Reporting And Managing Breast Lesions: Role of Magnetic Resonance Imaging (MRI)

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Outlines

• Introduction
• **Strategy for managing MRI-detected lesions**
  • Minimise number of ‘indeterminate’ lesions
  • Careful case selection
  • Refine patient pathways to minimise delays
• Succinct and accurate reports
• Assessment categories
• MRI score
• Management plan
• Selection of cases for second-look ultrasound and biopsy
• Selection of cases for MRI biopsy
• Selection of cases for MRI follow-up
• Discuss reports at MDT meeting
• **Illustrative cases**
Introduction

- MRI breasts examination is the most accurate technique for diagnosing and delineating the extent of both invasive and in-situ breast cancer.\(^1\)
- Recognised that it correlates best with pathology.\(^2\)

- Identify significant additional foci of disease that will change management (up to 30% of cases).\(^3-5\)
- Identify disease that is occult both clinically and on mammography and ultrasound.\(^6\)
- A valuable adjunct to conventional imaging in selected difficult cases (dense breasts, lobular cancer).\(^7-8\)
Minimise number of ‘indeterminate’ lesions: High-quality examinations

- Good positioning and minimisation of movement
- Patient movement must be minimised if subtraction and dynamic images are going to be diagnostic
- Radiographers need appropriate training and should be performing examinations regularly

- Professional approach + empathy + good communication skills \( \rightarrow \) high-quality examination

- Involvement of MRI radiographers in post-processing of images is helpful in the reporting of scans and also emphasises to the radiographer the importance of high-quality images with minimal movement
Minimise number of ‘indeterminate’ lesions: **Standard protocols**

- Ideally be performed at **day 6-16 of the menstrual cycle**
- Recognised protocols that can be optimised and followed
- Axial plane is preferred
- Unenhanced and contrast-enhanced images are obtained and access to a workstation to allow post-processing of dynamic sequences is mandatory
- Post-processing includes generation of minimum intensity projection (MIP) images and mean contrast medium uptake curves
Minimise number of ‘indeterminate’ lesions: Standard protocols

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T2 weighted sequence</strong></td>
<td>High spatial resolution improves specificity</td>
</tr>
<tr>
<td><strong>pre-contrast</strong></td>
<td>No fat suppression</td>
</tr>
<tr>
<td><strong>TI weighted sequence</strong></td>
<td>Required for lesion characterisation and visualisation of marker clips</td>
</tr>
<tr>
<td><strong>pre-contrast</strong></td>
<td></td>
</tr>
<tr>
<td><strong>T1 Post contrast</strong></td>
<td>3D or 2D</td>
</tr>
<tr>
<td></td>
<td>Dynamic sequences obtained before contrast and then as rapidly as possible for 5–7 minutes after a rapid IV bolus of contrast</td>
</tr>
<tr>
<td></td>
<td>Integral fat suppression technique or image subtraction should be used to improve lesion conspicuity</td>
</tr>
<tr>
<td><strong>High resolution</strong></td>
<td>Ultra high resolution post contrast with integral fat suppression.</td>
</tr>
<tr>
<td></td>
<td>Should have a 50% improvement in voxel size compared with dynamic scan</td>
</tr>
<tr>
<td></td>
<td>unless already achieving an in-plane resolution of 0.6 mm</td>
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</tbody>
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B.J.G Dall et al. 2011
Careful case selection

• Referral for MRI should be a multidisciplinary team (MDT) decision - what question is being asked and how it is going to change patient management?

• Indications for breast MRI are as follows:
  1. To prove or refute the presence of a breast cancer if this is still unclear after complete triple assessment - must not be used instead of a biopsy
  2. To assess the extent of a newly diagnosed breast cancer
  3. Monitoring neoadjuvant chemotherapy
  4. Screening high-risk women
  5. Breast implants
<table>
<thead>
<tr>
<th>Risk Factors for Developing Breast Cancer</th>
</tr>
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<tbody>
<tr>
<td>Increasing age</td>
</tr>
<tr>
<td>Geographic location</td>
</tr>
<tr>
<td>Family history</td>
</tr>
<tr>
<td>Reproductive factors</td>
</tr>
<tr>
<td>Early menarche less than 11 years</td>
</tr>
<tr>
<td>Late menopause more than 55 years</td>
</tr>
<tr>
<td>Nulliparity</td>
</tr>
<tr>
<td>Late first child-birth more than 30 years</td>
</tr>
<tr>
<td>Carcinoma of the uterus</td>
</tr>
<tr>
<td>Carcinoma of the ovary</td>
</tr>
<tr>
<td>Dietary factors – diet rich in animal fats</td>
</tr>
<tr>
<td>Exogenous hormones – Oral contraceptives</td>
</tr>
<tr>
<td>Hormone replacement therapy</td>
</tr>
<tr>
<td>Alcohol – more than 2 drinks per day</td>
</tr>
<tr>
<td>Postmenopausal obesity</td>
</tr>
<tr>
<td>Higher socio-economic group</td>
</tr>
<tr>
<td>Limited breast feeding (for long periods is a protective factor)</td>
</tr>
</tbody>
</table>

