

Circumscribed Breast Carcinoma: Mammographic and Sonographic Findings

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Circumscribed breast cancer is a well demarcated mass with or without a lobulated border simulating a benign tumor like fibroadenoma on mammography or breast US and is reported as approximate 10% of the incidence among primary breast carcinoma(1,2). Pathologically medullary, colloid, papillary, intraductal and rarely invasive ductal carcinomas are included in this group which show the less intense desmoplastic reaction than the scirrhous type cancer, resulting in the most favorable prognosis of all carcinoma of the breast(1). Among 214 primary breast carcinoma during the past 8 years, we experienced 6 cases of pathologically proven circumscribed breast cancer(2 cases of medullary carcinoma, 1 of colloid carcinoma, 1 of intracystic papillary carcinoma, 2 of comedo type intraductal carcinoma). Clinically 2 cases showed bloody nipple discharge from one hole of a unilateral nipple orifice.

Mammography showed a well circumscribed nodule with or without partial lobular contour and no pathologic calcification. Breast sonographic findings were a well defined heterogenous hypoechoic nodule with weak posterior acoustic enhancement. Characteristically a thin dilated lactiferous duct between the mass and the nipple on US could be detected in 2 cases which clinically was accompanied by bloody nipple discharge.

Although the mammographic criteria is promising as benign tumor, the possibility of circumscribed breast carcinoma must be considered in heterogenous hypoechoic nodule with weak posterior acoustic enhancement in US, especially in the presence of a dilated lactiferous duct between the mass and the nipple with bloody nipple discharge.

MATERIALS AND METHODS

6 circumscribed breast cancers which were preoperatively suggested as benign tumors on mammography were pathologically diagnosed among 214 primary breast carcinoma in Hallym University Hospitals between 1984 and 1991. These were classified pathologically into 2 cases of medullary carcinoma(Fig. 1), 1 case of colloid carcinoma(Fig. 2), 1 case of intracystic papillary carcinoma(Fig. 3), 2 cases of comedo type intraductal carcinoma with and without focal ductal invasion(Fig. 4) and were retrospectively reviewed by clinical history, mammographic and sonographic characteristics.

The review points of the clinical history included age, marital status, nipple discharge(location, number of discharged orifice, color, turbidity, cytologic result from discharge). The mammographic

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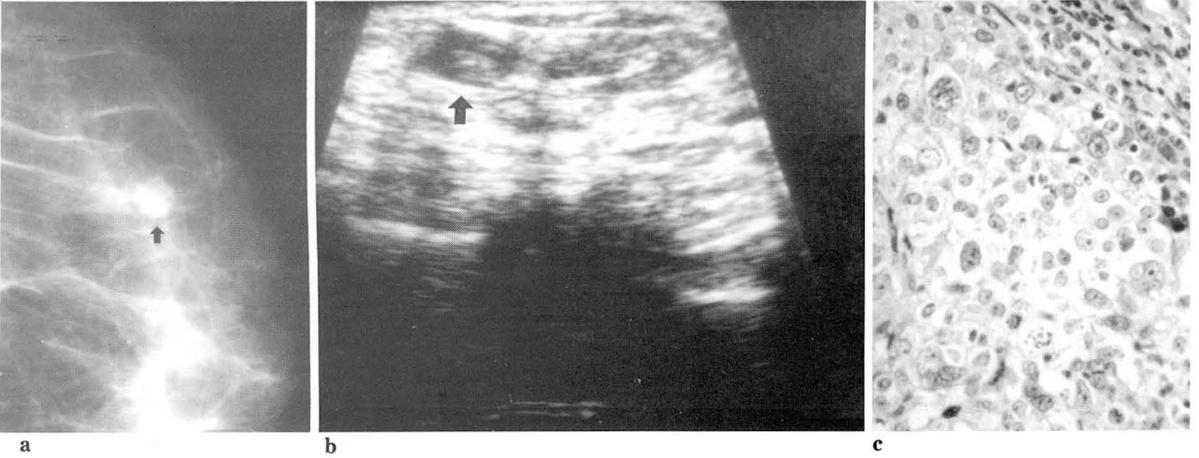


Fig. 1. Medullary carcinoma.

- a. X-ray mammogram shows a well circumscribed mass(arrow) with partial lobular margin in N1 breast parenchymal pattern.
- b. US shows a heterogenous hypoechoic mass(arrow) without reactive change of the surrounding tissue.
- c. Microscopic findings shows the medullary carcinoma with lymphocytic infiltration. Islands of tumor cells show irregular and large vesicular nuclei(H & E, X400).

