

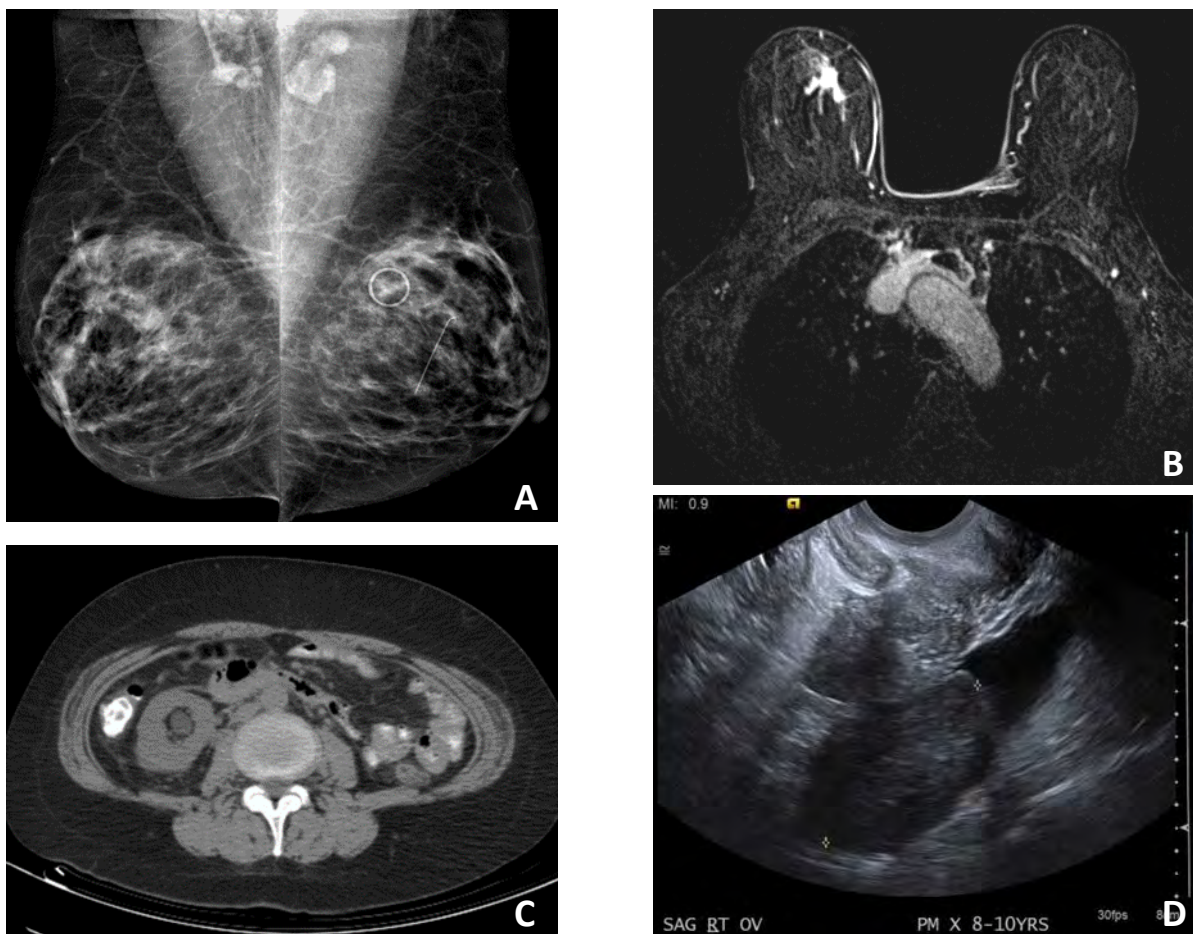
## Metastatic Invasive Breast Carcinoma

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### Case Presentation:

A 58-year-old woman presented for routine screening mammography. The patient had no personal history of cancer. Family history was significant for a paternal cousin with breast cancer at age 58 and a maternal second cousin with breast cancer at age 50. At presentation the patient was noted to have right nipple inversion. The patient subsequently underwent a diagnostic mammogram and ultrasound. Based upon the diagnostic work-up, the patient underwent additional imaging, including breast MRI and a PET-CT exam. PET-CT findings prompted a transvaginal ultrasound. Representative images from the diagnostic mammogram, breast MRI, PET CT, and transvaginal ultrasound are provided (Figs. A-D).



**Figure.** Bilateral MLO views (A) demonstrate an area of architectural distortion in the right breast at 12 o'clock with associated nipple retraction and a morphologically abnormal right axillary lymph node. Subsequent targeted ultrasound demonstrated an irregular antiparallel mass with spiculated margins (images not shown). Axial T1 post-contrast subtracted breast MRI image (B) reveals an irregular-shaped enhancing mass, corresponding to the mass seen on mammography and US. Also seen is stranding in the anterior mediastinal soft tissues as well. Unfused axial CT image from the patient's staging PET-CT exam (C) demonstrates unilateral right hydronephrosis and subtle right retroperitoneal fat stranding. Enlarged FDG avid ovaries were noted on the PET CT spurring evaluation with transvaginal ultrasound. A representative image from the transvaginal ultrasound is provided (D), demonstrating a rind of hypoechoic soft tissue encasing the ovaries.

