Updates and Revisions to the BI-RADS Magnetic Resonance Imaging Lexicon

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KEYWORDS

• Breast • MRI • BI-RADS • Lexicon

KEY POINTS

- The BI-RADS lexicon has improved the consistency of breast MR imaging interpretation and reporting.
- New revisions of the MRI Lexicon serve to further clarify breast MR imaging reporting, improve lesion diagnosis and management, and facilitate patient care.
- As diagnostic breast imaging increasingly includes multimodality evaluation, the new edition of the lexicon also contains revised recommendations for combined reporting with mammography and ultrasound if these modalities are included as comparison, and clarification on the use of final assessment categories in MR imaging.

INTRODUCTION

The American College of Radiology (ACR) developed the Breast Imaging Reporting and Data System (BI-RADS) mammography lexicon in 1993 to standardize and improve mammography interpretation and reporting.[1,2] Subsequently, a lexicon for breast magnetic resonance (MR) imaging was developed to enable comparison of findings from study to study in the literature and to provide a more consistent approach for communicating findings to referring physicians, patients, and scientists alike.[3–10]

Investigations of the normal breast and breast pathologic abnormality on MR imaging have advanced the understanding of the appearance of the breast in physiologic and diseased states. Advances and improvements in breast MR imaging hardware and software development have allowed higher spatial resolution and faster temporal scanning, with improved visualization of MR imaging findings. The MRI BI-RADS lexicon has been revised accordingly, with new terminology added to improve the description of lesions seen on current pulse sequences, and removal of terms that were infrequently used. In addition, the MRI BI-RADS lexicon underwent concurrent revision with the Mammography and Ultrasound Lexicons, with the aim of providing more consistency of terms across each modality-specific lexicon. The new ACR BI-RADS Atlas contains all 3 newly revised lexicons.

This article summarizes the updates and revisions to the second edition of the BI-RADS MRI lexicon (**Box 1**). A new feature in the lexicon is

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Box 1
Summary of revisions

Imaging Findings	Update
Background parenchymal enhancement	New imaging finding
Lesion types	
Masses	New and omitted terms
Non-mass-like enhancement	New and omitted terms
Associated findings	
Implants	New section and terms
Assessment and categories	
BI-RADS 0	Usage clarified
BI-RADS 4	Usage clarified

background parenchymal enhancement and its descriptors. Another major focus is on revised terminology for masses and non-mass enhancement. A section on breast implants and associated lexicon terms has also been added. As diagnostic breast imaging increasingly includes multimodality evaluation, the new edition of the lexicon also contains revised recommendations for combined reporting with mammography and ultrasound, and clarification on the use of final assessment categories in MR imaging. Note the lexicon is still undergoing revision and the final version of the lexicon should be reviewed for a complete compilation of the revisions in their entirety.

TECHNIQUE

There is a new section on technical parameters, which are important for obtaining high-quality breast MR images and for examination interpretation. A brief discussion related to reporting technique is included here.

Revised acquisition reporting recommendations include description of key elements of image acquisition, contrast administration, and postprocessing. Recommendations include comments on whether a dedicated breast coil was used, pulse sequence techniques obtained, such as T1-weighting or T2-weighting, and whether fat suppression was applied. It is recommended that a T2-weighted or fluid-specific sequence be obtained before the administration of intravenous contrast, as this has been shown to help identify lymph nodes, fluid, and other findings.[11,12]

The new lexicon mentions both diffusion-weighted imaging and magnetic resonance spectroscopy, which are still considered investigational. Reporting recommendations to include clinical history and comparison examinations are unchanged.

BACKGROUND PARENCHYMAL ENHANCEMENT

Although previously introduced as a concept and sporadically used in breast MR imaging reporting, background parenchymal enhancement (BPE) is a newly formalized BI-RADS feature to be recognized and described in the breast MR imaging report.

Categories of BPE are based on both the amount and the degree of normal parenchymal tissue enhancement on the first contrast-enhanced MR imaging sequence. BPE is described as none, minimal, mild, moderate, and marked (**Fig. 1**). It is important to note that the amount of background parenchymal enhancement on MR imaging is not correlated with the amount of mammographically visible fibroglandular tissue. For example, mammographically dense breasts may have no or minimal BPE, whereas breasts with scattered fibroglandular parenchymal tissue may have marked BPE.[13–15] Although mammographic glandular tissue patterns do not have a direct association with BPE, women with heterogeneously dense or dense glandular tissue have been found to have significantly more BPE than women with fatty or scattered fibroglandular tissue.[16]

The detection of malignancy by MR imaging is based on the angiogenic properties of tumors, including increased blood flow, neovascularity, and capillary leakiness.[13] Although it is hypothesized that greater BPE may negatively influence breast MR imaging performance,[17] either by decreasing the MR imaging sensitivity, similar to the way in which increased mammographic density decreases mammographic sensitivity, or by decreasing specificity caused by potential overlap in appearance with benign findings on MR imaging, current evidence from the literature to date demonstrates no adverse impact from BPE on the diagnostic accuracy of breast MR imaging. Two retrospective studies of BPE[16,17] found no significant difference in cancer detection between women with minimal/mild versus moderate/marked BPE. Furthermore, DeMartini and colleagues[17] showed no significant difference in positive rate of biopsy, cancer yield, or specificity between women with minimal/mild BPE compared with moderate/marked BPE. However, both studies also reported that greater BPE was associated with a higher rate of abnormal interpretation and probably benign findings (BI-RADS 3 final assessment), with Hambly and colleagues[16] noting that the most common finding (78%) to be given a