

Intracystic Papillary Carcinoma with Extensive Hemorrhage of the Breast: Sonographic and Advanced MR Findings: A Case Report¹

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Intracystic papillary carcinoma (IPC) of the breast is very rare, and it has a much better prognosis than the other types of breast carcinoma. We experienced a case of intracystic papillary carcinoma that we diagnosed in an 83-year-old-woman. MR imaging of the IPC shows a multicystic appearance with a subacute or chronic stage of intracystic hemorrhage. The contrast-enhanced MR imaging demonstrates enhancement of the cyst wall and mural nodules, and this modality proved to be successful for making an accurate preoperative diagnosis.

Index words : Breast neoplasms

Breast, MR

Breast, US

Breast radiography

Intracystic papillary carcinoma (IPC) of the breast is a rare tumor, and it has a much better prognosis than other types of breast carcinoma (1). Making the preoperative diagnosis of IPC via the clinical examination, ultrasonography and MR imaging is important to plan proper surgical treatment. Several studies have shown that MR imaging of IPC of the breast in a diagnostic setting is sensitive for identifying this malady (2, 3). We experienced a case of IPC that was diagnosed in an 83-year-old-woman. We describe here the clinical findings, ultrasonography and MR imaging that proved to be successful in making an accurate preoperative diagnosis.

Case Report

An 83-year-old woman had a 5-year history of a mass located in her right breast. She had not received any treatment for the mass because it was asymptomatic. She became aware of enlargement of the mass accompanied with pain and redness of the overlaying skin for the last one month, and she came to our department with spontaneous bleeding due to tearing of the overlaying skin. The physical examination revealed a palpable 8.0 × 9.0 cm well-circumscribed, firm, mobile, huge mass. Palpation did not reveal any abnormality in the axillary lymph nodes. There was no history of breast trauma.

Ultrasonography (US) was performed using a 5 - 12 MHz linear array transducer and a 5 - 8 MHz convex transducer (HDI 5000; ATL, Bothell, WA). US of the right breast mass showed a very large complex mass with an anechoic cystic portion, mural nodularity and papillary projections (Fig. 1A). Doppler US demonstrated a flow within the lateral wall portion of the mass and mural nodules (not shown). Magnetic resonance (MR)

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imaging of both breasts was performed with a 1.5 T system (Siemens Medical System, Erlangen, Germany). The patient was imaged in the prone position using a bilateral breast coil. The T1-weighted spin-echo images showed a large multiseptated cystic mass with multifocal hyperintense areas (Fig. 1B) that corresponded to inhomogeneous hyper or hypointense hematoma on the fat-saturated T2-weighted fast spin-echo images (not shown). The 2D fast low-angle shot (FLASH) gradient-echo MR images showed a multiseptated cystic mass with profound hypointense areas (Fig. 1C), and this rep-

resented subacute and chronic hemorrhage in the mass. A T1-weighted, 3D FLASH image was used before and after injection of intravenous gadolinium DTPA (Magnevist, Schering, Berlin, Germany) at a dose of 0.1 mmol/kg. The contrast-enhanced MR imaging revealed well enhanced cyst walls and mural nodules (Fig. 1D); this was well correlated with the Doppler US.

The needle puncture at the cystic portion of the mass showed bloody fluid. Fine-needle aspiration cytology from the breast lesion did not reveal any malignant cells. US-guided core biopsy for sampling the mural

