Dynamic High-Spatial-Resolution MR Imaging of Invasive Ductal Carcinoma: Influence of Histological Scirrhous Component on MR Descriptors

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Purpose: The purpose of this study was to assess the relationship between the amount of scirrhous component in invasive ductal carcinoma and its MR characteristics.

Materials and Methods: We retrospectively reviewed 71 consecutive patients with invasive ductal carcinoma smaller than 25 mm (average, 16.6 mm) in diameter. The scirrhous component was defined as invasive foci in small clusters of cancer cells showing desmoplasia. Invasive ductal carcinoma was subclassified into 3 groups in accordance with the amount of the scirrhous component (scirrhous component degree; SCD): SCD I (scirrhous component less than 20\text{\%}), SCD II (intermediate), and SCD III (more than 80\text{\%}). Dynamic magnetic resonance (MR) imaging was performed using volumetric interpolated sequence. Prior to dynamic study, $T_2^*$-weighted first-pass perfusion images were obtained before, during, and after bolus injection of 0.1 mmol Gd-DTPA/kg.

Results: Twenty-eight lesions were classified as SCD I, 14 as SCD II, and 29 as SCD III. Mass margin and signal intensity loss in the perfusion study were significantly different among the 3 SCD groups ($P<0.001$). The kinetic patterns were significantly different among the 3 SCD groups ($P=0.04$), and between SCD I/II and SCD III ($P=0.03$). The presence of enhancing internal septations was significantly different between SCD I/II and SCD III carcinomas ($P=0.05$). Central enhancement was only observed in SCD I carcinoma (4\%; 3/71).

Conclusion: The histological predominance of the scirrhous component in invasive ductal carcinoma may be one explanation for the differences in morphologic and kinetic patterns on MR imaging.

Keywords: breast neoplasm, invasive ductal carcinoma, MR imaging, dynamic study, perfusion study

Introduction

Magnetic resonance (MR) imaging has emerged as a highly sensitive modality for the imaging of breast tumors.\textsuperscript{1–8} Differences in the characteristics of MR enhancement between benign and malignant lesions are believed to reflect differences in vascularity, vessel permeability, and extracellular diffusion space. In addition, several morphologic characteristics and kinetic patterns on MR imaging in breast carcinoma are primarily explained by the histological structures of the lesions,\textsuperscript{9–11} such as central fibrosis, central necrosis, marginal fibrosis, and the degree of tumor angiogenesis.\textsuperscript{9,10,12–15} However, we previously reported that the tumor vascularity of breast carcinoma on power Doppler ultrasonography depended not only on the degree of tumor angiogenesis, but also on the growth pattern (solid versus “scirrhous” type).\textsuperscript{16}

The purpose of our present study was to assess the relationship between the amount of scirrhous component in invasive ductal carcinoma and the morphologic and kinetic patterns on MR imaging.

Materials and Methods

Patients

We retrospectively reviewed 455 consecutive patients who had undergone MR imaging of the
breast at our institution between July 2000 and September 2003. Inclusion in the study required that breast MR imaging had been conducted with patient in a prone position; no neoadjuvant chemotherapy had been administered; and diagnosis of invasive ductal carcinoma smaller than 25 mm had been established histologically. In all, 71 consecutive women (age range, 30 to 83 years; mean, 52 years) who underwent mastectomy or breast-conserving surgery after MR imaging of the breast were selected for the study.

**Histological classification**

In our institution, histological classification was conducted in accordance with the World Health Organization (WHO) classification. In this study, “invasive ductal carcinoma, not otherwise specified” (ductal NOS carcinoma) was subclassified as invasive ductal carcinoma, not otherwise specified (ductal NOS carcinoma) was subclassified into 3 groups in accordance with the amount of scirrhous component (scirrhous component degree; SCD) in the tumor: SCD I, scirrhous component less than 20%; SCD II, scirrhous component more than 80%; SCD III, scirrhous component between that of SCD I and SCD III. The scirrhous component was defined as invasive foci in small clusters of cancer cells showing desmoplasia. A single pathologist (M.S.) subjectively evaluated the SCD of the ductal NOS carcinomas by hematoxylin-eosin staining.