Yip C.H et al. 2006
**CHECK LIST FOR HIGH RISK WOMEN**  
*(TO BE ACCOMPANIED WITH THE REQUEST FORM)*

<table>
<thead>
<tr>
<th>Patient's name</th>
<th>Registration no (PID)</th>
<th>Age:</th>
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<tbody>
<tr>
<td></td>
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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
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1. Family history of breast cancer  
a. Mother, sisters or daughters ever had breast cancer before the age of 50 years.  
b. Two or more maternal or paternal relatives ever had breast cancer (grandmother, aunt, niece).

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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
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2. Family history of ovarian cancer  
a. Mother, sisters or daughters ever had ovarian cancer before the age of 50 years.  
b. Two or more maternal or paternal relatives ever had ovarian cancer (grandmother, aunt, niece).

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<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th><strong>Comment</strong></th>
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3. Genetic mutation  
a. Mutation of BRCA 1 or BRCA 2  
b. HER2 mutation  
c. PS3 mutation

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<th><strong>Yes</strong></th>
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4. Previous history of atypia on breast biopsy.  
Eg. Lobular carcinoma in situ and atypical hyperplasia.

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<th><strong>Yes</strong></th>
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5. Previous history of breast cancer or ovarian cancer.

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<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
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6. Currently on hormone replacement therapy

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7. Previous radiation therapy (breast/chest area)

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<th><strong>No</strong></th>
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8. Nulliparous or delivered after the age of 30 years

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<th><strong>Yes</strong></th>
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9. First menarche before the age of 12

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<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
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10. Body mass index of more than 30

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<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
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11. Smoking

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<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
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(Signature of Requesting Doctor)
A PRELIMINARY STUDY OF RISK FACTORS OF BREAST CANCER AND THE USEFULNESS OF BREAST MRI AS AN ADDITION TO MAMMOGRAPHY IN DETECTING BREAST CANCER IN HIGH RISK WOMEN

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2Lifestyle Sciences Cluster, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, 13200 Kepala Batas, Pulau Pinang, Malaysia
3Division of Research and Networking, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, 13200 Kepala Batas, Pulau Pinang, Malaysia
4Cincological and Radiological Sciences Cluster, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, 13200 Kepala Batas, Pulau Pinang, Malaysia
5Corresponding author

Gravitational abstract

The risk factors of breast cancer among women, such as genetic, family history, and lifestyle factors, can be divided into high, intermediate, and average. Determining these risk factors may only help in preventing breast cancer occurrence. Besides that, screening of breast cancer which include mammography, can be done in promoting early breast cancer detection. Breast magnetic resonance imaging (MRI) has been advocated as a supplemental imaging tool in high risk women. The aim of this study was to identify the significant risk factor of breast cancer among women and also to determine the usefulness of breast MRI as an addition to mammography in detection of breast cancer in high risk women. This retrospective cohort study design was conducted using patient data from those who underwent mammography for screening or diagnostic purposes in Advanced Medical and Dental Institute, Universiti Sains Malaysia, from 2007 until 2015. Data from 284 subjects were successfully retrieved and analysed based on their risk factors of breast cancer. Meanwhile, data from 120 subjects who had high risk and underwent both mammography and breast MRI were further analysed. There were two significant risk factors of breast cancer seen among the study population: family history of breast cancer (p-value < 0.001) and previous history of breast or ovarian cancer (p-value < 0.001). Breast MRI demonstrated high sensitivity (96%) while mammography demonstrated high specificity (80%) in detection of breast cancer in all 120 subjects. The number of cases of breast cancer detection using breast MRI (44/120) was higher compared to mammography (24/120). However, breast MRI was found to be non-significant as an adjunct tool to mammography in detecting breast cancer in high risk women (p-value > 0.05). A comprehensive screening guideline and surveillance of women at high risk is indeed useful and should be implemented to increase cancer detection rate at an early stage.
Refine patient pathways to minimise delays

