

# Synchronous Invasive Ductal Carcinoma and Metastatic Ovarian Serous Papillary Adenocarcinoma in the Same Breast

## - A Case Report -

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A 59-year-old woman displayed multiple palpable right breast masses along with ipsilateral cervical and axillary lymphadenopathy. She had a previous history of bilateral salpingo-oophorectomy for serous papillary adenocarcinoma two and half years ago. She underwent mastectomy for the lesions located in the upper inner breast quadrant. A 1 cm-sized primary ductal carcinoma was present; however, the other breast lesions and the metastatic axillary lymph nodes were confirmed as showing papillary serous adenocarcinoma, which were similar to the previous ovarian tumor. After the patient underwent postoperative adjuvant chemotherapy, of 8 cycles of doxorubicin and docetaxel, she has been stable during the clinical follow-up for 10 months with decreases in size of the metastatic nodules.

**Key Words** : Neoplasms, synchronous; Ovarian neoplasms; Adenocarcinoma, serous; Carcinoma, ductal, breast

Synchronous primary cancer and metastatic tumor in the same breast is an extremely rare finding, and only one case of collision tumor with mucosal associated lymphoid tissue lymphoma had been reported on.<sup>1</sup> The frequency of metastasis to the breast from other malignancies accounts for less than 2% of all breast carcinomas.<sup>2</sup> There have been only 10 reported cases of intramammary metastatic ovarian serous papillary carcinomas and most cases were not histologically proven.<sup>3-5</sup> We recently experienced a case of separate intramammary nodules in a mastectomy specimen; one nodule was an invasive ductal carcinoma and the others were metastatic ovarian serous papillary adenocarcinomas.

## CASE REPORT

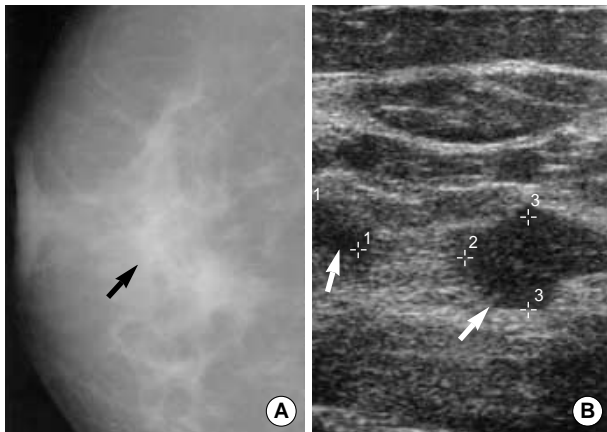
A 59-year-old woman presented with multiple palpable masses in the right breast, chest wall, abdominal wall and the ipsilateral cervical and axillary lymph nodes. She had a history of bilateral salpingo-oophorectomy due to ovarian serous papillary adeno-

carcinoma with peritoneal seeding 30 months ago.

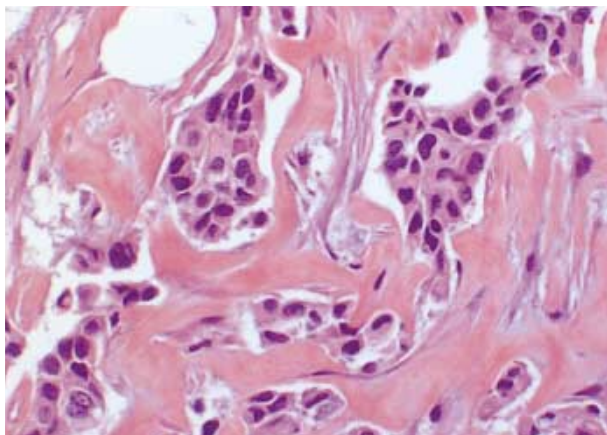
Mammography showed a 1 cm-sized spiculated mass in the right upper inner quadrant, that was suggested as a primary breast carcinoma. Diffuse trabecular thickening and skin thickening were evident on mammography, which were suggestive of extensive lymphangitic infiltration (Fig. 1A). Ultrasonographic examination showed multiple low echogenic masses at the 1, 4, and 9 o'clock positions (Fig. 1B).

Aspiration cytologic examination from the breast masses (Fig. 2A) and the axillary lymph nodes (Fig. 2B) revealed many papillary clusters of atypical epithelial cells, indicating metastatic ovarian papillary serous adenocarcinoma. However, preoperative percutaneous needle biopsy that targeted the mammary mass was confirmed as showing a typical primary invasive ductal carcinoma without the papillary configuration (Fig. 3).