**Breast MR imaging technique**

MR imaging was performed using a 1.5T system (Symphony; Siemens Medical Solutions, Erlangen, Germany; maximum gradient field strength, 30 mT/m). All patients were examined in a prone position using a double breast array coil. A transverse fat-suppressed T2-weighted fast spin-echo sequence was performed with the following parameters: repetition time/echo time (TR/TE), 3500/78; field of view (FOV), 200 mm; matrix size, 256 × 256; slice thickness, 5 mm with a 1 mm gap. T2*-weighted first-pass perfusion images were obtained in the transverse plane before, during, and after bolus injection of 0.1 mmol Gd-DTPA/kg at a rate of 3 mL/s, followed by a 20-mL saline flush using an automatic injector. The T2*-weighted perfusion data were collected with a multisection 2D single-shot echo-planar sequence (gradient echo type, 151/61, 70° flip angle, 250-mm FOV, 5-mm section thickness, 1.5-mm intersection gap). The multisection slices were acquired every 2 s, and the sequence was repeated about 30 times.

A 3-dimensional fat-suppressed VIBE (volumetric interpolated breath-hold examination) sequence was obtained before and 60 s, 100 s, and 4 min after the start of intravenous administration. The MR imaging parameters for the VIBE sequence were as follows: TR/TE, 3.7/1.7; flip angle, 25°; FOV, 270 mm; matrix, 256 × 218; receiver bandwidth, 490 Hz/pixel; mean partition thickness, 1.2 mm; and time of acquisition, 35 s. The section thickness varied, depending on the size of the breast, and ranged from 1 to 1.5 mm without a gap. The affected single breast was examined on the first- and third-phase dynamic images acquired at 60 s and 4 min, respectively, and both breasts were examined on images obtained in the second phase at 100 s. If incidental suspicious enhancement was detected in the contralateral breast during the second phase, additional images of both breasts were obtained immediately during the subsequent third phase. None of the patients in this study had lesions visualized as incidental enhancement in the contralateral breast.

**Image interpretation**

One experienced breast radiologist (M.T.) evaluated all cases retrospectively; the radiologist was unaware of the histopathological diagnosis. The morphological parameters evaluated were mass margin (smooth, irregular, spiculated) and pattern of internal enhancement (rim enhancement, enhancing internal septations, and central enhancement). The mass margin was evaluated on the coronal images and transverse, sagittal multiplanar reformations (MPRs), acquired at 60 s (early phase) and 4 min (delayed phase). If the margin of the lesion became progressively more indistinct with the passage of time, the mass margin was evaluated in the early phase images. The decision on the pattern of internal enhancement was made on images obtained during both early and delayed phases (e.g., delayed rim enhancement). Kinetic enhancement patterns were visually assessed by comparing the signal intensity on the first and third dynamic images, acquired at 60 s and 4 min, respectively. By definition, any decline in signal intensity between 60 s and 4 min after injection of contrast material was considered a “washout” enhancement pattern. “Plateau” enhancement was considered to be stabilized enhancement without change in signal intensity between 60 s and 4 min. “Persistent” enhancement was considered to be an increase in signal intensity throughout the dynamic period. Each lesion was characterized according to the strongest enhancement pattern visible over the entire lesion.

On the T1*-weighted first-pass perfusion images, the region of interest was positioned in the part showing maximal enhancement on the T1-weighted images (M.T.), and time-signal intensity curves were obtained. The maximum signal intensity loss within the first 30 s after bolus injection of contrast...
Table 1. Relationship between MR imaging parameters and scirrhous component degree in ductal NOS carcinoma