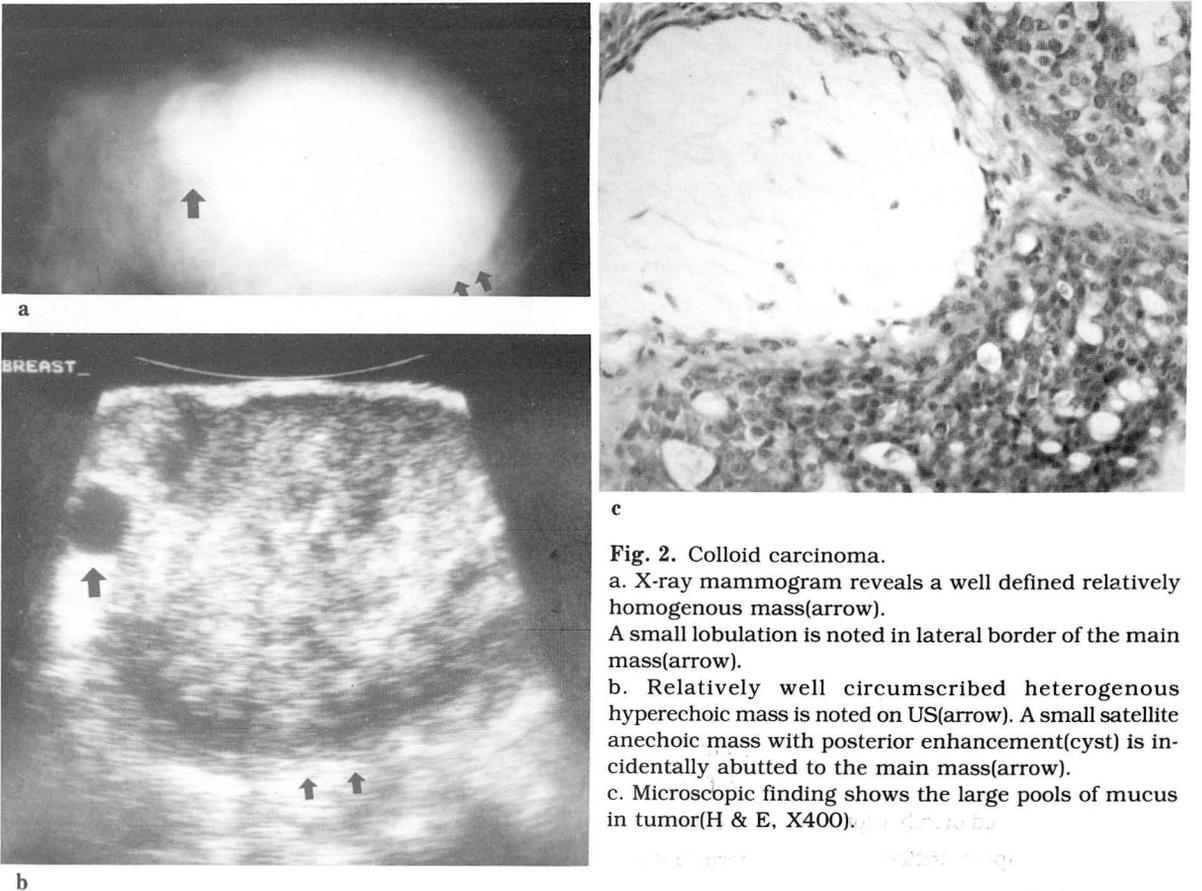


Fig. 2. Colloid carcinoma.

- a. X-ray mammogram reveals a well defined relatively homogenous mass(arrow). A small lobulation is noted in lateral border of the main mass(arrow).
- b. Relatively well circumscribed heterogenous hyperechoic mass is noted on US(arrow). A small satellite anechoic mass with posterior enhancement(cyst) is incidentally abutted to the main mass(arrow).
- c. Microscopic finding shows the large pools of mucus in tumor(H & E, X400).

Table 1. Clinical Presentation, Mammographic and US Findings of Circumscribed Breast Cancer.

