The Shrinking Breast: An Unusual Mammographic Finding of Invasive Lobular Carcinoma

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We report two cases of invasive lobular carcinoma of the breast that were initially missed on first mammographic interpretation because of an uncommon, easily overlooked, and unreported imaging presentation. The abnormality in the cases manifested as an apparent decrease in breast glandular tissue volume when compared with the patients' previous mammograms, observed as “shrinking” of the breast on mammography. Invasive lobular carcinoma is considered one of the most difficult subtypes of breast cancer to identify on mammography because the changes that occur are often nonspecific and subtle. Microcalcifications that are usually associated with breast masses on imaging are rarely seen in this subtype of breast cancer. Although magnetic resonance imaging and computer-aided detection have somewhat improved the detection of invasive lobular carcinoma, radiologic and clinical detection remains a challenge.

Introduction

Invasive or infiltrating lobular carcinoma (ILC) accounts for 5-10% of invasive breast cancers, composing the second most common type of invasive breast lesions after infiltrating ductal carcinoma [1]. Although there has been variability in reported prognosis when compared to the ductal variant [2], ILC is more often multicentric, bilateral, and does not have a characteristic mammographic appearance. Mammographic abnormalities associated with ILC can be subtle and include focal asymmetry (3-25%) or architectural distortion (10-25%) [3, 4]. Microcalcifications are present in less than 10% of cases [3, 4]. Likewise, discrete masses on mammography are much less common in ILC and often represent a coexisting malignancy, such as invasive ductal carcinoma or ductal carcinoma in situ [5]. The low attenuation of ILC on mammogram is due to its pathologic tendency to infiltrate in single rows, referred to as “Indian-filing,” with little disruption of surrounding anatomic structures or connective tissue reaction [5]. This contributes to the high false-negative rate of 4-19% [5] of these lesions on mammography, making radiologic and clinical detection of ILC challenging.

We report two cases of ILC that were initially missed on first mammographic interpretation because of an uncommon, easily overlooked, imaging presentation. The first case was identified when the patient sought a second opinion, while the latter was noted after biopsy of a suspicious lymph node seen on mammography revealed metastatic cancer; on re-review of the patient’s films, the breast exhibited subtle changes. The abnormality in the cases manifested as an apparent decrease in breast glandular tissue volume when compared with the patients’ previous mammograms. Specifically, the volume of breast occupied by the glandular tissue was slowly shrinking over time without any overall change in breast size.
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or findings on physical examination. Hence, we refer to this finding as the “shrinking” breast and, pathologically, this corresponds to diffuse tumor infiltration in a quadrant up to the entire breast.

Case Report 1

A 47-year-old asymptomatic woman with no family history of breast cancer presented for routine screening mammogram. When compared to the previous study (Fig. 1A), mammography of the left breast showed significant retraction of the breast parenchyma from the chest wall with breast tissue no longer overlying the pectoralis muscle on the mediolateral oblique (MLO) view (Fig. 1A). The cranio-caudal (CC) view of the left breast similarly showed an apparent increase in retro glandular fat and retraction of the fibroglandular tissue in the outer central breast (Fig. 1B). In addition, a single small axillary lymph node was seen (Fig. 1A). There were no mammographic abnormalities found in the right breast. The patient had no prior history of abnormal mammograms and no findings on clinical breast examination. Diagnosis of invasive lobular carcinoma was made with ultrasound-guided core biopsy, and the patient subsequently underwent mastectomy, radiation therapy, and chemotherapy.

Case Report 2

A 62-year-old woman with no family history of breast cancer presented for routine screening mammogram. Although there were no findings on physical examination, the patient complained of a vague, “tingling” sensation in the left nipple. A two-year interval had passed since her previous screening mammogram. When compared to the previous study (Fig. 2B), mammography revealed “shrinking” of the glandular volume of the entire left breast without any change on physical exam. Sonography showed a large area of ill-defined shadowing (Fig. 2C), and MRI demonstrated a large mass with diffuse enhancement and radiating spicules (Fig. 2D). The patient was diagnosed with invasive lobular carcinoma and underwent mastectomy, radiation therapy, and chemotherapy.

Discussion

Infiltrating lobular carcinoma is considered the most difficult subtype of breast cancer to identify on mammography [6] because of its tendency to resemble normal fibroglandular tissue. Histopathologically, the cells invade in a single-file pattern leading to eventual atrophy of the breast, which can be
noted mammographically in advanced cases. The extent of invasion associated with overall breast atrophy is a late finding and poor prognostic factor in ILC, and therefore, markers for earlier recognition are essential. Unfortunately, very little has been elaborated regarding specific mammographic abnormalities in infiltrating lobular carcinoma. The finding of “shrinking” breast glandular volume that we describe occurs earlier than breast atrophy, is secondary to malignant infiltration of glandular tissue, and though subtle, is readily detectable on mammography to the trained eye.

Traditionally, if seen on mammography, the typical imaging appearance of ILC is a non-calcified, spiculated mass or an area of architectural distortion [5, 6]. The mass associated with ILC usually does not contain microcalcifications and is twice as likely to be seen on the craniocaudal view than oblique or lateral projections [7]. The CC view may be able to better detect subtle lesions because of the tumor's tendency to grow in a certain orientation around the ligamentous structures in the breast [8]. Architectural distortion is most easily seen in areas where straightening of Cooper's ligaments occurs, such as at the edge of the glandular tissue cone or in the retroglanular fat [6]. The normal, scalloped appearance of breast tissue may take on a tented appearance [6]. Other nonspecific, mammographic findings of ILC are asymmetry and developing density, noted when images are compared with a patient's previous study [4].

In order to document specific imaging features of ILC, Mendelson et al. [9] described the prevalence of five distinct mammographic patterns of infiltrating lobular carcinoma after reviewing 50 biopsy-proven cases. The most common was an asymmetric density without definable margins, likely caused by thickened tissue from tumor infiltration. The four other patterns in order of decreasing prevalence were: high-density mass with spiculated borders, dense breast without mass, microcalcifications (rarely the only finding and present in 25% of the samples), and discrete mass.

Harvey et al. previously described a decrease in breast size as a late sign of ILC in cases of large tumor burden, which was attributed to decreased compressibility of the breast once infiltrated [10]. The decrease in breast size on mammography was noted before the patients had noticed a physical decrease in size [10]. However, all of the patients exhibited abnormal breast examination findings, including skin thickening and nipple retraction, that correlated with the radiologic findings. The mammographic changes did not occur in isolation, but were tied to changes in the clinical breast examinations of these patients. The change was further quantified by a decrease in the nipple-to-pectoralis major muscle distance on the mediolateral oblique (MLO) view between the diagnostic and previous mammogram [10].
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In contrast to the existing literature, the “shrinking” seen on mammography in our series is not associated with a change in the posterior nipple line and thus is an earlier finding in ILC and precedes that described by Harvey et al. A change in this nipple-to-pectoralis line would result in a physical change noted on clinical exam, and the patients in our series had no abnormal physical findings on clinical breast examinations. The unusual presentation of the two cases we describe was only apparent when breast glandular density was compared to previous mammograms dating at least two years earlier. The “shrinking” breast is a subtle pattern that has not been previously described and may represent a specific marker for invasive lobular carcinoma.

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