<table>
<thead>
<tr>
<th>MR Descriptor</th>
<th>SCD I (n = 28)</th>
<th>SCD II (n = 14)</th>
<th>SCD III (n = 29)</th>
<th>p-valueb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of lesion size (mm)a</td>
<td>16.4 ± 5.5</td>
<td>18.2 ± 4.6</td>
<td>16.0 ± 4.7</td>
<td>n.s.</td>
</tr>
<tr>
<td>Lesion margin</td>
<td></td>
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<td></td>
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<tr>
<td>Smooth (n = 8)</td>
<td>6 (21)</td>
<td>1 (7)</td>
<td>1 (3)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Irregular (n = 24)</td>
<td>16 (57)</td>
<td>5 (36)</td>
<td>3 (10)</td>
<td></td>
</tr>
<tr>
<td>Spiculated (n = 39)</td>
<td>6 (21)</td>
<td>8 (57)</td>
<td>25 (86)</td>
<td></td>
</tr>
<tr>
<td>Kinetic pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistent (n = 12)</td>
<td>2 (7)</td>
<td>4 (29)</td>
<td>6 (21)</td>
<td>0.04/0.03c</td>
</tr>
<tr>
<td>Plateau (n = 11)</td>
<td>3 (11)</td>
<td>0</td>
<td>8 (28)</td>
<td></td>
</tr>
<tr>
<td>Washout (n = 48)</td>
<td>23 (82)</td>
<td>10 (71)</td>
<td>15 (52)</td>
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<tr>
<td>Perfusion study</td>
<td></td>
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<tr>
<td>Average of signal intensity loss (%)a</td>
<td>66.2 ± 16.3</td>
<td>61.5 ± 17.0</td>
<td>28.9 ± 24.0</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Internal enhancement</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(MR signs of the lesion)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Rim enhancement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early phase (n = 40)</td>
<td>15 (54)</td>
<td>5 (36)</td>
<td>20 (69)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Delayed phase (n = 58)</td>
<td>23 (82)</td>
<td>10 (71)</td>
<td>25 (86)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Enhancing internal septation</td>
<td></td>
<td></td>
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<tr>
<td>Early phase (n = 44)</td>
<td>20 (71)</td>
<td>10 (71)</td>
<td>14 (48)</td>
<td>n.s./0.05c</td>
</tr>
<tr>
<td>Delayed phase (n = 61)</td>
<td>26 (93)</td>
<td>13 (93)</td>
<td>22 (76)</td>
<td>n.s./0.05c</td>
</tr>
<tr>
<td>Central enhancement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early phase</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Delayed phase (n = 3)</td>
<td>3 (11)</td>
<td>0</td>
<td>0</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Note: Percentage are shown in parentheses.

aData are mean ± SD

bDerived for group differences from numeric variables from the Kruskal-Wallis test, and for group differences from dichotomous variables from the chi-square test.

cStatistical differences between SCD I/II and SCD III NOS carcinoma

n.s. = not significant

material was calculated as a percentage of the baseline signal intensity values in the precontrast images.

Statistical analysis

The Kruskal-Wallis test was used to analyze group differences from numeric variables. Chi-square and McNemar’s chi-square tests were employed to analyze group differences from dichotomous variables. P value less than 0.05 was considered statistically significant.

Results

Histological results

The average tumor size was 16.6 mm (range, 8 to 25 mm). In terms of the grade of ductal NOS carcinoma based on the amount of the scirrhous component, 28 lesions were classified as SCD I, 14 as SCD II, and 29 as SCD III. The respective average tumor diameters of the SCD I, II, and III ductal NOS carcinomas were 16.4 mm, 18.2 mm, and 16.0 mm. There were no statistically significant differences in mean tumor diameter among the 3 SCD groups of ductal NOS carcinoma.

Relationship of the histological to the MR findings

Table 1 shows the relationship between the histological grading of the ductal NOS carcinomas based on the amount of scirrhous component and MR findings. The mass margin was significantly different among the 3 SCD groups (P < 0.001). A spiculated margin was found in 86% of SCD III ductal NOS carcinomas (Fig. 1), whereas only 21% of SCD I carcinomas showed this feature (Figs. 2, 3). The kinetic patterns were also significantly different among the 3 SCD groups (P = 0.04), and between SCD I/II and SCD III (P = 0.03). A washout pattern was observed in 82% of SCD I ductal NOS carcinomas, whereas only 52% of SCD III carcinomas showed this pattern. The signal intensity loss on the T2*-weighted first-
A 57-year-old woman with suspicious density on mammography

**a:** Coronal first contrast-enhanced fat-suppressed $T_1$-weighted volumetric interpolated magnetic resonance (MR) image of the right breast demonstrates spiculated mass with rim enhancement (long arrow) and irregular mass (short arrow).