MRI appointment arranged

MDT discussion

MRI performed and reported

Put back on MDT

2nd look US ± Biopsy
Succinct and accurate reports

- Using a modified Breast Imaging Reporting and Data System (BI-RADS) lexicon for reporting.\(^9\)
- Descriptive report should conclude with an MRI score and a suggested management plan.
- Double reporting has been shown to increase the cancer-detection rate by 6-10% within the NHS Breast Screening Programme (NHS BSP).\(^10\)
Succinct and accurate reports

- Overall description of the breast composition
- The amount of fibroglandular tissue (FGT) that is present
- The amount of background parenchymal enhancement (BPE) - asymmetric (more enhancement in one breast than in the other)/symmetric (mirror image)
- Whether implants are present - composition (saline, silicone, or other), number of lumens (single or multiple), location (retroglandular or retropectoral), abnormal implant contour, intracapsular silicone findings (radial folds, subcapsular line, keyhole sign, or linguine sign), extracapsular silicone (breast or lymph nodes), water droplets and peri-implant fluid
Amount of FGT

- Almost entirely fat
Amount of FGT

- Scattered fibro glandular tissue
Amount of FGT

- Heterogenous fibroglandular tissue
Amount of FGT

- Extreme fibroglandular tissue
Amount of BPE

- Minimal
Amount of BPE

- Mild
Amount of BPE

- Moderate
Amount of BPE

- Marked
Succinct and accurate reports

- Clear description of any important findings

(1) Lesion morphology: lesions should be categorised into:

(a) Focus (< 5 mm)

(b) Mass (> 5 mm) on an unenhanced T2-weighted sequence

Shape [round, oval (includes lobulated) or irregular], margin
(circumscribed, not circumscribed, irregular or spiculated), and
internal enhancement characteristics (homogenous, heterogenous, rim enhancement, dark internal septations);

(c) Non-mass-like enhancement (NME)

Distribution (focal, linear, segmental, regional, multiple regions, or diffuse) and internal enhancement patterns (homogeneous, heterogeneous, clumped, clustered ring)
Succinct and accurate reports

(2) Lesion kinetics

(a) The fastest enhancing portion of the lesion or the most suspicious washout curve pattern in the lesion should be assessed (sample fast enhancing areas and sample for and report on the worst looking kinetic curve shape);

(b) Signal intensity/time curve

Initial upslope (Uptake within the first 2 min after contrast medium administration or until the first change in curve and is interpreted as slow, medium, or fast);

Delayed phase [Persistent (continues to rise, interpreted as benign), plateau (steady, interpreted as suspicious), or washout (decrease in signal intensity, interpreted as malignant)].
Increase in signal intensity

Type I: 83% benign, 9% malignant
Type II: 11.5% benign, 34% malignant
Type III: 5.5% benign, 57% malignant

Early postcontrast phase
Intermediate and late postcontrast phase
Time
(3) Lesion position

Right or Left

Use of the breast quadrant and clock-face position to describe a sector (or central, retroareolar, and axillary tail descriptors)

Distance from nipple, skin, or chest wall (in centimetres)
Useful in planning second-look ultrasound provided it is understood that a whole quadrant should be scanned centred on the clock face (e.g., for lesion reported as at 6 o’clock scan from 4 o’clock through to 8 o’clock)
Succinct and accurate reports

- Intramammary lymph node, skin lesion
- Non-enhancing findings (e.g. cyst, architectural distortion, postoperative collections)
- Associated features (e.g. nipple or skin retraction/invasion, skin thickening, chest wall/pectoralis muscle invasion, axillary adenopathy)
- Fat-containing lesions (lymph nodes, fat necrosis, hamartoma, or postoperative seroma/haematoma with fat)
- Stability of enhancement (new, stable, or changed)
- Findings from other techniques, such as diffusion-weighted imaging or MR spectroscopy
**Diffusion weighted imaging**

- Diffusion weighted imaging (DWI) is performed using motion-sensitising gradients to measure the Brownian motion (or random movement) of water molecules.

- To date, the greatest evidence and most widely explored application of DWI for breast imaging is as an adjunct sequence to reduce false positives on conventional contrast-enhanced breast MRI.

- Numerous groups have demonstrated significantly lower ADC values in malignant versus benign lesions.

