Invasive cribriform carcinoma of the breast is a distinct histologic type of invasive carcinoma that was first described by Page et al. in 1983 (1) and is characterized by a cribriform histologic pattern in the majority of its invasive component (1). Cribriform carcinoma is a well-differentiated variant of invasive ductal carcinoma and has a relatively favorable prognosis and low frequency of axillary nodal metastases (2). To our knowledge, the radiologic findings of invasive cribriform carcinoma of the breast are limited. MR imaging findings have not been previously described and there were highly suspicious findings of the masses on mammography and sonography in previous reports (3, 4). We report a case of invasive cribriform carcinoma of the breast with radiologic features including MR imaging findings.

**Case Report**

A 48-year-old woman visited our hospital because of left breast cancer which was detected by screening. She underwent a mammography and breast sonography for screening at an outside clinic. A sonographically-guided core biopsy was performed at an outside clinic and the biopsy result was ductal carcinoma in situ. The patient was referred to our hospital for surgery. Upon physical examination, there was no palpable mass or axillary lymphadenopathy. Moreover, skin changes or nipple retraction were not found. On mammography, there was no notable finding except for heterogeneously dense breast (not shown). On ultrasonography, an approximately 0.9-cm microlobulated isoechoic mass was detected in the left breast at the 1-o’clock position (Fig. 1A). Breast conservation surgery was planned and breast MR imaging was performed to evaluate the extent of the disease. MRI was performed with a 1.5T system (GE Signa Excite GE Healthcare, Milwaukee, WI, U.S.A.) using a dedicated breast coil. The mass showed iso-signal intensity on a fat-saturated
T1 weighted image and iso- to slightly high signal intensity on a fat-saturated T2 weighted image (Figs. 1B, C). After contrast (Gadopentetate dimeglumine) enhancement, the mass showed an oval, smooth, marginated, and heterogenously early enhancement with a delayed washout kinetic pattern (Figs. 1D, E). In addition, there was no evidence of multiple or bilateral breast cancer on breast MR images and the breast conservation surgery was performed. Macroscopically, the main tumor, which had a long axis of 0.9 cm, was well-demarcated in some regions, but had irregular invasive margins in other regions. Upon microscopic examination, the invasive component exhibited a cribriform pattern with well differentiated nuclei. Cribriform ductal carcinoma in situ was also present (Fig. 1F). The lymphovascular invasion, tumor necrosis, or microcalcifications were absent. There was no lymph node metastasis detected on sentinel lymph node biopsy. Immunohistochemical staining indicated a positive finding for the estrogen and progesterone receptors. The final histopathological diag-

![Image](image1.png)

**Fig. 1.** Invasive cribriform carcinoma of the breast in a 48-year-old woman.
A. Sonogram shows a 0.9-cm, microlobulated isoechoic mass (arrows) in the left breast at a 1-o’clock position.
B, C. The mass (arrow) has an iso-signal intensity on a fat-saturated T1 weighted image (B) and an iso- to slightly high signal intensity on a fat-saturated T2 weighted image (C).
D, E. Images reveal oval, smooth early enhancement (arrow) on fat-saturated T1 weighted subtraction images after contrast infusion (D) and show an initial rapid rise and delayed washout pattern in the kinetic curve (E).
nosis was invasive cribriform carcinoma. Following diagnosis, the patient has received radiation therapy and hormonal therapy and is presently free from local recurrence or metastasis 28 months after conservation surgery.

**Discussion**

Invasive cribriform carcinoma is a rare type of invasive ductal carcinoma of the breast, which accounts for about 0.3–6% of breast cancers [1, 5, 6]. It was first described by Page et al. and was divided into the classical type and mixed type. Tumors that are exclusively cribriform or are cribriform to the limited extent of tubular invasive elements only were designated classic and the tumors also contained areas of less well differentiated invasive carcinoma were designated mixed type [1]. Some authors use the term pure type to describe the tumors that do not show any other infiltrating carcinoma type [5, 6]. Previous studies suggest that pure and classic invasive cribriform carcinoma has a relatively good prognosis and a low frequency of axillary nodal metastases [1, 5, 6].

On histopathology, cribriform carcinoma must be distinguished from other invasive breast carcinomas that show a cribriform pattern such as adenoid cystic carcinoma [1, 2, 7]. In addition, immunocytochemical staining for the basement membrane materials or ultrastructural examination is recommended when accurate diagnosis is difficult [7]. The radiologic findings of invasive cribriform carcinoma are not well known, with only a few reports about the radiologic findings of invasive cribriform carcinoma of the breast and most cases describing their mammographic features. Stutz et al. reported the mammographic findings of eight cases and sonographic findings in 4 cases. They reported spiculated masses measuring 20 to 35 mm in four of the patients and two mass that contained a few flecks of punctate calcifications on mammography. Four other tumors were not visible on mammography and the sonographic findings were ill-defined, inhomogenous solid masses in three of four cases [3]. Another case report showed a well circumscribed high density mass with microcalcifications on mammography [4]. In our case, it was occult on mammography because of the small size of the mass in the background of heterogeneously dense breast. A mass weighing about a 0.9 cm and with a focal microlobulated margin detected on sonography, was considered as a breast image report and data system (BI-RADS) category 4A. To the best of our knowledge, the MR imaging finding of invasive cribriform carcinoma have not been previously described, and in our case showed heterogeneously early enhancement with delayed with a washout kinetic pattern compatible with the malignant mass, although it is not different from other histologic types of invasive breast carcinoma.

In summary, we describe a case of invasive cribriform carcinoma of the breast and most cases describing their mammographic features. Stutz et al. reported the mammographic findings of eight cases and sonographic findings in 4 cases. They reported spiculated masses measuring 20 to 35 mm in four of the patients and two mass that contained a few flecks of punctate calcifications on mammography. Four other tumors were not visible on mammography and the sonographic findings were ill-defined, inhomogenous solid masses in three of four cases [3]. Another case report showed a well circumscribed high density mass with microcalcifications on mammography [4]. In our case, it was occult on mammography because of the small size of the mass in the background of heterogeneously dense breast. A mass weighing about a 0.9 cm and with a focal microlobulated margin detected on sonography, was considered as a breast image report and data system (BI-RADS) category 4A. To the best of our knowledge, the MR imaging finding of invasive cribriform carcinoma have not been previously described, and in our case showed heterogeneously early enhancement with delayed with a washout kinetic pattern compatible with the malignant mass, although it is not different from other histologic types of invasive breast carcinoma.

In summary, we describe a case of invasive cribriform carcinoma of the breast in a 48-year-old woman with radiologic findings including the MR imaging features. Further study with a large number of patients is anticipated to better describe the imaging characteristics of this disease.
References

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침윤성사상형유방암: 증례 보고

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침윤성사상형유방암은 매우 드물게 발생하는 원발성 유방암으로, 조직학적으로 사상형 구조를 보이고, 좋은 예후를 갖는 특징이 있다. 하지만, 영상소견에 대해서는 보고가 드물다. 이에 저자들은 침윤성사상형유방암의 자기공명영상소견을 포함한 영상소견에 대해 보고하고자 한다.