**b:** Coronal third contrast-enhanced fat-suppressed $T_1$-weighted volumetric interpolated MR image demonstrates spiculated heterogeneous mass with a washout pattern and disappearing rim enhancement (long arrow) and irregular heterogeneous mass with a plateau pattern (short arrow). This patient underwent mastectomy, which yielded ductal not otherwise specified (NOS) carcinoma with scirrhous component degree (SCD) III (long arrow) and intraductal papilloma (short arrow).

**c:** Transverse $T_2^*$-weighted first-pass perfusion MR image obtained before the contrast material injection shows high signal intensity in the tumor (arrow). $1$ = region of interest ($\bigcirc$).

**d:** Time-signal intensity curve of the perfusion study. The maximum signal intensity decrease is 22.4% compared with the precontrast baseline value.

pass perfusion study was also significantly different among the 3 SCD groups ($P<0.001$) (Fig. 4).

The presence of enhancing internal septations was significantly different between SCD I/II and SCD III ductal NOS carcinomas ($P=0.05$) (Fig. 2). There were no significant differences in the frequency of rim enhancement among the 3 SCD groups. Central enhancement was detected in 3 lesions (4%), but only observed in SCD I ductal NOS carcinoma (Fig. 3). All lesions were characterized histologically by the presence of large solid clusters of cancer cells with expansive growth that formed distinct boundaries. The pooling of contrast material following washout, corresponding to central enhancement, was explained by the central fibrosis.

Table 2 shows the frequency of rim enhancement and enhancing internal septations in the same patients. Rim enhancement ($P<0.001$) and enhancing internal septations ($P<0.001$) were more fre-
Fig. 2. An 83-year-old woman with suspicious density on mammography

a: Transverse multiplanar reformatting (MPR) of first contrast-enhanced fat-suppressed T1-weighted volumetric interpolated magnetic resonance (MR) images of the right breast demonstrates a lobulated heterogeneous mass (arrow).

b: Transverse third contrast-enhanced fat-suppressed T1-weighted volumetric interpolated MR image demonstrates a heterogeneous mass with partially indistinct margin (long arrow), rim enhancement, and enhancing internal septations (short arrow) following washout.

c: Photomicrograph of histopathologic specimen shows ductal not otherwise specified (NOS) carcinoma with scirrhous component degree (SCD) I, characterized by the presence of large solid clusters of cancer cells. The enhancing internal septations are well correlated with the fibrous stroma separating the solid clusters of cells (arrows).

Discussion

MR imaging of the breast has emerged as a promising tool for characterizing suspicious breast lesions. Several morphologic characteristics and kinetic patterns on MR imaging in breast carcinoma are explained primarily by the histological structures and the degree of tumor angiogenesis.

In our study, mass margin \( P < 0.001 \) and kinetic pattern \( P = 0.04 \) were significantly different among the 3 SCD groups. One physiopathological explanation for this difference is that ductal NOS carcinomas with a dominant scirrhous component with accompanying desmoplastic reaction tend to invade surrounding tissue (spiculated margin), and contrast material pools during the delayed phase.
A 63-year-old woman with suspicious density on mammography

**a**: Coronal first contrast-enhanced fat-suppressed T₁-weighted volumetric interpolated magnetic resonance (MR) image of the right breast demonstrates an oval mass with a smooth margin (arrow).

**b**: Coronal third contrast-enhanced fat-suppressed T₁-weighted volumetric interpolated MR image demonstrates a washout pattern, enhancing internal septations, rim enhancement, and central enhancement (arrow).

**c, d**: Photomicrograph of histopathologic specimen shows ductal not otherwise specified (NOS) carcinoma with scirrhous component degree (SCD) I, characterized by the presence of large solid clusters of cancer cells with expansive growth forming distinct boundaries. The rim enhancement is well correlated with marginal fibrosis (arrow heads, c), and the enhancing internal septations and central enhancement are explained by the fibrous stroma separating the solid clusters of cells (arrows, c, d).