- Sensitivity and specificity are not significantly affected by choice of b value, but suggested a maximum b value of 1000 s/mm² may be optimal for distinguishing benign and malignant lesions.
MR Spectroscopy

- A technique called in vivo magnetic resonance spectroscopy (MRS) can be performed along with MRI to obtain information about the chemical content of breast lesions.
- This information can be used for several clinical applications, such as monitoring the response to cancer therapies and improving the accuracy of lesion diagnosis.
- Several studies performed with $^1$H-MRS noted that a resonance from choline-containing compounds (tCho) was commonly present in malignant lesions but not in benign or normal tissues.
• A working hypothesis is that elevated [tCho] is an indicator of increased cellular proliferation
• The largest component contributing to the tCho peak from neoplastic tissue is phosphocholine, a known precursor of membranes
• Thus, the increased [tCho] in neoplastic tissues may be a reflection of increased membrane turnover by replicating cells
• Some groups have also shown that the tCho peak decreases or disappears in response to chemotherapy treatment
Assessment categories

- Based on BI-RADS categories developed for mammography

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Management</th>
<th>Likelihood of Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 0: Incomplete — Need Additional Imaging Evaluation</td>
<td>Recommend additional imaging: mammogram or targeted US</td>
<td>N/A</td>
</tr>
<tr>
<td>Category 1: Negative</td>
<td>Routine breast MRI screening if cumulative lifetime risk ≥ 20%</td>
<td>Essentially 0% likelihood of malignancy</td>
</tr>
<tr>
<td>Category 2: Benign</td>
<td>Routine breast MRI screening if cumulative lifetime risk ≥ 20%</td>
<td>Essentially 0% likelihood of malignancy</td>
</tr>
<tr>
<td>Category 3: Probably Benign</td>
<td>Short-interval (6-month) follow-up</td>
<td>≥ 0% but ≤ 2% likelihood of malignancy</td>
</tr>
<tr>
<td>Category 4: Suspicious</td>
<td>Tissue diagnosis</td>
<td>&gt; 2% but &lt; 95% likelihood of malignancy</td>
</tr>
<tr>
<td>Category 5: Highly Suggestive of Malignancy</td>
<td>Tissue diagnosis</td>
<td>≥ 95% likelihood of malignancy</td>
</tr>
<tr>
<td>Category 6: Known Biopsy-Proven Malignancy</td>
<td>Surgical excision when clinically appropriate</td>
<td>N/A</td>
</tr>
</tbody>
</table>

ACR BI-RADS atlas Fifth edition; 2013
<table>
<thead>
<tr>
<th>Category</th>
<th>BI-RADS</th>
<th>NBCC</th>
<th>RCRBG</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Assessment incomplete. Need to review prior studies and/or complete additional imaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Negative. Continue routine screening</td>
<td>No significant abnormality. There is no significant imaging abnormality</td>
<td>Normal/no significant abnormality. There is no significant imaging abnormality</td>
</tr>
<tr>
<td>2</td>
<td>Benign finding. Continue routine screening</td>
<td>Benign findings. No further imaging is required</td>
<td>Benign findings. The imaging findings are benign</td>
</tr>
<tr>
<td>3</td>
<td>Probably benign finding. (&lt;2% chance of malignancy) Short-term follow-up mammogram at 6 months, then every 6–12 months for 1–2 years</td>
<td>Indeterminate/equivocal findings. Requires further investigation, usually FNA cytology/core biopsy</td>
<td>Indeterminate/probably benign findings. There is a small risk of malignancy. Further investigation is indicated</td>
</tr>
<tr>
<td>4</td>
<td>Suspicious abnormality. Perform biopsy, preferably needle biopsy</td>
<td>Suspicious findings of malignancy. Requires further investigation. May require excisional biopsy</td>
<td>Findings suspicious of malignancy. There is a moderate risk of malignancy. Further investigation is indicated</td>
</tr>
<tr>
<td>5</td>
<td>Highly suspicious of malignancy: appropriate action should be taken. Biopsy and treatment, as necessary.</td>
<td>Malignant findings. Requires further investigation, even if non-excision (percutaneous) sampling is benign</td>
<td>Findings highly suspicious of malignancy. There is a high risk of malignancy. Further investigation is indicated</td>
</tr>
<tr>
<td>6</td>
<td>Known biopsy-proven malignancy, treatment pending. Assure that treatment is completed</td>
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BI-RADS, American College of Radiology Breast Imaging Reporting and Data System; NBCC, Australian National Breast Cancer Centre, RCRBG, Royal College of Radiologists Breast Group; FNA, fine-needle aspiration.
### MRI score