The patient underwent right modified radical mastectomy, and the histology of the surgical specimen well matched with the above discrepant results. Multiple small-sized masses (up to 1.3 cm at the greatest dimension) of papillary neoplasm with



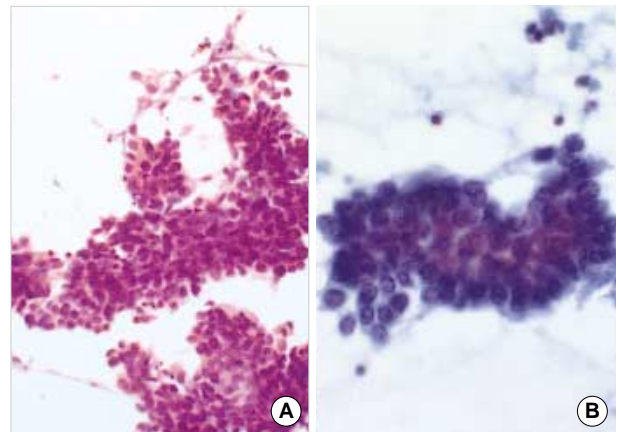
**Fig. 1.** (A) Mammogram shows a spiculated 1 cm-sized mass (arrow) in right upper inner quadrant. (B) Ultrasonogram shows multiple low echogenic masses (arrows) at 1, 4, and 9 o'clock directions.



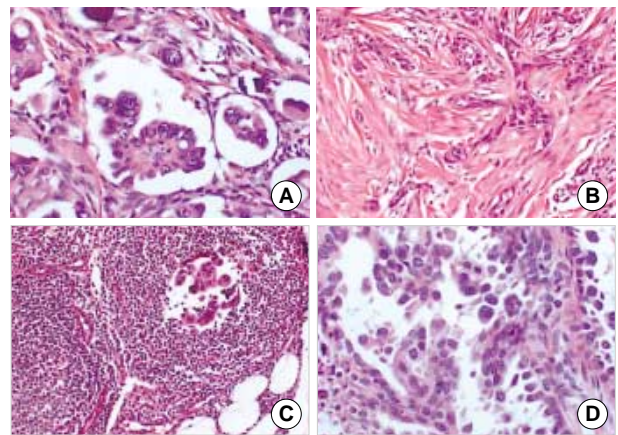
**Fig. 3.** Sono-guided needle biopsy shows typical invasive ductal carcinoma without papillary configuration.

psammoma bodies and a high nuclear grade were scattered in the breast tissue (Fig. 4A). The surrounding ducts of the metastatic tumors were not hyperplastic. An invasive ductal carcinoma with ductal distortion was present (Fig. 4B). The primary invasive ductal carcinoma was 1 cm in the greatest dimension and it was classified as modified Bloom and Richardson's histologic grade II and Black's nuclear grade II. There was neither ductal carcinoma in situ component nor any associated microcalcification. Seven out of 25 axillary lymph nodes displayed metastatic papillary serous adenocarcinoma (Fig. 4C). When we reviewed previous ovarian tumor, the tumor cells were similar to the intramammary metastatic masses (Fig. 4D).

Papillary mammary carcinomas could not be excluded based only on the morphologic features. Immunohistochemical staining for cytokeratin 7 was different between the two types of



**Fig. 2.** Fine needle aspiration cytological smears from breast (A) and axillary (B) masses show papillary clusters with high nuclear grade.



**Fig. 4.** (A) Intramammary metastatic masses show papillary configuration, high nuclear grade, and psammoma bodies. (B) Invasive ductal carcinoma shows a ductal distortion. (C) Metastatic serous papillary adenocarcinoma involves axillary lymph nodes. (D) The previous ovarian carcinoma was papillary in growth pattern with high nuclear grade.

intramammary masses; there was a diffuse positive reaction in the ductal carcinoma and focal positivity in the metastatic papillary carcinomas. The cytokeratin 7 immunohistochemical staining result in the previous ovarian mass was same as intramammary papillary serous adenocarcinoma. The hormone receptor and cytokeratin 20 immunostaining results were negative in both tumors.

Postoperatively, the patient underwent adjuvant chemotherapy of 8 cycles of doxorubicin and docetaxel. She has remained stable with decrease in sizes of mediastinal lymph nodes and intraabdominal regions for 10 months since the completion of her chemotherapy.

## DISCUSSION

Metastases to the breast from non-mammary malignant neoplasms are rare findings and this type of tumor accounts for less than 2% of all breast carcinoma.<sup>2</sup> The reported primary sites are the lung, kidney, stomach, intestine, ovary, uterine cervix and thyroid gland.<sup>6</sup> About 10 cases of metastatic ovarian serous papillary carcinomas have been reported on.<sup>3-5</sup> Most cases were part of a systemic spread and they were not histologically proven due to far advanced diseases. However metastatic carcinoma in the breast has been reported to be the first evidence of an occult renal primary cancer<sup>7</sup> and advanced bilateral ovarian carcinomas.<sup>4</sup> A case of ovarian serous adenocarcinoma with simultaneously mammary metastases has also been reported.<sup>8</sup>

The clinical and radiologic correlation is important to differentiate metastatic tumor from primary mammary carcinoma. Some of the clinical features are helpful in recognizing that a neoplasm in the breast is a metastatic tumor. The average interval for the development of a mammary metastasis is approximately 2 years in the patients with previously treated cancer. In our case, the possibilities of primary and metastatic tumors could be clinically considered.