Ductal NOS carcinomas with a dominant scirrhous component, the so-called “scirrhous carcinoma” in Japanese subclassification, have been frequently reported to exhibit a serrated border. Whereas ductal NOS carcinomas are subclassified as solid tubular, papillotubular, and scirrhous carcinoma in the Japanese classification, the 3 subtypes show mixed characteristics, and final diagnosis is based on the rule of predominance. In this context, we previously reported that the scirrhous component is also found in varying amounts in 60% (21/35) of non-scirrhous ductal NOS carcinomas. At any rate, whereas one of the greatest disadvantages of the Japanese subclassification is the presence of a histological mixture of the 3 subtypes in the same tumor, the histological predominance of the “scirrhous” component of ductal NOS carcinoma may be one explanation for the aforementioned differences in the morphologic and kinetic patterns on MR imaging.

As for rim enhancement, numerous studies have reported that its presence suggests malignancy. Buadu and associates reported different patterns of rim enhancement and concluded that early rim enhancement with progression to the center was fairly specific for carcinomas. Matsubayashi’s group reported that whereas early
Fig. 4. Graph shows the correlation between the signal intensity loss on the $T_2^*$-weighted first-pass perfusion study and the scirrhous component degree (SCD) in ductal not otherwise specified (NOS) carcinomas ($n = 71$). The average signal intensity loss of the SCD I, II and III ductal NOS carcinomas is 66.2%, 61.5%, and 28.9%, respectively ($P < 0.001$).

Table 2. Frequency of internal enhancement in the early and delayed phases

<table>
<thead>
<tr>
<th>MR Descriptor</th>
<th>Early phase</th>
<th>Delayed phase</th>
<th>$p$-value$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rim enhancement</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total lesions ($n = 71$)</td>
<td>40 (56)</td>
<td>58 (82)</td>
<td>$&lt; 0.001$</td>
</tr>
<tr>
<td>Washout lesions ($n = 48$)</td>
<td>26 (54)</td>
<td>44 (92)</td>
<td>$&lt; 0.001$</td>
</tr>
<tr>
<td>Non-washout lesions ($n = 23$)</td>
<td>14 (61)</td>
<td>14 (61)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Enhancing internal septations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total lesions ($n = 71$)</td>
<td>44 (62)</td>
<td>61 (86)</td>
<td>$&lt; 0.001$</td>
</tr>
<tr>
<td>Washout lesions ($n = 48$)</td>
<td>31 (65)</td>
<td>47 (98)</td>
<td>$&lt; 0.001$</td>
</tr>
<tr>
<td>Non-washout lesions ($n = 23$)</td>
<td>13 (57)</td>
<td>14 (61)</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Note: Percentages are shows in parentheses.
$^a$Derived for group differences from dichotomous variables from McNemar’s chi-square test.

n.s. = not significant

rim enhancement correlated significantly with a high ratio of peripheral to central microvessel density, delayed rim enhancement was related to the surrounding fibrosis. Kuwada’s group$^{11}$ reported that all lesions showing delayed rim enhancement following washout were characterized by the presence of large solid clusters of cancer cells with expansive growth that formed distinct boundaries; the delayed rim enhancement was explained by marginal fibrosis. In our study, there were no significant differences in the frequency of rim enhancement among the 3 groups of ductal NOS...
scirrhous carcinomas (4.5%). However, we found that in the cases showing a washout pattern, the presence of rim enhancement was more frequent in the delayed than in the early phase ($P<0.001$) (Figs. 2, 3).

In addition, Kitagawa and colleagues$^{19}$ reported that delayed rim enhancement was rarely observed among scirrhous carcinomas (4.5%; 1/22). In our study, there were no significant differences in the frequency of delayed rim enhancement among the 3 SCD groups of ductal NOS carcinoma (SCD I, 82%; II, 71%; and III, 86%). The apparently higher frequency of delayed rim enhancement in our study may be attributable to the differences in the protocols employed for dynamic scanning. Delayed-phase scans were acquired at 4 min after the start of intravenous administration of the contrast material, whereas in Kitagawa’s study,$^{19}$ the corresponding scans were obtained at 10 min after injection of the contrast material. Sherif’s group$^{34}$ reported that a characteristic steep decline of the enhancement curve between 4 min and 10 min is observed at the periphery of the tumor in cases of breast carcinoma. Thus, rim enhancement detected in the early phase may remain in delayed-phase scans acquired at 4 min after the injection of contrast material (Fig. 1).