<table>
<thead>
<tr>
<th>MRI 1</th>
<th>Symmetrical glandular enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Symmetrical glandular enhancement</td>
</tr>
<tr>
<td>MRI 2</td>
<td>All NON – enhancing lesions</td>
</tr>
<tr>
<td>Benign</td>
<td>Morphologically benign + benign curve</td>
</tr>
<tr>
<td>MRI 3</td>
<td>Morphology unclear + benign enhancement</td>
</tr>
<tr>
<td>Probably benign</td>
<td>Morphology benign + suspicious enhancement</td>
</tr>
<tr>
<td>MRI 4</td>
<td>Suspicious morphology + enhancement</td>
</tr>
<tr>
<td>Suspicious</td>
<td>Suspicious morphology + enhancement</td>
</tr>
<tr>
<td>MRI 5</td>
<td>Malignant morphology + enhancement</td>
</tr>
<tr>
<td>Malignant</td>
<td>Direct extension of known tumour</td>
</tr>
</tbody>
</table>

B.J.G Dall et al. 2011
Factors which alter MRI score.

Factors which **increase level of concern and RAISE score:**
- Confirmed cancer in ipsi-lateral breast
- Increased risk factors for developing cancer e.g. Family history, previous breast cancer
- Solitary enhancement with minimal background enhancement

Factors which **decrease level of concern and LOWER code:**
- Bilateral nodular enhancement
- Incidental findings on MRI particularly in contra-lateral breast with normal 2nd look ultrasound
Management plan

- MRI-detected lesions must be fully categorised and coded
- Advice on further imaging and biopsy, and to advise what the next step should be if further imaging is normal
- Should advise MDT discussion particularly when the MRI is problem-solving or where an indeterminate lesion is found
- Depend on the level of concern about the MRI-detected lesion, i.e., MRI score/code
Selection of cases for second-look ultrasound and biopsy

- Suspicious or indeterminate lesion identified on MRI
  - mammogram reviewed + targeted ultrasound performed
- If lesion is a mass on MRI, it is more likely to be seen on ultrasound.\(^{12}\)
- Non-mass-like area of enhancement identified on MRI is less likely to be seen on ultrasound and less likely to be invasive carcinoma
Selection of cases for second-look ultrasound and biopsy

- Reasonable to perform second-look ultrasound for masses > 5 mm and areas of enhancement > 10 mm.\textsuperscript{13}
- Lesion seen on ultrasound +/- ultrasound-guided biopsy
Selection of cases for MRI biopsy

- If a suspicious or indeterminate mass > 5 mm or an area of enhancement > 10 mm is identified on MRI, and subsequent mammography review and second-look ultrasound are normal, then an MRI biopsy should be considered.
- MRI biopsy can be performed of both medially and laterally placed lesions but the ability to biopsy posterior lesions is limited.
- Marker clip should be placed at the end of the procedure and a post-biopsy sequence should be performed to look for a biopsy cavity as a way of assessing that the targeting has been accurate.
Selection of cases for MRI follow-up

- MRI follow-up is not required routinely, particularly if a patient is already having regular mammography.
- However, it should be considered if a suspicious (MRI 4) or indeterminate (MRI 3) lesion is identified on MRI that is too small for biopsy.
- It is also required if a biopsy of an MRI 3 lesion is attempted but fails or if a biopsy is performed and the result is not diagnostic.
- An MRI 4 lesion would, in this situation, usually progress to diagnostic biopsy.
Selection of cases for MRI follow-up

- MRI follow-up in 1 year is usually appropriate
- Earlier follow-up may be required in specific circumstances; follow-up at 6 months may be appropriate if there is a strong family history\textsuperscript{14} and earlier follow-up should be considered if a lesion is missed at biopsy
- All of these follow-up decisions should be made at the MDT meeting
Discuss reports at MDT meeting

• Full discussion of the MRI findings, together with all the other clinical, imaging, and histological details to decide patient management

• A major difference between finding a second suspicious lesion and finding a second suspicious lesion and proving it with biopsy

• In general, mammography overestimates, ultrasound underestimates, and MRI overestimates tumour size

• Therefore, radiologists reporting MRI should use this knowledge to be conservative in sizing of lesions
Discuss reports at MDT meeting

- The MDT meeting is used to discuss the level of concern
- The surgeon needs to accept the uncertainty around the measurement of disease extent and discuss the implications with the patient
- These discussions, together with review of the histopathology, are how the clinical team gains an understanding of how MRI can help in clinical management
Case selection for further investigation