Radiologically, the metastatic lesions tend to be discrete, round shadows without spiculation.<sup>9</sup> Microcalcifications in metastatic breast tumors are uncommon, but these have been described in metastatic ovarian carcinoma.<sup>10-12</sup> The mammogram of this presenting case showed spiculation, suggesting a primary mammary carcinoma. However, this primary mass didn't match the result of the sonogram, and it could not be retrospectively separated from the multiple low-echogenic metastatic tumors. Multifocal psammomatous calcifications were observed beside the metastatic tumors.

Synchronous detection of two different types of malignancies in the same breast was very uncommon. A case of collision tumor that was composed of invasive ductal carcinoma and MALT-lymphoma has been reported.<sup>1</sup> The relationship of the two tumors was hypothesized as the antigenic stimulation of the adjacent carcinoma may have caused the genesis of lymphoma on the analogy with gastric MALT lymphoma. In this presenting case, a similar mechanism can also be speculated, but not proven.

In men, involvement of the breast by metastatic prostatic adenocarcinomas has suggested that estrogen treatments predispose patients to the development of mammary metastasis.<sup>13</sup> The role of hormonal receptor in organ-specific cancerization can be considered. However, estrogen is widely used in clinical practice, but breast metastasis is relatively infrequent. The hormonal

receptors of this presenting case were all negative in both the metastatic and primary tumors.

Genetic susceptibility could be related to multiple site-specific cancers. The BRCA-1 gene on the long arm of chromosome 17 and the BRCA-2 gene on chromosome 13 have been well reported. BRCA-1 may account for up to 90% of the patients suffering with combined breast and ovarian carcinoma.<sup>14</sup> The current case illustrates an unusual presentation of ductal carcinoma and synchronous metastatic ovarian serous papillary carcinomas. Further research involving genetic analysis is needed to evaluate the genetic susceptibility of a patient to multiple malignancies.

## REFERENCES

1. Susnik B, Jordi Rowe J, Redlich PN, Chitambar C, Chang CC, Kamalath B. A unique collision tumor in breast: invasive ductal carcinoma and mucosa-associated lymphoid tissue lymphoma. *Arch Pathol Lab Med* 2004; 128: 99-101.
2. Yeh CN, Lin CH, Chen MF. Clinical and ultrasonographic characteristics of breast metastases from extramammary malignancies. *Am Surg* 2004; 70: 287-90.
3. Elit LM, Cunnane MF. Breast metastasis from ovarian carcinoma: report of two cases and literature review. *J Surg Pathol* 1995; 1: 69-74.
4. Fraumeni EE, Ro JY, Silva EG, el-Naggar A. Well-differentiated serous ovarian carcinoma presenting as a breast mass: a case report and flow cytometric DNA study. *Int J Gynecol Pathol* 1991; 10: 79-87.
5. Yamasaki H, Saw D, Zdanowitz J, Faltz LL. Ovarian carcinoma metastasis to the breast. case report and review of the literature. *Am J Surg Pathol* 1993; 17: 193-7.
6. Rosen PP. Metastases in the breast from nonmammary malignant neoplasm. In: *Rosen's Breast Pathology*. 2nd ed. Philadelphia: PA Lippincott Williams & Wilkins, 2001: 689-701.
7. Kannan V. Fine-needle aspiration of metastatic renal-cell carcinoma masquerading as primary breast carcinoma. *Diagn Cytopathol* 1998; 18: 343-5.
8. Manini C, Pietribiasi F, Sapino A, Donadio S. Serous cystadenocarcinoma of the ovary with simultaneous breast metastases. Description of a case. *Pathologica* 1998; 90: 152-5.
9. Bohman L, Bassett LW, Gold RH, Voet R. Breast metastases from extramammary malignancies. *Radiology* 1982; 144: 309-12.
10. Duda RB, August CZ, Schink JC. Ovarian carcinoma metastatic to the breast and axillary node. *Surgery* 1991; 110: 552-6.
11. Raptis S, Kanbour AI, Dusenbery D, Kanbour-Shakir A. Fine-needle aspiration cytology of metastatic ovarian carcinoma to the breast. *Diagn Cytopathol* 1996; 15: 1-6.

12. Moncada R, Cooper RA, Garces M, Badrinath K. Calcified metastases from malignant ovarian neoplasm. Review of the literature. *Radiology* 1974; 113: 31-5.
13. Salyer WR, Salyer DC. Metastases of prostatic carcinoma to the breast. *J Urol* 1973; 109: 671-5.
14. Easton DF, Ford D, Bishop DT. Breast and ovarian cancer incidence in BRCA1-mutation carriers. Breast Cancer Linkage Consortium. *Am J Hum Genet* 1995; 56: 265-71.