

14:00-14:20

CAD for Breast MRI

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Breast MRI

1.5 T, 3T
High resolution
Dynamic study
Diffusion imaging
Spectroscopy
Biopsy
CAD

Use

- Detection of breast cancer (high sensitivity)
Screening populations -high-risk groups
Diagnostic populations -suspected breast lesions
- Detection of tumor recurrence
- Follow up during chemotherapy
- Plastic surgery

Limitation

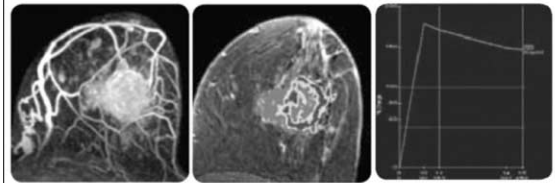
- Variable specificity
20-90%
Unnecessary biopsy $\Rightarrow$ CAD
Anxiety
Increase medical cost

CAD

- Mammography
- US
- MRI: Enhancing lesion
Hemodynamics

CAD

- Use contrast-enhanced MR images
- Computer-aided evaluation system
- **Benefits**
 - Automatically processed
 - Reduce artifact
 - Hemodynamic study: color, graph
 - Multipolar images
 - Biopsy

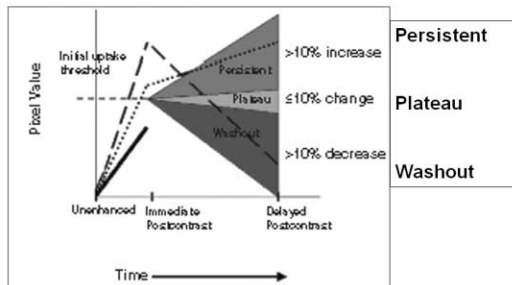


Scanning

Image registration and processing

Multipolar Imaging

Analysis of Dynamics

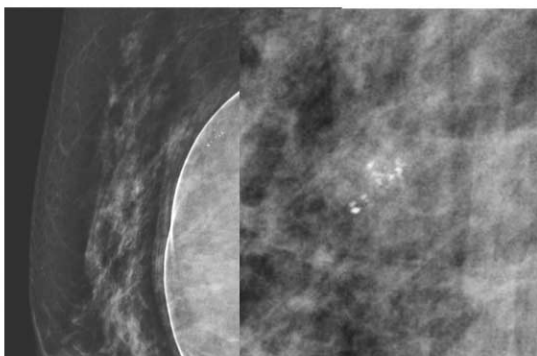


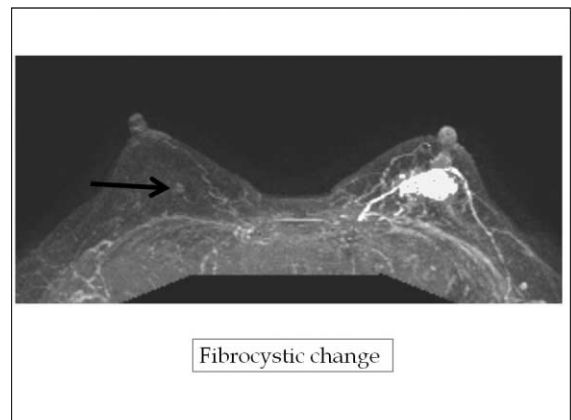
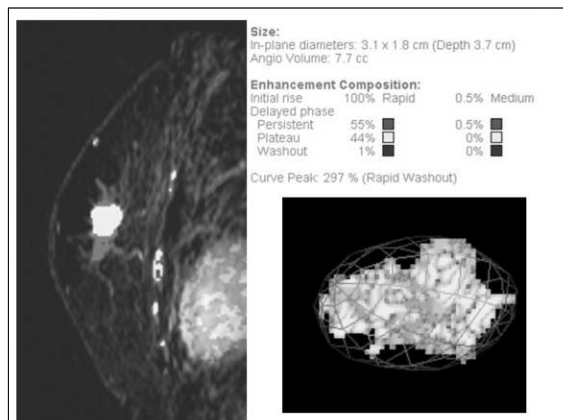
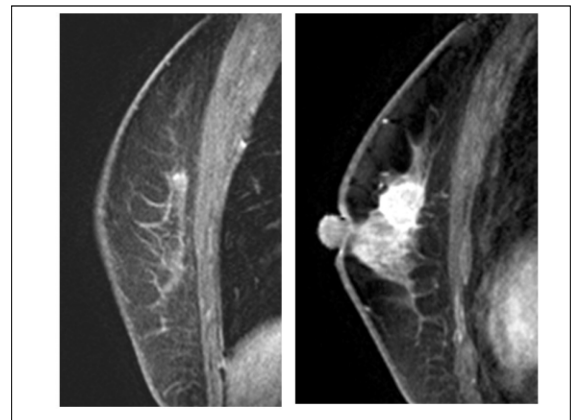
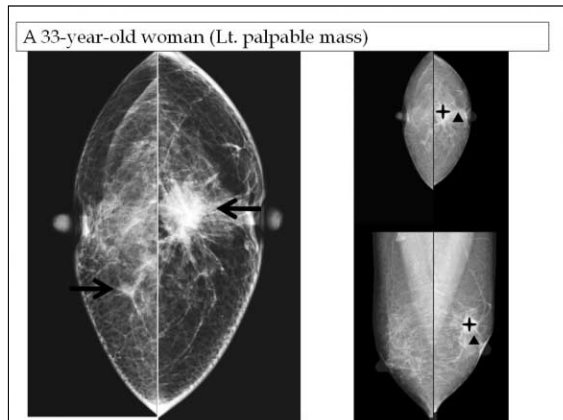
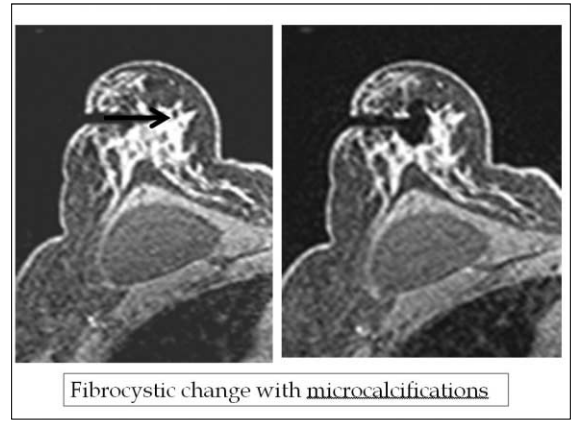
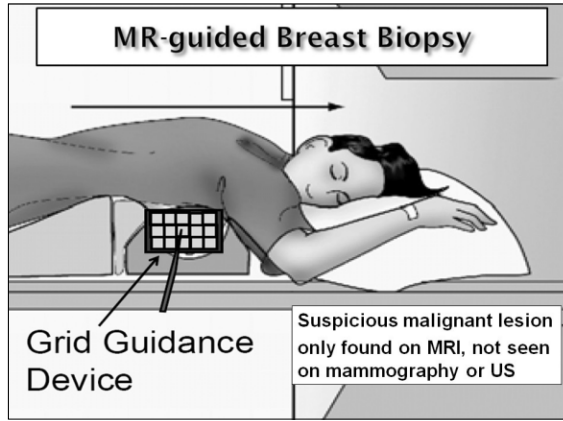
CAD

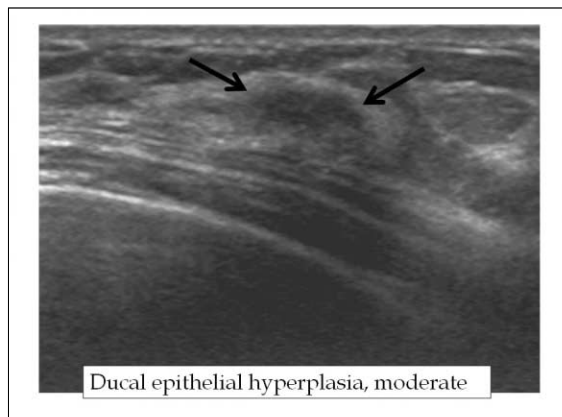
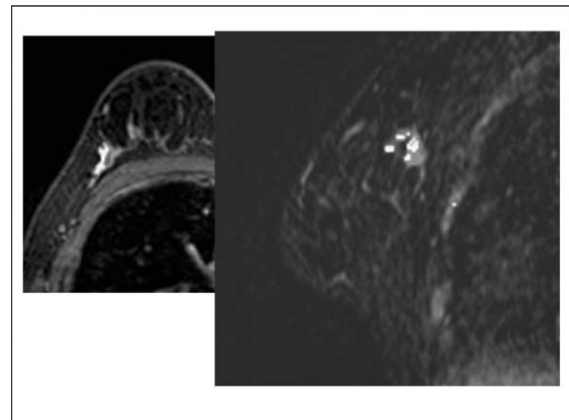
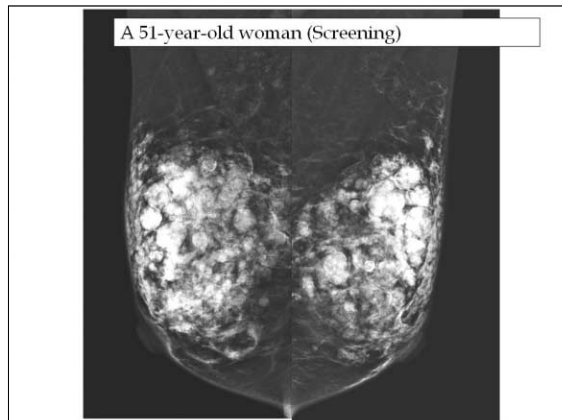
• Clinical usefulness