Selection of cases for ‘second look ultrasound’
- Mammographic review normal
- Indeterminate or suspicious Masses >5 mm
- Areas of enhancement >10 mm
- Advise in report what action should be taken if ‘second look ultrasound’ normal i.e. no further action/MRI biopsy/MRI follow-up

Selection of cases for MR Biopsy
- ‘Second look ultrasound’ and mammographic review normal
- Indeterminate or suspicious Masses >5 mm
- Areas of enhancement >10 mm

Selection of cases for MRI follow-up
- If suspicious mass <5 mm or area of enhancement <10 mm then follow up MRI 6 months or 12 months
- If biopsy performed and not conclusive will also need follow-up 6/12 months

B.J.G Dall et al. 2011
## Summary of management plan

<table>
<thead>
<tr>
<th>MRI score</th>
<th>Mass &lt;5 mm Enhancement &lt;10 mm</th>
<th>Mass &gt;5 mm Enhancement &gt;10 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI 3</td>
<td>Use DOUBLE REPORTING to minimise the number of cases in this category by raising the score or lowering the score</td>
<td>2nd look ultrasound + biopsy</td>
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<tr>
<td></td>
<td></td>
<td>MRI biopsy</td>
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<td></td>
<td></td>
<td>MRI follow up</td>
</tr>
<tr>
<td>MRI 4/5</td>
<td>2nd look ultrasound ± biopsy</td>
<td>2nd look ultrasound ± biopsy</td>
</tr>
<tr>
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<td>MRI follow up</td>
<td>MRI biopsy</td>
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<td></td>
<td>−12 months</td>
<td>−6 months if Family history</td>
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<td>Surgical excision</td>
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Illustrative cases

Case 1: MRI 4 lesion; histology benign
- 23-year-old, presented with a palpable lump in the lateral aspect of her right breast
- Ultrasound - an irregular, spiculated, heterogeneous mass
- Mammography (which was performed despite her age as carcinoma was suspected) - dense breast parenchyma with an ill-defined mass with one or two associated microcalcifications
- Suspicious of carcinoma and confirmed with an image guided core biopsy
• MRI (in view of her young age and dense breast parenchyma) - a large mass with two adjacent small nodules lying between the mass and the nipple, suspicious of satellite lesions
• Second-look ultrasound - a lobulated, hypoechoic lesion
• Ultrasound-guided biopsy - fibroadenoma
• The patient responded well to chemotherapy and a marker clip was positioned centrally within the residual tumour mass.

• Wide local excision at the end of treatment found a residual 10 mm invasive ductal carcinoma of no special type (NST) grade 2 (G2) tumour with surrounding fibrosis in keeping with tumour regression.
Teaching Point

Suspicious lesions identified on MRI should be confirmed on biopsy before they are used to change patient management.
Case 2: MRI 4 lesion; histology malignant

- A high-risk family history patient had a screening mammogram that identified a new 5 mm mass in the left breast
- Ultrasound - an irregular hypoechoic lesion
- Confirmed as invasive carcinoma on ultrasound biopsy
- MRI (since high-risk family history) - small tumour and identified a second irregular mass with similar morphology and enhancement profile lying more anteriorly in the breast (MRI 4)
- Second-look ultrasound was normal
- MRI biopsy was benign
- Review of the post biopsy films suggested that the biopsy cavity was lateral to the MRI lesion
• MDT decision - wide local excision on ultrasound wire plus diagnostic biopsy on x-ray wire localising the MRI positioned marker clip
• Both lesions were removed as a single excision with clear margins and two NST G1 tumours measuring 7 mm and 8 mm were confirmed at histopathology
Teaching Point

MRI 4 lesions usually require excision if biopsy not representative.

Multifocal disease on MRI does not always require mastectomy.
Case 3: MRI 3 lesion; histology benign

- A patient presented with a right sub-areola lump, which was confirmed as carcinoma on triple assessment.
- MRI (to assess whether this was amenable to central excision) - a 10 mm morphologically benign mass with a suspicious enhancement curve (MRI 3) lying posteriorly in the contralateral left breast.
- Second-look ultrasound - a deeply placed, lobulated, hypoechoic lesion
- Ultrasound biopsy - not representative
- MRI-guided biopsy - fibroadenoma
Teaching Point

MRI-guided biopsy is required if ultrasound biopsy is not representative
References


References


13. Technical guidelines for magnetic resonance imaging for surveillance of women at increased risk of developing breast cancer. NHSBSP Publication No 68 2009.
THANK YOU FOR THE ATTENTION