

EFFECT OF NEOADJUVANT CHEMOTHERAPY (NAC) ON MR IMAGING APPEARANCE OF A BENIGN BREAST LESION: A CASE REPORT

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ABSTRACT

BACKGROUND: In patients with newly diagnosed breast cancer, additional breast lesions with probably benign morphology may cause a difficulty in diagnosis when they response to neoadjuvant chemotherapy. We report a case of contralateral breast lesion with probably benign morphology, which showed total loss of contrast enhancement after NAC. **CASE REPORT:** A 41-year-old female patient presented with a palpable left breast mass. Ultrasonography demonstrated 35x25 mm heterogenous hypoechoic mass with indistinct margins, On the right breast, there was a 7x4 mm hypoechoic lesion which was considered as BI-RADS 3 lesion. On breast MR imaging the left breast lesion showed rapid heterogenous enhancement which was considered to be a BI-RADS 5 lesion. The right breast lesion showed progressive contrast enhancement. Tru-cut needle biopsy of the BI-RADS 5 lesion and left axillary LAP revealed out not otherwise specified invasive ductal carcinoma (NOS-IDC) with axillary metastasis. NAC was planned before surgical management. At 6 th month, follow up MRI revealed out total regression of the left breast BI-RADS 5 lesion with no contrast enhancement. The right sided lesion also showed no contrast enhancement. Although on targeted US this right breast mass was seen as similar with its pre NAC appearance excision of the mass was decided with the malignant lesion at the same operation. Histopathological result of the right breast mass was reported as fibroadenom. **CONCLUSION:** Additional ipsilateral or contralateral breast lesions with otherwise probably benign appearance seen on preoperative MRI that respond to NAC in the similar way with the malignant lesion on follow up MR imaging may not be a malignant focus.

Background

Studies showed that there was no difference between neoadjuvant chemotherapy (NAC) and adjuvant chemotherapy in terms of survival and progression of disease among breast cancer patients.¹ For this reason, in patients with locally advanced breast cancer, preoperative NAC is applied. By means of NAC, the number of operable patients and the chance for breast conserving surgery increases without a change in survival.² In addition to that, the effects of chemotherapy agents can be observed. But NAC

has been reported to have effects on not only cancer cells but also on normal breast tissue and benign appearing breast lesions. This causes a confusion in the management of benign breast lesions. NAC decreases the size of cancer and metastatic axillary lymph nodes with its direct effect on endothelial cells, resulting in loss of tumor vascularity.^{3,4,5} While these occur in malignant lesions, the normal breast tissue is also affected by NAC in the same way resulting in decrease in cellularity, lobular atrophy and fibrosis, which are seen as decreased background parenchymal enhancement (BPE) on contrast enhanced breast magnetic resonance imaging (MRI).^{6,7,8}

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Case Report

A 41-year-old nullipar female patient with no family history of breast cancer, presented to our breast clinic with a 3-week history of a palpable, painless left-sided breast mass that was incidentally found on self breast examination. The mammogram revealed a 55x25 mm mass with an indistinct margin in the left breast at the lower outer quadrant. There was also an axillary lymphadenopathy (LAP) with increased cortical thickness and density (Fig.1). Ultrasonography (US) of bilateral breast demonstrated 35x25 mm heterogenous hypoechoic solid mass with lobulated contours and indistinct margins, having