By Lehman et al. and Williams et al.
Improved the discrimination of benign from malignant lesions
Reduced false positive rates for the diagnosis of breast cancer
→ CAD system for breast MR is promising for improving specificity of MRI for the diagnosis of breast

A 56-year-old woman (Lt. MRM due to DCIS, Rt. Implant)



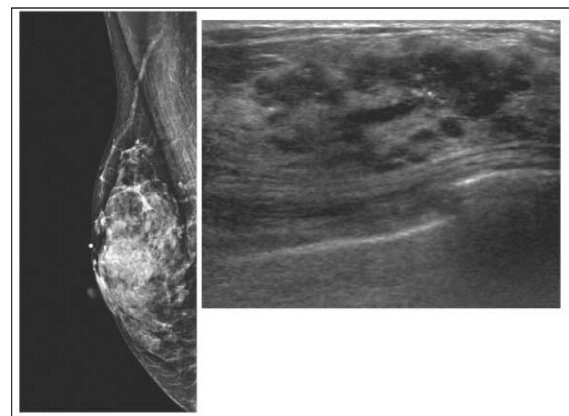


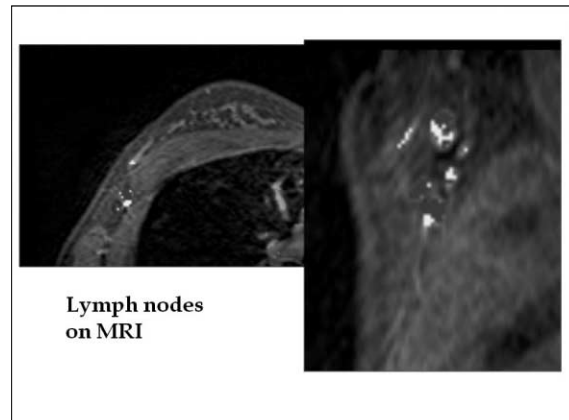
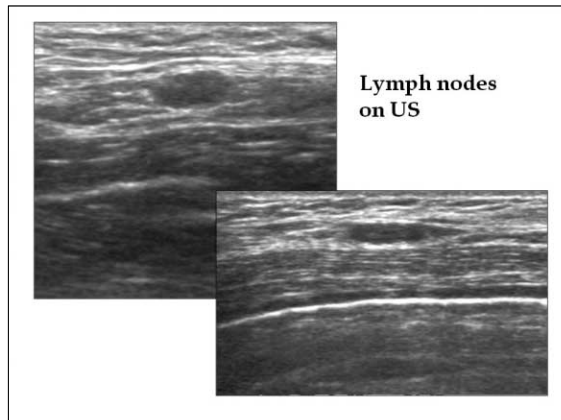


Lymph Node Metastasis

- Breast MR CAD system with 3 T magnet of axillary lymph nodes in patients of breast cancer (2009 RSNA meeting)
- 31 patients with breast cancers (8 lymph node +, 23 lymph node -)
- Color mapping +, no color -
- Results: Sensitivity 32%, specificity 100%
7/8 dominant red color (88%)
1/8 mixed color (12%)

- In breast cancer patients, axillary LN with dominantly red (washout) color mapping in on MR CAD images may suggest the possibility of metastasis rather than reactive hyperplasia
- MR CAD images has similar sensitivity and relatively lower specificity in diagnosis of axillary LN metastasis compared with other imaging modalities





Conclusion

- Advanced imaging techniques for MR can improve diagnostic performance
- Convenience for patients' care, clinician, surgeon, and us