# Unusual mammography findings in patients with ductal carcinoma *in situ* (DCIS) of the breast

**F Ismail,** *MB BCh*
**J Höll,** *MB ChB, FFRad (D)*
**Z Lockhat,** *FCRad (D) SA*
*Department of Radiology, Pretoria Academic Hospital, University of Pretoria*

**H J Akande,** *MB BS, FMCR (Nigeria)*
*Department of Radiology, University of Ilorin, Nigeria*

## Abstract

The early detection of carcinoma is the high point of mammography. We present 2 patients with pathological diagnoses of DCIS with unusual mammographic findings for which one needs to have a higher index of suspicion. The first patient presented with multifocal disease requiring biopsy of all visible lesions, and the second patient (a young woman) presented with segmental distribution of calcifications, which might have been missed had a single-view baseline mammogram not been done.

## Introduction

One of the main objectives of mammography and breast ultrasound is the early detection of cancer and the correct, individualised management of the disease thereafter. Therefore, it is important to bear in mind that ductal carcinoma *in situ* (DCIS) may present with multifocal or multicentric disease (as demonstrated in our first case), which implies that all visible lesions should be biopsied and that it is necessary to consider doing a single-view baseline mammogram in young patients with breast disease so that abnormal calcification patterns are not missed (highlighted in our second case).

## Case 1

A 51-year-old woman was referred to us by the surgery department with a history of a right-breast mass since November 2006. She was referred for a mammogram and biopsy of the lesion. Previous biopsies of the mass had been attempted but were unsuccessful.

She had had 3 children and breast-fed each of them. She was currently on occasional anti-inflammatory medication for back pain and was perimenopausal. There was neither a previous history of cancer nor family history of cancer.

On examination, her vital signs, and general, cardiovascular and respiratory functions were normal. She had no thyroid enlargement. Examination of her breasts revealed a small mass in the right outer, lower quadrant. The mass was firm but mobile and approximately 1.5 × 1.5 cm in size.

### Imaging

The mammogram (Fig. 1) demonstrated 3 distinct lesions in the right upper, outer quadrant of the right breast.
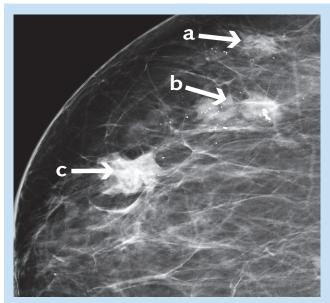


Fig. 1. Three lesions in the right outer, upper quadrant of the right breast (labelled a, b, c).

**Lesion A** is the most lateral lesion and demonstrates a cluster of calcifications of heterogeneous shape and density and an associated moderately dense mass with an irregular margin and some architectural distortion. The lesion was not clinically palpable, and was suspect for malignancy.

**Lesion B** demonstrated scattered, well-circumscribed round-to-oval calcifications and a region with similar calcifications clumped together. These calcifications had a similar density and regular margins but varied in size. There were associated moderate densities which were well circumscribed with minimal architectural distortion. This lesion was not clinically palpable.

**Lesion C** demonstrated a heterogeneously dense lesion with irregular margins and mild architectural distortion. There were 4 calcifications of different sizes, with regular margins associated with the mass. This lesion was clinically palpable.

Biopsies were taken of each lesion. The histological analyses confirmed DCIS in all 3 lesions. Solid, micropapillary and comedo types were present in all 3 biopsies. There were small foci of invasive cancer in specimens A and C.

## Case 2

A 27-year-old woman presented with a 2-week history of a right nipple discharge which was intermittently bloody but mostly cream in colour. Also, a mass was present in the 3 o'clock position, which had first been noticed 2 weeks prior to the onset of the discharge. She had no children, no significant medical or surgical history and no history of cancer or family history of cancer. She had a normal menstrual cycle and was on an injectable contraceptive. On examination, her vital signs, and

general, cardiovascular and respiratory functions were normal. She had no thyroid enlargement. A mass was not palpable, but a change in the consistency of the breast was noted in the 3 o'clock position.

An ultrasound scan was performed which did not demonstrate any mass but a change in the breast architecture. A single discharging duct appeared to be present. The discharge was sent for cytological evaluation. A ductogram showed obstruction of the duct. A single-view baseline mammogram was done (Fig. 2) that showed segmental diffuse increased density of the glandular breast tissue and segmental diffuse calcifications of heterogeneous size, shape and density. There were areas of clustering of the calcifications, and the pattern was highly suggestive of malignancy.

Cytological examination of the nipple discharge demonstrated atypical cells. A stereotactic biopsy was then performed. Histological analysis of the specimen demonstrated extensive DCIS (comedo type).
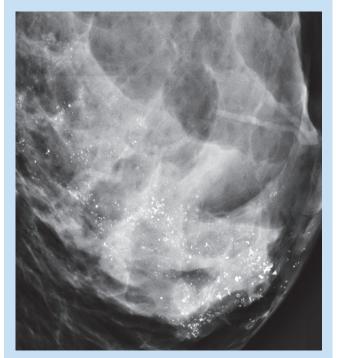


Fig. 2. A left medio-lateral oblique view demonstrating segmental diffuse increased density of the breast tissue and segmental diffuse pleomorphic calcifications of heterogeneous size, shape and density.