Case Pathology	Clinical P.		Mammography				US			
	Age	Nipple discharge*	Parenchymal pattern**	Size(cm)	contour	lobulation	echo	posterior acoustic enhancement	lateral shadow	dilated duct
1. Medullary ca	59	-	N1	1×1	well defined	-	heterogenous hypoechoic	weak	-	-
2. Medullary ca	41	-	P2	3×2	well defined	partial	heterogenous hypoechoic	weak	+	-
3. Colloid ca	38	-	DY	4×5	smooth	partial	heterogenous hyperechoic	-	-	-
4. Intracystic papillary ca	48	bloody	P1	1×1.5	well defined	partial	hyperechoic nodule in cyst	moderate	-	+
5. Comedo ca*	57	bloody	N1	1.0×0.8	well defined	partial	homogenous hypoechoic	weak	-	+
6. Comedo ca	43	-	N1	1×1.5	well defined	-	homogenous hypoechoic	-	-	-

* Comedocarcinoma in situ with focal ductal invasion

** Parenchymal pattern by Wolfe's classification

findings were reviewed according to the type of breast parenchyme, size of the mass, contour, presence of halo, peripherl lobulation and microcalcification.

Mammograms were obtained by the Senographe(CGR). Breast sonographic characteristics were evaluated on the echogenicity of the mass, contour, posterior acoustic enhancement, lateral shadow, and correlation with the lactiferous duct. US examinations were performed on a 7.5MHz with the water path system(Aloka, SSD-630). Histologic examinations were performed with the H & E stain.

RESULTS

Circumscribed breast cancer appearing as benign tumor like fibroadenoma on mammography were diagnosed pathologically in 6 cases among 214 primary breast carcinoma during the past 8 years. The ages ranged from 38 to 59 years with a mean age of 48. Clinically 2 cases of intracystic papillary carcinoma and comedo carcinoma in situ with focal ductal invasion showed bloody nipple discharge from one lumen of the nipple orifice of the unilateral breast.

The mammographic finding of 6 cases of circumscribed breast cancer showed well defined round mass with or without partial lobulated margin(Table

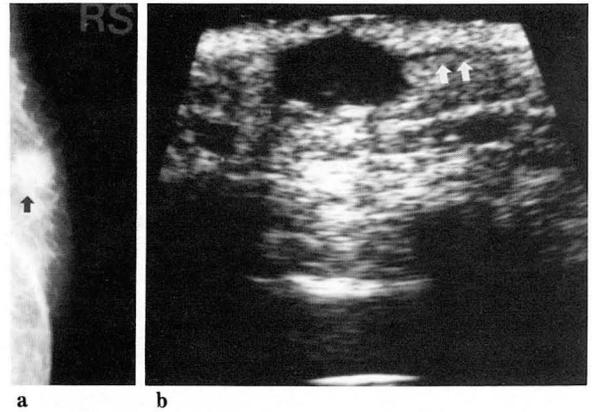


Fig. 3. Intracystic papillary carcinoma.

a. X-ray mammogram shows a lobular marginated round mass in central area of the breast(arrow).

b. US reveals a hypoechoic mass with few hyperchoic internal contents with tadpole tail like dilated lactiferous duct(arrows) between mass to the nipple. the patient had the bloody nipple discharge.

1). The size of the masses was less than 1×2 cm in 4 cases. Each medullary and colloid cancer was over 3 cm in diameter. All of these 6 cases showed no macro or microcalcification. According to Wolfe's classification of breast parenchymal pattern, 1 case of medullary carcinoma and 2 cases of comedocarcinoma are noted in type N1. Another medullary carcinoma was found to be type P2. One colloid

