

# 87 MR Mammography: Dynamic Imaging

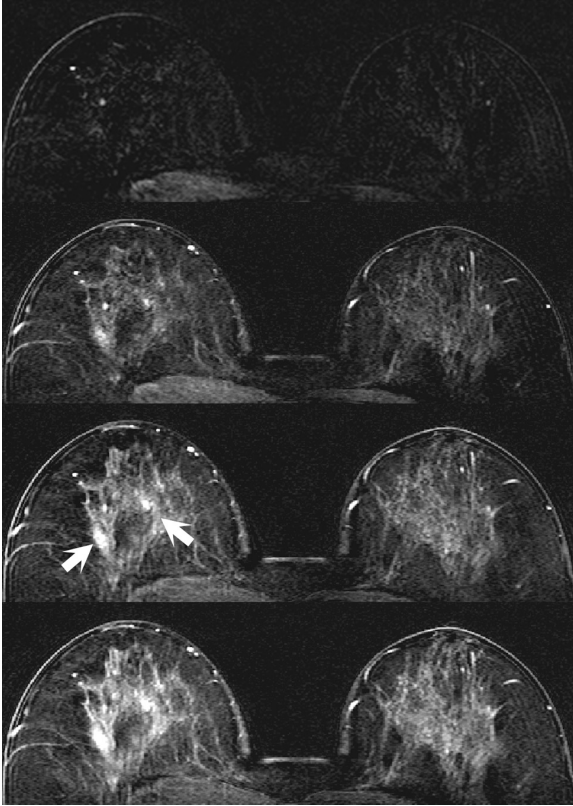


Fig. 87.1

In MR imaging of the breast, there is significant overlap in T1s and T2s between benign and malignant lesions, with these parameters thus of little utility. The introduction of dynamic post-contrast imaging represented a major breakthrough for diagnosis of breast tumors; however, this approach requires advanced hardware and software. A dedicated double breast coil is mandatory with newer designs also permitting MR-guided stereotactic biopsy. Both breasts need to be covered in a dynamic fashion with a slice thickness of  $\leq 2$  mm and in plane resolution  $\leq 1$  mm<sup>2</sup>, placing considerable demands on pulse sequence design. 3D gradient echo sequences are employed with a temporal resolution of  $\approx 1$  min, imaging for  $\approx 5$  min following IV gadolinium chelate administration. To eliminate the high signal intensity

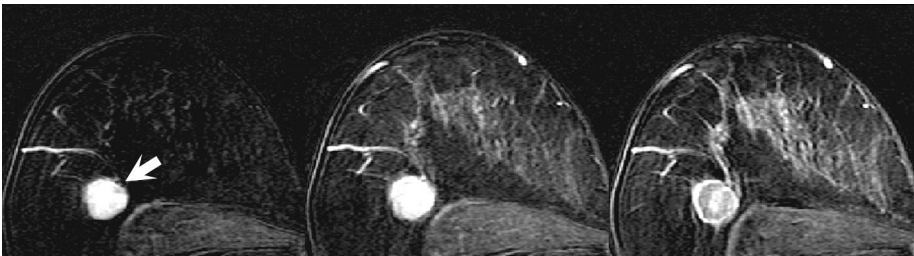


Fig. 87.2

## Dynamic MR Imaging of Breast Malignancy

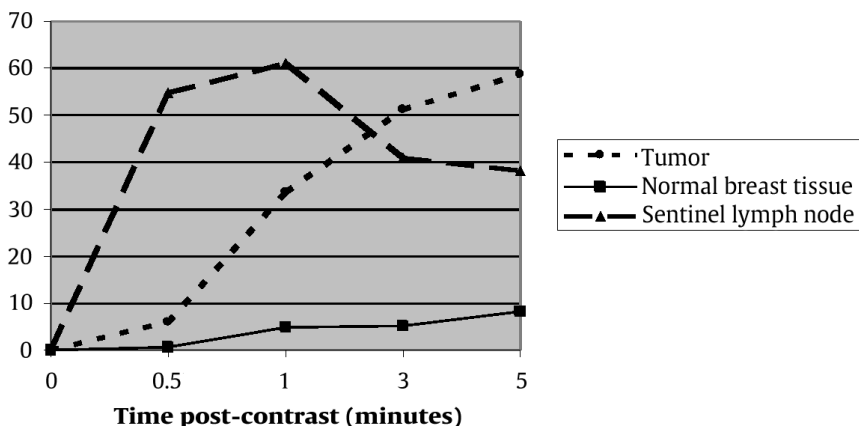


Fig. 87.3

of fat, subtraction of the unenhanced images from the contrast-enhanced images is performed (as in the scans illustrated). Alternatively, fat saturation or selective water excitation may be employed. Premenopausal women should be imaged between days 6 and 16 of the menstrual cycle. Otherwise enhancement of normal tissue due to hormonal stimulation may obscure and/or mimic malignant lesions. MR findings indicative of malignancy include irregular lesion contour, enhancement that follows ducts or starts from the periphery, and early lesion enhancement followed by a plateau or washout. In **Fig. 87.1**, four dynamic scans are displayed (immediate, 1, 3, and 5 min post-contrast). In the right breast (arrows), there are areas with prominent, fast enhancement, demonstrating some plateau, and thus suspicious for malignancy (invasive ductal carcinoma by surgical pathology). In **Fig. 87.2**, three dynamic scans (immediate, 1, and 3 min post-contrast) through a large malignant lymph node (arrow) in the same patient depict several typical signs of malignancy—a focal lesion with fast, prominent enhancement and early washout. Region of interest (quantitative) analysis is typically performed to evaluate the time course of enhancement, as illustrated in **Fig. 87.3**. Due to overlap in contrast enhancement patterns between benign and malignant lesions, interpretation of MR scans must be performed with correlation to X-ray mammography.