## Discussion

Our first case highlights two important points about DCIS. The first is that non-palpable lesions may exist concurrently with palpable lesions; mammography is an important tool in this regard and has huge implications for further management of the patient, i.e. mastectomy, wide-excision breast-conserving surgery (BCS) plus radiotherapy or BCS alone. It is also important that, as radiologists, we have a high index of suspicion for multicentric and multifocal disease and therefore need to perform a biopsy on every visible lesion.

Multifocal lesions are defined as multiple lesions occurring in the same quadrant. Multicentric lesions occur in different quadrants of the same breast. Bilateral cancers are synchronous when diagnosed at the same time or within 6 months of each other, and metachronous when they occur bilaterally at different times, i.e. more than 6 months apart.[1] The incidence of multicentric disease varies but may be as high as 33 - 50%.[1]

In patients under the age of 40, ultrasound is more beneficial than mammography owing to the increased density of breast tissue. In young patients, especially those without a breast mass, abnormal calcification patterns may be missed on ultrasound. We therefore advocate a single-view baseline mammogram to exclude this presentation. In our second case, had this not been done, we might not have elected to perform a biopsy.

The most common mammographic finding of DCIS is calcifications that are characteristically rod-shaped and branching with a ductal distribution.[1] The next most common is a spiculated or lobulated mass or architectural distortion. Patients may also present with a palpable mass or spontaneous nipple discharge.

Features that are important when evaluating calcifications are:[1]
1. **Form**, i.e. are they round, oval or linear in shape, or do they have no specific shape (amorphic) or do they change shape (pleomorphic)?
2. **Sizes** of the microcalcifications, i.e. are they large calcifications or small punctuate calcifications and do they demonstrate homogenous or heterogeneous size?
3. **Distribution**, i.e. are they clustered together or sporadic, or are they distributed in a particular pattern, e.g. in a breast segment or along a duct?
4. **Density** of the calcifications, i.e. are they homogenous or heterogeneous in density, and is the density high or low?
5. **Margin** – calcifications with irregular margins are more likely to be malignant.

Some studies have also propounded the number of calcifications within a cluster as an important tool in determining the potential of malignancy. One study showed that a cluster with ≥35 calcifications had a positive predictive value of 83% for malignancy.[2] Other authors did not find that the number of calcifications in a cluster was helpful in their studies.[2]

A study by Yunus *et al.* showed that the number of microcalcifications (MCs) per cm$^2$ of a cluster was nonspecific, as malignancy could not be excluded even if there were <10 MC/cm$^2$. They also suggested that other nonspecific criteria for malignancy were the total number of MCs and the heterogeneity of the MCs. Factors that were more specific for malignancy included the linear, branched and vermicular shape of MCs (Le Gal type 5) and irregularity in size and density of MCs.[3]

Diffuse, randomly distributed calcifications are usually associated with benign breast disease. However, if the calcifications are wild, profuse and chaotic and have irregular, heterogenic shape, then diffuse breast cancer should be considered.[3] This is probably secondary to DCIS, comedo type, which usually presents in older patients. This was the presentation of the second patient; however, she was only 27 years old.

The presence of calcifications on ultrasound, which is then correlated with mammography, has also been shown to be useful in determining malignancy in calcifications that are not sonographically benign (BI-RADS 2).[4]

## Conclusion

As DCIS may present with multicentric or multifocal disease, biopsies of all presenting lesions should be undertaken as this will influence further management of the patient, i.e. mastectomy, wide-excision BCS plus radiotherapy or BCS alone. In patients under the age of 40, ultrasound is still the investigation of choice, but a single baseline medio-lateral oblique mammogram view of the affected breast should be performed to exclude any abnormal calcification patterns as these may be missed on ultrasound. This is especially important if no clinical mass is present and also because the incidence of breast cancer in younger females is increasing.

1. Cardenosa G. *Breast Imaging, The Core Curriculum.* Philadelphia, USA: Lippincott, Williams & Wilkins, 2004: 239-280.
2. Fondrinier E, Lorimer G, Guerin-Boblet V, Bertrand A-F, Mayras C, Dauver N. Breast microcalcifications; multivariate analysis of radiological and clinical factors for carcinoma. *World J Surg* 2002; 26: 290 -296.
3. Yunus M, Ahmad N, Masroor I, Yaqoob J. Mammographic criteria for determining value of microcalcifications in the detection of early breast cancer. *J Pak Med Assoc* 2004; 54(1): 24-29.
4. Hashimoto BE. Sonographic assessment of breast calcifications. *Curr Probl Diagn Radiol* 2006; 35: 213-218.

unusual.indd 99                                                                 12/5/08 11:59:25 AM