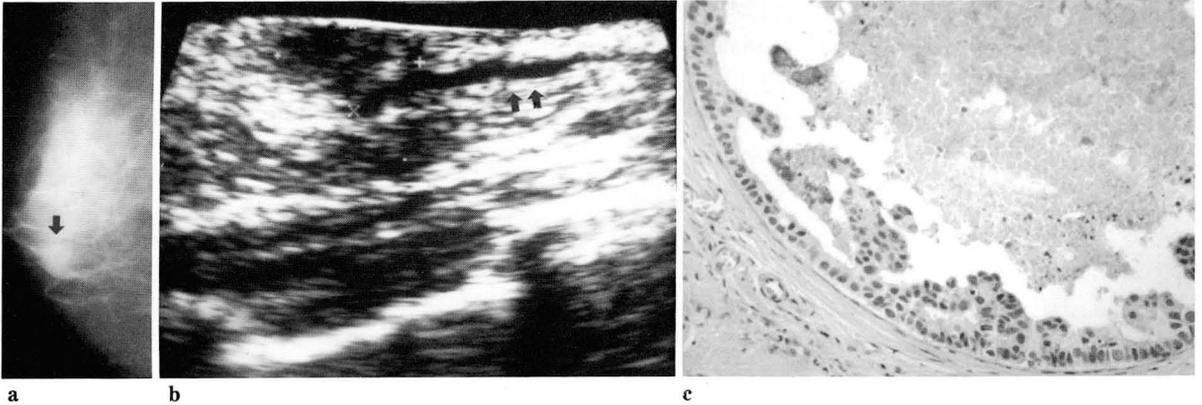


Fig. 4. Comedo carcinoma.

- a. X-ray mammogram shows a partially lobulated well defined mass (arrow) in N1 breast parenchymal pattern.
 b. US reveals heterogenous hypoechoic mass with a dilated lactiferous duct (arrows) between mass to the nipple. Bloody nipple discharge was noticed.
 c. Microscopic specimen shows comedocarcinoma in situ. The duct is filled by a sheet of loosely cohesive tumor cells with central semisolid materials. Focal invasion of duct was noted (H & E, X400).

carcinoma was DY and one intracystic papillary carcinoma was found to be of P1 type. The halo sign was noted partially in 2 cases. The mammographic findings of 6 cases were simulated as a noncalcified benign tumor such as fibroadenoma. On US, well circumscribed relatively inhomogenous hypochoic mass appearance with weak posterior acoustic enhancement was seen in 2 cases of medullary cancer and 2 cases of comedocarcinoma. The colloid carcinoma showed heterogenous hyperchoic pattern which was correlated with large pools of mucin component on histologic specimen (Fig. 2c). Incidentally small cysts were abutted on the main colloid cancer mass, simulating daughter cysts on mammogram (Fig. 2a,b). Moderate posterior acoustic enhancement was noted in the intracystic papillary carcinoma due to internal hemorrhagic fluid content. A lateral shadow from the mass was noted in 1 cases of medullary carcinoma.

The comet tail like appearance, which was a dilated lactiferous duct between the main mass and the nipple orifice, was noted in the intracystic papillary carcinoma and comedocarcinoma in situ with focal invasion (Fig. 3b,4b). These 2 cases showed clinically bloody nipple discharge from one lumen of the nipple orifice of the unilateral breast.

DISCUSSION

Primary signs of breast cancer by mammography are asymmetric breast architecture, increased density, calcification and mass with irregular border. Secondary signs are increased vascularity, skin thickening, skin retraction, nipple retraction, enlarged axillary lymph nodes and changed ductal patterns (3).

Circumscribed breast cancer is a well defined mass with or without lobular margin on mammography or on US. This type shows no additional other primary or secondary sign, resulting in difficulty of differentiation by radiological examination from benign tumors such as fibroadenoma. The majority of pathologic classification of circumscribed breast carcinoma include the medullary, solid papillary, intracystic papillary, colloid, intraductal and rarely invasive ductal carcinoma (1). These lesions do not show the intense desmoplastic reaction and have the most favorable prognosis of all the invasive carcinomas of the breast (1). McSweeney et al reported the incidence of circumscribed cancer is approximate 10% of primary breast carcinoma. We found 6 cases among 214 primary breast cancer during the past 8 years (3%). Feig reported the probability of a cancer mass over 1cm in size appearing as a benign tumor

on mammography is 20%(4). In our cases the contour of mass on mammography was well defined in all cases and four cases showed partial lobulated borders. In two cases the diameter of tumor was over 3cm. There were no evidence of pathologic calcification in all cases. Meyer et al reported the partial or complete halo sign surround the mass in 3 cases. Meyer et al reported the partial or complete halo sign surround the mass in 3 cases of 24 medullary cancer(5). Swan et al reported the halo sign is not characteristics of a benign breast tumor, rarely but also of a breast carcinoma(6). We detected the halo sign in 2 cases of 6 circumscribed breast cancer. The mammographic features of our series suggested more benignity than malignancy and there were no differential criteria among pathologic types. The major criteria of breast cancer is US also corresponded with the mammographic signs. But the differentiation of internal content of masses and lactiferous ductal status is superior by US than mammography.