**Key Clinical finding**

Nipple retraction

**Key imaging findings**

Nipple retraction

Architectural distortion with underlying spiculated mass

Morphologically abnormal right axillary lymph node

**Secondary imaging findings**

Unilateral hydronephrosis and retroperitoneal fat stranding

Soft tissue encasing the enlarged ovaries

**Differential diagnoses**

Metastatic IDC not otherwise specified

Metastatic Invasive Lobular Carcinoma

**Discussion**

Breast cancer remains the most commonly diagnosed malignancy in women and accounts for 14% of cancer deaths.<sup>1</sup> An estimated 226,870 new cases were diagnosed in 2012.<sup>1</sup> The majority of newly diagnosed invasive cancers are invasive ductal adenocarcinoma (IDC). Invasive lobular carcinoma (ILC) accounts for approximately 10-15% of invasive breast cancers and represents the second most common histologic subtype of breast cancer.<sup>2,3</sup> Twenty percent of invasive lobular carcinomas are bilateral.<sup>3</sup>

Invasive lobular carcinoma is often clinically and mammographically elusive. ILC often fails to present as a palpable abnormality and rarely presents as a discrete mass mammographically.<sup>3</sup> Clinically the neoplasm is rubbery and poorly-defined on physical exam, in contrast to the hard, well-defined masses commonly found with invasive ductal carcinomas.

On mammography, architectural distortion or focal asymmetry is most often seen with ILC.<sup>4</sup> ILC has a tendency to spread diffusely or between the collagen fibers of the breast in a classic single file-pattern and

produces little desmoplastic response.<sup>3,4</sup> The cells generally lack cohesion which may be related to the loss of e-cadherin histologically.<sup>5</sup> As tumor burden increases, the breast may decrease in size mammographically (the "shrinking" breast sign) presumably due to decreased compressibility.<sup>4</sup> On sonography, ILC presents as an area of architectural distortion with acoustic shadowing more often than as a discrete mass.<sup>4,5</sup>

Approximately 20% of invasive lobular carcinomas are bilateral at presentation and are often multicentric.<sup>3</sup> The propensity for nodal metastases is similar between invasive lobular carcinoma and IDC, though nodal metastasis may be more difficult to diagnose in ILC.<sup>6</sup> The presence of morphologically abnormal axillary lymph nodes on mammography is suspicious for malignancy in a patient with invasive lobular carcinoma and should trigger further evaluation with ultrasound.

ILC has an unusual metastatic pattern compared with invasive ductal carcinoma. The metastatic rate of ILC to the liver and bone is comparable to that of IDC.<sup>7</sup> However, ILC is more likely to metastasize to the peritoneum, retroperitoneum, gynecologic organs, gastrointestinal tract, urogenital tract, adrenal glands, bone marrow, leptomeninges, orbit, and myocardium.<sup>3,4,7,8</sup>

The clinical presentation of GI metastasis due to ILC is typically vague. The clinical, radiological, endoscopic and histopathologic findings of metastatic ILC are often difficult to distinguish from primary gastric carcinoma. Patients are more likely to present to a gastroenterologist than a breast surgeon. Therefore, a high index of clinical suspicion with early endoscopy or colonoscopy in those with non-specific symptoms and a past history of breast cancer, particularly ILC, is recommended. It is imperative to differentiate between metastatic breast cancer and primary gastric carcinoma as treatment strategies differ significantly.<sup>9</sup> Also, at times the interval between the primary cancer and the metastatic relapse may be long; therefore, the key to the correct diagnosis and treatment requires recognition of the patient's history of breast cancer.<sup>6</sup>

Hydronephrosis is a commonly reported complication of metastatic ILC.<sup>8</sup> Patients with ILC not infrequently develop hydronephrosis due to metastasis to the retroperitoneum causing ureteral

obstruction.<sup>10</sup> Finally, ovarian metastases are visualized as a rind of soft tissue encasing the ovaries.

The presence of a unilateral hydronephrosis, retroperitoneal fat stranding, and a pelvic or ovarian mass in a patient with diagnosis of invasive lobular carcinoma, as seen in the above case, should trigger further evaluation to rule out metastatic disease.<sup>4</sup>

## Diagnosis

Metastatic invasive lobular carcinoma

## Summary

Although much less common than invasive ductal carcinoma, it is vitally important for radiologists to understand the common imaging presentation and metastatic patterns of invasive lobular carcinoma. The most common mammographic findings include regions of architectural distortion or focal asymmetry; occasionally, the “shrinking” breast sign may be seen. Compared to IDC, ILC is more likely to be multicentric or bilateral and has a similar propensity for region lymph node spread. The metastatic pattern is a distinguishing feature with ILC more likely to metastasize to the gastrointestinal system, gynecologic organs, and peritoneum-retroperitoneum. A basic understanding of these differences will help suggest the appropriate diagnosis and guide management decisions.

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