekend shifts
  - Four breast MRI technologist trainees selected by MRI manager
  - Create technologist training program for breast MRI
- Eliminate the requirement for physical presence by a breast imaging radiologist

Do: Establish Technologist Proficiencies

- 17-item proficiency checklist developed by MRI supervisor and breast imaging radiologist including these domains:
  - Pre-scan assessment of the patient's last menstrual period
  - Proper external marking of areas of clinical concern
  - Proper positioning of the patient in the breast coil
  - Proper sequence and fat saturation technique
  - Correct documentation before and following the scan
- Checklist reviewed with the MR supervisor at the completion of training to assess technologist proficiency

Breast MRI Technologist Proficiency Checklist

Objective	Technologist	Supervisor	Comments
Before scanning			
Tech reviewed the tutorial on fat saturation in the MR Operations/Staff Resource			
Tech checks order to verify type of scan: implant or breast cancer protocol			
Tech will verify LMP; if premenopausal, patient should be scanned on day 7-14 of cycle for breast cancer protocol			
Tech knows to review intake questionnaire. If there is an area of clinical concern, place a vitamin E capsule on the overlying skin			
Tech will ask patient for prior outside images and/or reports and document information in notes section			
Positioning			
Tech knows how to position breasts in coil in order to limit artifact and optimize exam			

Breast MRI Technologist Proficiency Checklist

Objective	Technologist	Supervisor	Comments
Technical			
Tech knows the proper FOV and should include axilla, pectoralis, chest wall, and inframammary fold			
Tech knows to verify fat saturation before contrast administration. There should be no superimposed water saturation on breast tissue or chest wall			
For implant protocol, tech ensures that the silicone implants are not saturated on STIR sequences			
Tech knows all sequences should have standard names to allow for post-processing by CAD software			
Tech knows to use Gadoteridol (Prohance®) with weight-based dose for all enhanced breast MRI			
Tech knows to verify contrast administration by checking the heart			
If scanning is delayed due to equipment malfunction, tech knows that the pre and post contrast dynamic need to be performed together			

Breast MRI Technologist Proficiency Checklist

Objective	Technologist	Supervisor	Comments
Documentation			
Tech knows to document the type of contrast and amount used			
Tech knows to make sure questionnaires are filled out and included with paperwork for radiologist			
Tech knows to make sure the order and protocol sheets are with the paperwork			
Tech knows to verify all initials and signatures are present and legible			

Do: Train Technologists

- Prior to performing breast MRI independently, the technologists should:
  1. Review breast MR protocol with lead technologist and MR supervisor
  2. Review expected proficiencies on checklist
  3. Scan ≥10 breast MRI examinations under the direct supervision of an experienced breast MRI technologist
  4. Demonstrate proficiency to the MRI supervisor by independent completion of the items on the checklist
- Average technologist breast MRI training time = 10 hours
  - Additional training conducted as needed

Do: Expand Schedule Access

- One month after technologist training began, the scheduling grid was expanded to weekend appointments

- Eight months later, the scheduling grid was expanded to weekday evenings

Breast MRI Volume

- 798 breast MRIs were performed during the study period

- Monthly volume 12/2014: 36 breast MRI

- Monthly volume 3/2016: 50 breast MRI

- Breast MRI monthly volume range: 36-64 exams

Study: Breast MRI Wait Time Results

Wait time fell from 101 days before implementation to 11 days at study completion (range: 5-101 days)
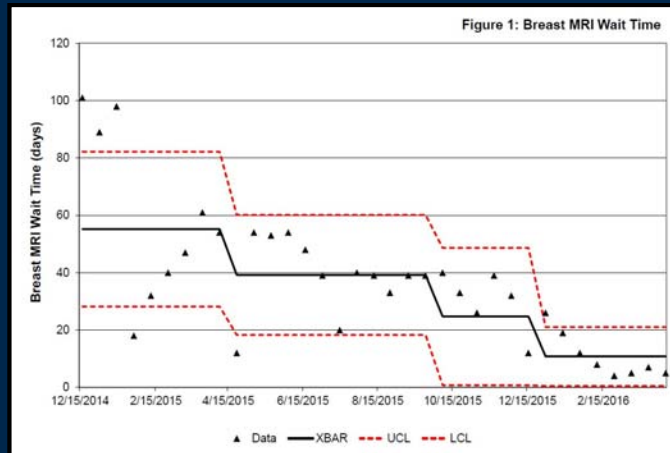
UCL= Upper Control Limit, LCL= Lower Control Limit, XBAR= plots the mean over time

Study: Image Quality Results

- One patient recalled for repeat imaging during study, due to incorrect protocol assignment by the radiologist
  - Recall rate was 0.13% (1/798)

- Superb image quality maintained by technologists newly trained to perform breast MRI
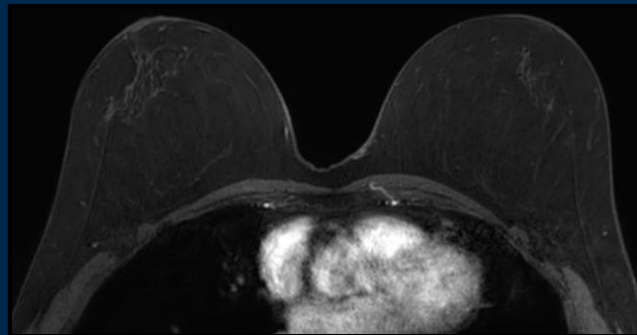
Conclusion

- A specialized MRI exam was transitioned into routine clinical operation while maintaining image quality and engaging employees

- A structured technologist training plan with proficiency checklist coupled with side-by-side scanning with an experienced technologist allowed our institution to schedule breast MRI on weekdays, evenings, and weekends, thereby improving patient access and reducing wait times

- This model may be useful for transitioning newly implemented advanced diagnostic imaging examinations into routine clinical operation

References

1. Stout NK, Nekhlyudov L, Li L, Malin ES, Ross-Degnan D, Buist DS, Rosenberg MA, Alfisher M, Fletcher SW. Rapid increase in breast magnetic resonance imaging use: trends from 2000 to 2011. JAMA Intern Med 2014; 174: 114-121

2. Holbrook A, Glenn H Jr, Mahmood R, Cai Q, Kang J, Duszak R Jr. Shorter Perceived Outpatient MRI Wait Times Associated With Higher Patient Satisfaction. JACR 2016; 13: 505-509

Thank You

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