The US findings of medullary carcinoma are reported as a well circumscribed rounded or lobulated hypoechoic mass with moderate to strong anterior and posterior boundary echoes. Central necrosis, especially in larger circumscribed is a common feature(1,4). There was no central necrosis in our cases. With the US findings of the partially lobulated well circumscribed hypoechoic mass in our cases, it was difficult to differentiate medullary cancer from fibroadenoma.

Colloid carcinoma showed a well defined mass with low level intensity echo content on US(1). In Cole-Beuglet et al's survey, colloid carcinoma revealed a weakly echogenic mass with some acoustic attenuation(7). In our case the colloid carcinoma showed a heterogenous moderate echogenic mass with a well defined boundary echo. this increased echo in the mass was presumed as the result of large pools of mucus in the tumor. There was no posterior acoustic enhancement.

Intracystic papillary carcinoma produces obstruction of the duct, bleeds into the obstructed duct and produces a blood-filled cyst. We could aspirate the blood from the anechoic mass with small internal hyperechoic nodules on US.

Comedocarcinoma is one of the most common patterns of intraductal carcinoma in situ. Histologically, ducts are dilated by a semisolid creamy material of proliferating epithelium which occludes the ducts(8,9).

Four cases of solid tumors in our cases, with the exception of colloid carcinoma and intracystic papillary carcinoma, showed heterogenous hypoechoic nature. But posterior acoustic enhancement was not strong, so simple cyst could be easily excluded. Too low gain settings of the US can cause the missing of faint internal echo in hypoechoic solid tumors leading to misdiagnosis as a cyst(2,5). Kobayashi et al regarded the lateral shadow as a benign property of a solid mass(10). However, we could demonstrate the lateral shadow in 1 case of medullary carcinoma. The dilated lactiferous duct appearing as a comet tail between the solid mass and the nipple was noted in intracystic papillary carcinoma and in 1 case of comedocarcinoma in situ with focal ductal invasion which revealed bloody nipple discharge from one orifice in the unilateral breast nipple clinically. Although the report about this findings was not given yet, we suspected the bloody nipple discharge even in comedocarcinoma due to adjacentis small vessel invasion and the dilated lactiferous duct transporting blood from the mass to the nipple orifice.

Conclusively, a well defined lobular marginated hypoechoic mass with weak posterior acoustic enhancement on US, regardless of mammographic suggestion of benignity, must be considered as possible circumscribed breast cancer. Moreover, a dilated lactiferous duct like comet tail between mass and the nipple with clinical bloody nipple discharge from one orifice of the unilateral breast is an important suggestion of malignancy.

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<국문 요약>

국한성 유방암의 X-선 유방촬영술 및 초음파 소견

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국한성 유방암이란 X-선 유방촬영술 또는 초음파상 섬유선종과 같은 양성종양과 유사한 명확한 윤곽을 나타내어 방사선학적 진단에 주의를 요하는 유방암으로 유방암의 약 10%의 발생빈도를 나타내며, 결합조직형성반응(desmoplastic reaction)이 경성유방암에서 보다 적어 모든 침윤성 유방암중 예후가 가장 좋은 군으로 알려져 있다(1). 지난 8년간 한림대학교병원에서 진단된 214예의 유방암중 X-선 유방촬영술상 양성종양과 유사한 소견을 나타내었으나 초음파 검사로 악성이 의심되었으며, 조직병리 검사로 악성으로 판명된 국한성 유방암은 6예로 수질암 2예, 교질암 1예, 낭내유두상암 1예, 구진암 2예 이었다.

X-선 유방촬영술상 윤곽이 분명한 종괴로 주변부 경계는 4예에서 부분적으로 불규칙 하였으며 결절내 석회화 소견은 관찰되지 않았다. 초음파 소견은 4예에서 불균등한 저에코의 결절로 4예에서 후방음향 증강이 약하거나 관찰되지 않았으며, 임상적으로 혈성유두분비를 보였던 2예에서 종괴와 유두를 연결하는 확장된 유관이 특징적으로 관찰되었다.

X-선 유방촬영술에서 명확한 윤곽을 보이는 종괴라도 초음파상 후방음향 증강이 약한 불균등한 저에코의 결절상은 국한성 유방암을 의심할 수 있으며, 특히 혈성유두분비와 함께 종괴와 유두사이에 확장된 유관이 관찰되는 경우에는 악성종양을 의심케 하는 소견이라 사료된다.

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