“Breast Imaging Reporting and Data System (BI-RADS)$^{25}$” reported enhancing internal septations as a sign of malignancy. We reported that the presence of this sign following washout may be useful in the differential diagnosis between benign and malignant lesions.$^{28}$ In this study, the frequency of this sign was significantly different between SCD I/II and SCD III NOS ductal carcinoma ($P=0.05$). This may be explained by the presence of diffuse infiltration without the formation of large septations in ductal NOS carcinoma with a predominant scirrhous component. Moreover, in the same patients showing a washout pattern, we found that enhancing internal septations were more frequently observed in delayed than early phase ($P<0.001$).

Numerous studies have reported that tumor growth and metastasis depend on angiogenesis,$^{27}$ and a rapid loss in signal intensity on the time-signal intensity curve in a $T_2^*$-weighted first-pass perfusion study has been reported useful in differentiating benign from malignant breast lesions.$^{28-31}$ The rapid permeability of the contrast material has been explained on the basis of the high degree of tumor angiogenesis in malignant lesions. In this study, the degree of signal intensity loss in the perfusion study was also significantly different among the 3 SCD groups of ductal NOS carcinoma ($P<0.001$). The largest limitation of this study is that the correlation between microvessel density and $T_2^*$-weighted first-pass perfusion data was not evaluated. On the other hand, there have been no reports on the relationship between degree of angiogenesis and tumor growth pattern, in particular, that of the scirrhous component. Thus, we suggest that the $T_2^*$-weighted first-pass perfusion data may be related not only to the degree of angiogenesis, but also to the amount of the scirrhous component. Furthermore, several studies have suggested that the MR characteristics in cases of breast carcinoma might be useful prognostic factors.$^{32,33}$ However, a word of caution is that the enhancement characteristics on MR imaging have only been explained on the basis of the degree of angiogenesis in the tumors.

The recently published BI-RADS included the first edition of the Breast MR Lexicon.$^{25}$ The description of BI-RADS MR imaging focused on the morphology of the lesions, but kinetic data provided crucial information regarding the nature of the lesions. Kinetic assessment in this lexicon comprised enhancement rate, defined as early enhancement within the first 2 min (initial rise) and time course patterns (delayed phase).$^{25}$ However, it is controversial whether the enhancement rate is useful in differentiating benign and malignant lesions.$^{1-7,34,35}$ In this study, $T_2^*$-weighted first-pass perfusion data were combined into a high-spatial and high-temporal resolution sequence as a substitute for evaluation of enhancement rates. Based on the results of this study, the potential pitfall of the significant variability of the signal intensity loss in invasive NOS carcinomas in a $T_2^*$-weighted first-pass perfusion study must be borne in mind. However, it is proposed that a combination of the perfusion data and margin characteristics may be useful in differentiating benign and malignant lesions because of their close relationship to the amount of scirrhous component in the lesions.

Our study had several limitations. First, only a relatively small group of 71 histologically proved lesions was evaluated, and only cases of ductal NOS carcinoma were evaluated retrospectively. In addition, the correlation between microvessel density and $T_2^*$-weighted first-pass perfusion data was not evaluated.

In conclusion, the histological predominance of the “scirrhous” component in ductal NOS carcinoma may be one explanation for the differences in the morphologic and kinetic patterns on MR imaging, in particular, the margin characteristics ($P<0.001$), visually assessed kinetic information ($P=0.04$), $T_2^*$-weighted first-pass perfusion data
(P<0.001), and the presence of enhancing internal septations (P=0.05). It may be useful to take note of the relationship between these MR parameters and the predominance of the “scirrhous” component in the differential diagnosis of breast lesions.

References


