

# The Effectiveness of MR Imaging in the Assessment of Invasive Lobular Carcinoma of the Breast

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## KEYWORDS

- Breast cancer • Invasive lobular carcinoma
- Breast MR imaging • Preoperative staging

Invasive lobular carcinoma (ILC) is the second most common form of breast cancer, reported in 5% to 20% of patients. The relative frequency of ILC has been increasing in the last decades, probably related to the increased use of complete hormone replacement therapy in perimenopausal women.<sup>1,2</sup> The reduced use of this therapy in recent years may already have resulted in a small decrease of the incidence of ILC.<sup>3</sup> ILC derives its name from the old assumption that the tumor arises from the lobules,<sup>4</sup> whereas the more common form of breast cancer, invasive ductal carcinoma (IDC), arises from the milk ducts. Because most breast cancers, including IDC and ILC, have been shown to arise from the terminal ductal lobular units, these common breast cancers are somewhat awkwardly named.<sup>5,6</sup>

The main difference between IDC and ILC is their growth pattern, with ILC tending to grow more diffusely. The “classic type” lobular carcinoma consists of relatively small, uniform cells that grow in a loosely cohesive fashion, forming lines of cells infiltrating the healthy tissue—so-called Indian files (Fig. 1). Formation of webs around healthy ducts, referred to as targetoid growth, is often reported. Furthermore, skip lesions, that is, areas of tumor separated from

the index lesion by normal breast tissue, are more common than in IDC.<sup>7,8</sup> Moreover, synchronous and metachronous contralateral carcinomas are more often observed in ILC.<sup>9</sup>

The genetic basis for these differences is probably due to a mutation in the E-cadherin gene (CDH1). E-cadherin is strongly related to cell-cell cohesion, and affects morphology and motility of cells. Hence a lack of E-cadherin expression may

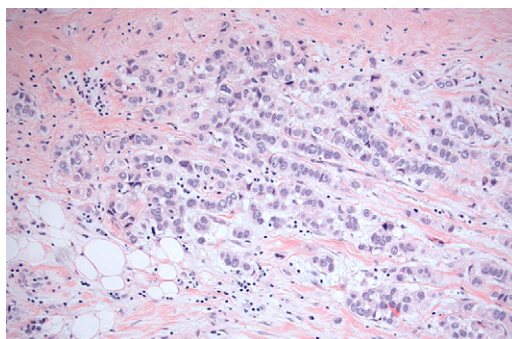


Fig. 1. Ten-times enlarged hematoxylin-eosin stain of an ILC. Note the relative uniformity and the linear arrangement of the small round cancer cells. (Courtesy of Peter Bult, MD, PhD, Department of Pathology, Radboud University of Nijmegen Medical Center.)

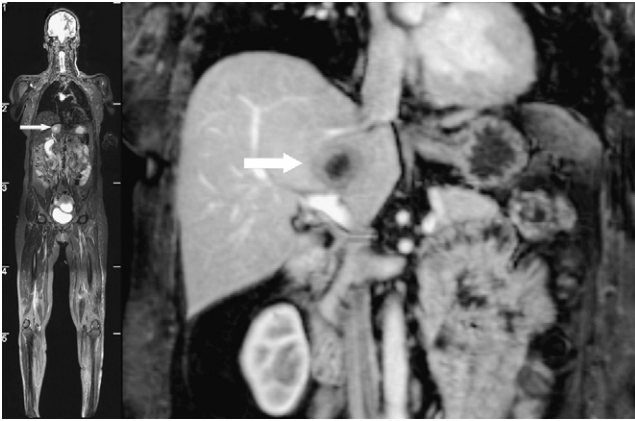
There are no conflicts of interest to disclose.

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Magn Reson Imaging Clin N Am 18 (2010) 259–276

doi:10.1016/j.mric.2010.02.005

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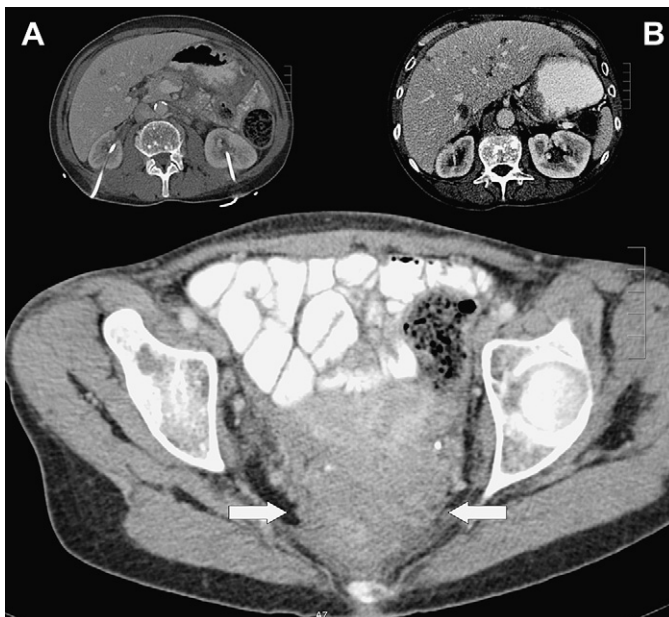
**Fig. 2.** Images of a 47-year-old woman presenting with a T4 ILC. She underwent whole body MR imaging to screen for distant metastases. The whole body STIR (short time inversion recovery) acquisition (*left*) and the postcontrast (15 mL Gd-DOTA) T1-weighted VIBE (volumetric interpolated breath-hold examination) acquisition (*right*) show a large metastasis central in the liver, with central necrosis (*arrows*). The patient underwent neoadjuvant chemotherapy, to which she responded very well; 6 months later the liver metastasis was no longer visible and the primary tumor was surgically removed.

be the cause for the disjointed growth of ILC.<sup>7,8,10</sup> Apart from the lack of E-cadherin expression, classic ILC biologically resembles low-grade IDC. Similarly, the more aggressive subtype pleomorphic ILC resembles high-grade IDC.

There are only a few other documented differences between IDC and ILC. ILC are generally larger at detection than IDC, and are more often estrogen and progesterone receptor positive. Furthermore, ILC metastasizes to locations that are extremely rare for IDC, such as the gastrointestinal tract, the retroperitoneum, the gynecologic organs, and the leptomeninges.<sup>11,12</sup> However, the most common metastatic sites for ILC are the lungs, the liver, and the bones (Figs. 2–5).

Outcomes are not very different, with a 5 year disease-free survival of 85.7% and 83.5% for ILC and IDC, respectively.<sup>9</sup> Some studies suggest even a slightly better outcome for ILC than IDC, regardless of the often larger size of ILC at diagnosis.<sup>13,14</sup> At present, there are no differences in treatment based on the histopathologic differentiation between IDC and ILC.<sup>15</sup>

Despite the relative small differences between IDC and ILC, ILC presents a major diagnostic challenge. The tumors are, due to their diffuse growth pattern, more difficult to detect than IDC. The infiltrative growth pattern is the most likely explanation for why ILC tends to be larger than IDC. Moreover, the diffuse growth pattern of ILC makes mammography and ultrasound unreliable at staging, thus



**Fig. 3.** Postcontrast axial CT images of a 59-year-old woman, 3 years after detection and treatment of a pT3N2a ILC, who presented with bilateral hydronephrosis, caused by a large irregular retroperitoneal mass (*arrows*) obstructing both ureters. Histology was obtained, showing diffuse metastasis of ILC. The hydronephrosis was treated with bilateral nephrostomy (inset A). Note also the multiple hypodense liver metastases and sclerotic metastases in the vertebral bodies (insets A and B).

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