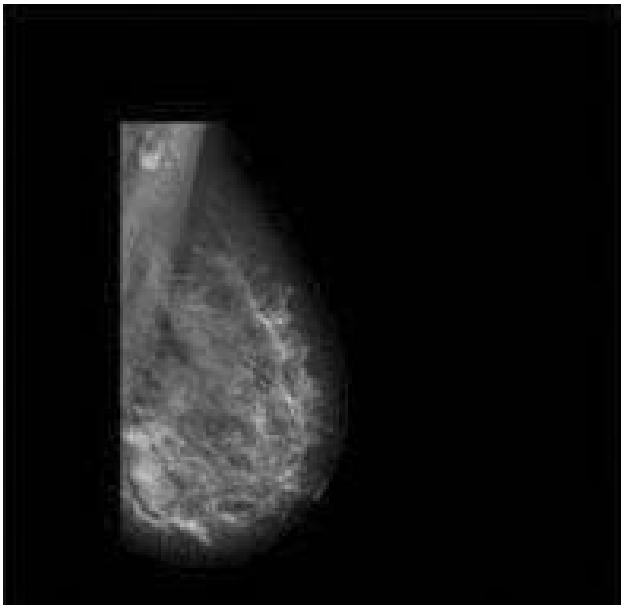


Figure 1: Mediolateraloblique mammography image 55x25 mm opacity with an indistinct margin in the left breast at the lower quadrant (arrow) and 19x13 mm axillary lymphnode with increased cortical thickness and density (arrow head)

posterior acoustic shadowing, which fall into category of Breast Imaging-Reporting and Data System (BI-RADS) 5. There was a few axillary LAP showing increased cortical thickness and the largest of them was 19x13 mm in size. On US of the right breast, as an additional finding, there was a 7x4 mm hypoechoic solid lesion with regular contours in the upper outer quadrant which was considered to be a BI-RADS 3 lesion and follow up was recommended. Bilateral breast MRI was performed to determine the extent of the disease. On early phase dynamic images the left breast lesion showed rapid heterogenous enhance-

ment with linear enhancing projections into the breast parenchyme and associated a few axillary LAP (Fig. 2A,B). The right breast lesion showed Type 1 (progressive) contrast enhancement pattern (Fig.3). Tru-cut needle biopsy of the BI-RADS 5 lesion and left axillary LAP was performed and revealed out not

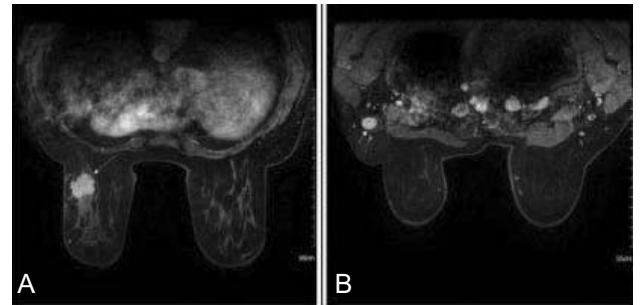


Figure 2: Early phase dynamic MRI images. A) A left breast lesion showing intense, heterogenous enhancement with linear enhancing projections into the breast parenchyme B) the largest axillary LAP



Figure 3: Late phase dynamic MRI image. A right breast lesion with regular contours showing Type 1 (progressive) contrast enhancement

otherwise specified invasive ductal carcinoma (NOS-IDC) with axillary metastasis. The results of immunohistochemistry were as follows: negative for estrogen receptors, negative were progesterone receptors with positivity for Her2 protein (3+). High proliferative activity with Ki67 (60%) was established. She was revised in the tumor council of our institution and NAC was planned before surgical management due to Her2 protein overexpression. Under US guidance,

surgical clip as a marker for tumor localization were placed prior to NAC. At the follow up US after 3 months, the left breast mass showed decrease in size and the LAP showed total regression. At 6th month, after she took the total six chemotherapy cycles, MRI was performed and revealed out total regression of the left breast BI-RADS 5 lesion with no contrast enhancement. The right sided lesion also showed no contrast enhancement in addition to the marked decrease in the background parenchymal enhancement (BPE) of both breasts (Fig.4A,B). Although on targeted US this right breast mass was seen as similar with its pre NAC appearance excision of the mass was decided with the malignant left breast lesion at the same operation. She underwent left

modified radical mastectomy and left axillary lymph node excision in addition to the excision of the right breast mass. Histopathological result of the right breast mass was reported as fibroadenoma with uniform epithelial and stromal hypercellularity but lacking leaf like pattern of phylloides tumor. There were no atypical features that is no periductal stromal condensation, no cytologic atypia, no mitotic figures > 3/10 HPF.