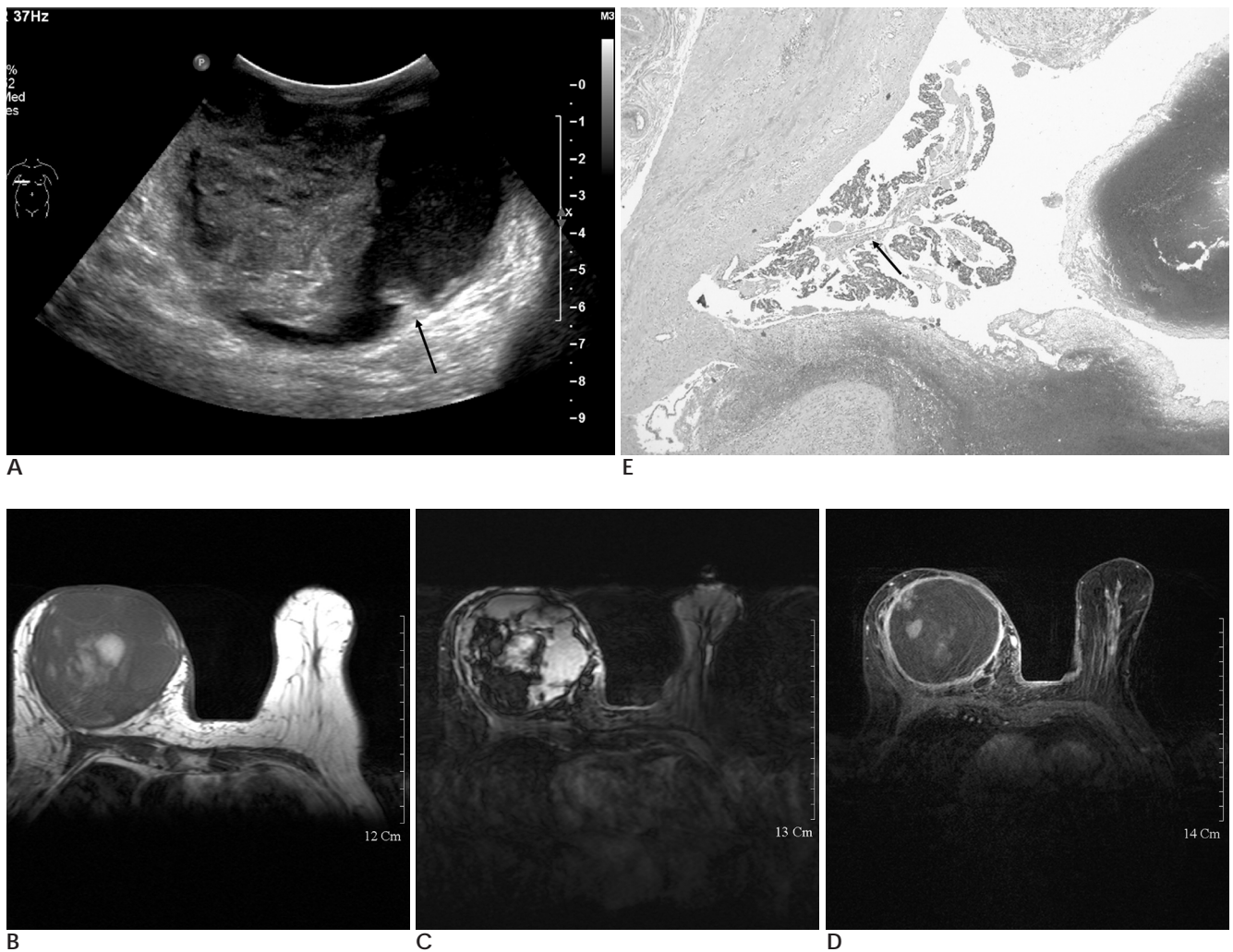


Fig. 1. A. Breast US of the right breast mass shows a large complex mass with an anechoic cystic portion, mural nodularity (arrow), and papillary projections. B. The T1-weighted spin-echo image shows a large multiseptated cystic mass with multifocal hyperintense areas. C. The T2-weighted gradient-echo image shows profoundly hypointense foci within the mass, which is suggestive of subacute or chronic hemorrhage. D. The dynamic contrast-enhanced early enhancing MR image reveals early enhanced lesions at the wall and mural nodules of the cystic mass. E. Photomicrograph of a histopathologic specimen shows the mural nodules that were made up of epithelial cells that were relatively uniform in size and columnar in shape and they had an arborizing nature with stout fibrovascular cores (arrow). (Hematoxylin & Eosin $\times 400$)

nodules was recommended, but patient was refused. However, the radiologic findings, including those of the mural nodules and the extensive hemorrhage, suggested a malignant lesion. We performed simple mastectomy. The cut surface showed an empty space filled with hematoma and blood clots, and this empty space measured 7 × 5 cm across in the subareolar space. Furthermore, multiple mural nodules with papillary cut surfaces were detected. Microscopically, the mural nodules were made up of epithelial cells that were relatively uniform in size and columnar in shape. They had an arborizing nature with stout fibrovascular cores (Fig. 1E). They also showed nuclear hyperchromasia, a high nucleocytoplasmic ratio and high mitotic activity. Negative immunostaining for smooth muscle actin (SMA) demonstrated the absence of myoepithelial cells. A few microinvasive foci of atypical cells to the stroma were also observed. The tumor was diagnosed to be IPC with microinvasion.

Discussion

Papillary carcinomas are unusual ductal malignancies that constitute 1 - 2% of all breast carcinomas in women; the survival rate for this neoplasm is better than that for most breast carcinomas (4, 5). In comparison with the other forms of breast carcinoma, they generally occur in older women. Papillary carcinomas may be solitary or multiple. When the epithelium of papillary carcinoma has features that are diagnostic of intraductal carcinoma, then the lesion is classified as papillary ductal carcinoma in situ. If a cystic component is present, then the tumor is described as an intracystic papillary carcinoma (IPC) (6). The incidence of IPC is 0.26 - 2.0% of all the patients with breast cancer. IPC appears as a mural nodule within a large cystic space, which suggests a dilated duct (4). Furthermore, this type of cancer is usually diagnosed based on the macroscopic findings, regardless of the histological type. Pathologically, IPC appears as a grossly visible mass with a cystic component that may have a papillary, nodular or shaggy inner surface. It often has fibrous and vascular elements, and necrosis is often a prominent feature when an associated invasive component is present (4, 6). Hemorrhagic areas are often identified within the solid components of the tumor; these areas contain blood and fluid within the cystic spaces (7).

