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EDITORIAL

MR Mammography - A Paradigm Shifter in Onco - Imaging

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Introduction

Breast Cancer is one of the leading causes of cancer deaths in women[1]. According to the World Health Organization (WHO), the prevalence of breast cancer in women globally is 2.3 million in 2020[2]. Though the incidence is greater at advancing ages, breast cancer can occur at any age post-puberty. Early detection and accurate classification of suspicious masses as benign or malignant is needed for an appropriate treatment plan**.** Early diagnosis and early intervention has also decreased the mortality rate over the years.

MR Mammogram (MRM) is an emerging modality in detecting and characterizing breast lesions. It is accurate in evaluating lesions within the dense breast, subcentimetric lesions, and those not conclusive on X-ray mammography and sonomammography. MRM has a 90-100% sensitivity and 85-90% specificity in characterizing breast carcinoma[3]. Due to its high resolution with good morphological data and information on neo-angiogenesis MRM is one of the best methods for tumor detection[4].

MRI breast protocols include

- T1-weighted spin echo sequence
- T2weighted spin echo sequence
- STIR
- diffusion-weighted imaging (DWI)
- apparent diffusion coefficient (ADC)
- DCE-MRI with time intensity curve

Indications

The most common indication of breast MRI in clinical practice is to evaluate for breast cancer[5].

Annual screening MRI of the breasts is recommended in high-risk women such as patients with the risk of 20% or greater

- BRCA mutation carriers
- Untested first degree relative of BRCA carrier
- History of chest irradiation between ages 10 and 30 years.
- Women with genetic syndromes predisposing for breast cancer

In patients already diagnosed with breast cancer, MR imaging is important for further evaluation including:

- Preoperative assessment of the extent of cancer in newly diagnosed patients for surgical planning
- Screening of contralateral breast in conditions where there is an increased risk of bilaterality such as lobular carcinoma
- Breast cancer staging for treatment planning
- Monitoring tumor response to neoadjuvant therapy such as chemotherapy or hormonal therapy

Preoperative assessment for multifocal and multicentric lesions is important for appropriate treatment, which can decrease re-excision rate and recurrence rate.

Other indications for breast MRI include:

- Women with dense breasts, as they have one to two-fold increased risk of breast cancer than the general population
- To differentiate scar versus recurrence
- Woman with suspected inflammatory breast cancer - MRI demonstrates skin enhancement
- Axillary nodal metastasis with unknown primary or occult breast lesion on mammography and ultrasound
- To assess the stability of silicone breast implants

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- Patients with nipple discharge with inconclusive findings on other imaging studies

Disadvantages

Some challenges that present with the use of breast MRI include high cost, lack of availability in some of the breast centers, longer examination time, need for intravenous contrast medium, and false positive reads. False positives result in additional imaging, biopsy, or unnecessary surgical interventions.

Conclusion

Breast cancer ranks as the most common malignancy in women. Annual screening mammography is recommended to every woman starting at age 40[5]. MRI of the breast is an ideal complementary imaging study to mammography and ultrasound for the evaluation of breast disease. The primary care provider and nurse practitioner must be aware of the screening recommendations and indications for breast mammogram. Dynamic contrast-enhanced MRI is the most sensitive imaging modality to differentiate benign and malignant breast lesions. This diagnostic modality leads to early detection of breast cancer, better patient management, and outcome. Overall, the mortality rate for breast cancer has been decreasing due to screening and improved management, which is best accomplished with an interprofessional team approach using the various physician specialties (radiology and oncology) along with the nursing staff and radiology techs.

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