Discussion

In patients with newly diagnosed breast cancer, contrast enhanced breast MRI is the best modality in the evaluation of the extent of the disease and response to NAC.^{9,10,11,12,13,14} In MRI of the patients diagnosed with breast cancer, we sometimes see additional lesions with benign or probably benign morphology and contrast enhancement characteristics (BI-RADS 2 or 3) in the same or contralateral breast. After NAC, if these lesions accompanying the cancer show similar response to treatment like the malignant mass, suspicion about the possibility of additional cancer focus arises. Rebecca et al.¹⁵ demonstrated that NAC affects benign lesions in a similar fashion as it affects cancers. According to their study, benign breast lesions may also show a decrease in size and enhancement after NAC. In this study, there was no significant difference between the decrease in the amount of the enhancement, but the decrease in size was less compared to the decrease in the malignant tumor. They proposed that the same processes happening in normal glandular parenchymal tissue of the breast probably occur in benign lesions as a result of the direct effect of NAC on endothelial cells leading to loss of vascularity and causing decrease in size and in the amount of enhancement. In our patient, the right sided BI-RADS 3 lesion showed total loss of enhancement similar with the cancer. This was similar with this study. We recommend excision of this lesion in the same operation of the left breast mass and the histopathological evaluation of this right breast lesion was reported as fibroadenoma.

Conclusion

Additional ipsilateral or contralateral breast lesions with otherwise probably benign appearance seen

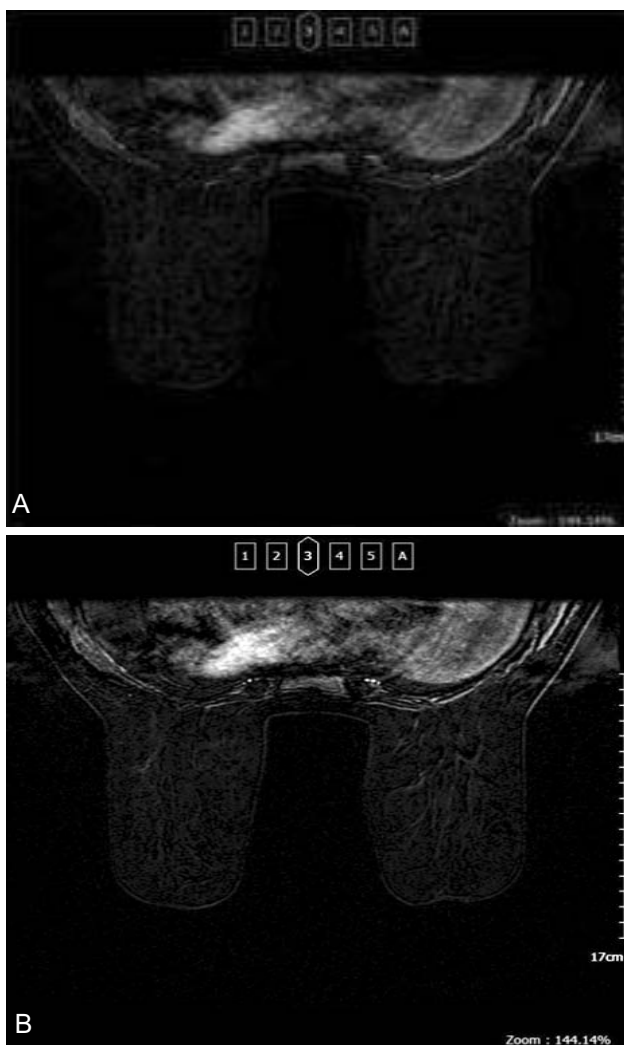



Figure 4: A) Early phase dynamic MRI image and B) Late phase dynamic MRI images after NAC. Both of the left and right breast lesions with total loss of contrast enhancement in addition to the marked decrease in background parenchymal enhancement.

on preoperative MRI that respond to NAC in the similar way with the malignant lesion on follow up MR imaging may not be a malignant focus. The management decisions should rely on the initial level of suspicion and second look US is important in such situations. Our case was compatible with the literature at this aspect.

Conflict of Interest: No financial or administrative conflict.

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