On mammography, IPC is usually seen as a well-circumscribed mass. Satellite nodules or clustered micro-

calcifications or both are occasionally present. Ultrasonography (US) demonstrates solid or complex cystic and solid masses that have mild to moderate posterior acoustic enhancement, and Doppler US may show intratumoral blood flow or large feeding vessels entering the lesions (2), while MR imaging shows a multicystic appearance with intracystic hemorrhage (3). Contrast-enhanced MR imaging demonstrates marked enhancement of the cystic walls, septations and mural nodules (2). The diagnosis is suggested by a combination of mammography, US (including Doppler US), and contrast-enhanced MRI. In our case, the blood flow that was noted on the Doppler US inside the mural nodule carried blood out the papillary projection that was inside the wall of the large cyst. The relevant region showed excellent enhancement on the contrast-enhanced MR imaging. In particular, the gradient echo images, which are mainly used to detect scanty hemorrhage, were additionally used to analyze the contents inside the cyst. This revealed mixed existence of hemorrhage inside the mass on several phases of the images, and this and this increased our confidence for making the IPC diagnosis. Accordingly, the existence of hemorrhage allowed a firm preoperative IPC diagnosis.

Puncture cytology rarely leads to a definitive diagnosis; thus, core biopsy or surgical biopsy is usually required. There is currently no consensus on the treatment of IPC. A study by Harris et al. (8) reviewed patients who undergone various combinations of local excision, radiotherapy and tamoxifen. In their 1983 series, Carter et al. (4) have reported that wide local excision or simple mastectomy without axillary dissection is the treatment of choice for pure IPC, especially for the elderly women whom are so often the victims of this tumor. We performed simple mastectomy because there was some doubt about IPC on the radiologic findings and due to the absence of clinically and radiologically suspicious axillary lymphadenopathy. However, in our case, the presence of microinvasion beyond the IPC dictated the need for regular clinical and radiological follow-up. The prognosis for intracystic papillary carcinoma is usually very good with the disease-specific survival rates approaching almost 100% (1). Because of the microinvasive foci, the prognosis for our case may be a bit less optimistic.

In conclusion, MR imaging demonstrates certain characteristic findings of IPC of the breast. Using various protocols, the MR imaging of IPC shows a multicystic appearance with subacute or chronic intracystic hemor-

rhage. The contrast-enhanced MR imaging demonstrates enhancement of the cyst walls and mural nodules, and so in our case, this proved to be successful for making an accurate preoperative diagnosis.

References

1. Solorzano CC, Middleton LP, Hunt KK, Mirza N, Meric F, Kuerer HM, et al. Treatment and outcome of patients with intracystic papillary carcinoma of the breast. *Am J Surg* 2002;184:364-368
2. Soo MS, Williford ME, Walsh R, Bentley RC, Kornguth PJ. Papillary carcinoma of the breast: imaging findings. *AJR Am J Roentgenol* 1995;164:321-326
3. Knelson MH, el Yousef SJ, Goldberg RE, Ballance W. Intracystic papillary carcinoma of the breast: mammographic, sonographic, and MR appearance with pathologic correlation. *J Comput Assist Tomogr* 1987;11:1074-1076
4. Carter D, Orr SL, Merino MJ. Intracystic papillary carcinoma of the breast. After mastectomy, radiotherapy or excisional biopsy alone. *Cancer* 1983;52:14-19
5. Fisher ER, Redmond C, Fisher B. Pathologic findings from the National Surgical Adjuvant Breast Project (Protocol no. 4). VI. Discriminants for five-year treatment failure. *Cancer* 1980;46:908-918
6. Leal C, Costa I, Fonseca D, Lopes P, Bento MJ, Lopes C. Intracystic (encysted) papillary carcinoma of the breast: a clinical, pathological, and immunohistochemical study. *Hum Pathol* 1998;29:1097-1104
7. Lefkowitz M, Lefkowitz W, Wargotz ES. Intraductal (intracystic) papillary carcinoma of the breast and its variants: a clinicopathological study of 77 cases. *Hum Pathol* 1994;25:802-809
8. Harris KP, Faliakou EC, Exon DJ, Nasiri N, Sacks NP, Gui GP. Treatment and outcome of intracystic papillary carcinoma of the breast. *Br J Surg* 1999;86:1274

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