

Evidence Discussion (BR 5.1)

Breast Implant Evaluation

The two types of breast implants include saline and silicone. Saline implant rupture is more clinically apparent, since the body readily resorbs the leaking saline and the implant shell appears deflated on exam.¹ Thus, there is no role for MRI breast(s) in asymptomatic women with saline implants.² However, if the exam is equivocal for rupture, initial imaging supported by the American College of Radiology includes diagnostic mammogram and/or ultrasound in individuals >30 years old. In those <30 years of age, diagnostic mammogram is not typically performed and ultrasound is the initial imaging of choice.²

An exam is not as reliable for detecting the rupture of silicone implants as it is for saline implants. Therefore, if an exam is equivocal for rupture, imaging with a combination of ultrasound, mammogram, and/or MRI of the breast (with the choice of mammogram depending upon age) is appropriate.³

The initial evaluation of individuals who present with a suspicious finding on breast imaging or a palpable mass upon examination involves a biopsy (percutaneous or surgical if percutaneous is not feasible). If the biopsy results are discordant with the imaging findings, an MRI for further evaluation is supported.⁴

Imaging with BI-RADS assessment of category 4 require biopsy. MRI is not supported prior to biopsy.⁵

Imaging with BI-RADS assessment of category 3 require short-term follow up imaging: at 6, 12, and 24 months.⁶

Phyllodes Tumor

Phyllodes tumors of the breast are usually benign, fibroepithelial lesions that have a range of biologic behaviors. Diagnosis is made by percutaneous core biopsy or excisional biopsy. MRI breast has not been shown to be of value in distinguishing phyllodes tumor from fibroadenoma. However, malignant phyllodes have the propensity to metastasize. Thus, MRI is supported in malignant phyllodes to determine the extent of disease and resectability.⁷

References:

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High Risk Indications

Li Fraumeni Syndrome is associated with an increased incidence of premenopausal breast cancer, with the median age of diagnosis being in the early 30s.⁵ Accordingly, the National Institute for Health and Care Excellence⁴ recommends annual MRI screening beginning at age 20.⁴

While the American Cancer Society has found that there's not enough evidence to make a recommendation for or against screening MRI in these populations,¹ the NCCN has recommended annual breast MRI for those with ADH, ALH or LCIS who have at least a 20% residual lifetime risk of developing breast cancer. Screening could begin at the age of diagnosis of ADH or lobular neoplasia, but not before the age of 25. They further note that the residual lifetime risk calculation depends on the age at diagnosis.²

BRCA1 and *2* are associated with a risk of developing breast cancer > 60%.³ The NCCN guidelines recommend starting MRI screening at the age of 25.³

STK11 mutations are associated with a 32-54% risk of developing primary breast cancer. *CDH1* and *PALB2* mutations each confer a risk of 41-60% of developing breast cancer. NCCN guidelines recommend starting MRI screening in these patients at age 30. For patients with *NF1*, the risk of developing breast cancer is 20-40%. NCCN guidelines recommend considering annual MRI screening from ages 30-50. *ATM* mutations are associated with a 20-30% risk of developing breast cancer, and *CHEK2* mutations similarly are associated with a 20-40% risk. NCCN guidelines suggest consideration of annual breast MRI starting at age 30-35 in both of these groups. *PTEN* mutations are associated with a 40-60% risk of developing breast cancer. while NCCN guidelines are silent on breast cancer screening for this population, ESMO guidelines recommend starting annual MRI at the age of 30.^{3,6}

BARD1, *RAD51C* and *RAD51D* are each associated with a 17-30% risk of developing breast cancer. The NCCN guidelines recommend considering an annual breast MRI starting at age 40.³

However, mutations and variants with a < 15% absolute risk of developing breast cancer lack sufficient evidence to suggest that screening MRI would be beneficial. Therefore, the NCCN does not recommend screening MRI for these patients unless other risks are present.³

The American Cancer Society considers individuals who have a first-degree relative with a BRCA 1 or 2 gene mutation and who have not been tested themselves to be at high risk. They recommend an annual MRI screening starting at age 30.¹ On the other hand, NCCN guidelines suggest that untested individuals with a first-degree relative with a BRCA 1 or 2 mutation should start screening either 10 years before the youngest family member was diagnosed with breast cancer, but not before age 25, or at age 40, whichever comes first.²

MRI utilizes a magnetic field and radio waves with computer processing to produce detailed images whereas CT uses ionizing radiation. Radiation dosages vary based on many factors and can be harmful to tissues. Thus, from radiation safety perspective MRI should be utilized when appropriate and supported by existing literature; however, the NCCN also acknowledges potential harms of MRI use, such as increased false positives, increased recall, and increased benign biopsies.²

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