CASE REPORT

Metaplastic breast carcinoma with chondroid differentiation: a rare variant of infiltrative carcinoma in a 38-year-old woman

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SUMMARY

Metaplastic breast carcinoma (MBC) is a rare type of invasive breast carcinoma, and chondroid differentiation is even rarer. Here we report a case of MBC with extensive chondroid differentiation in a 38-year-old woman who presented with a lump in her left breast. Ultrasound findings were most compatible with those of giant fibroadenoma. A histopathological examination revealed a malignant lesion comprising neoplastic epithelial cells arranged in solid nests, with large areas of chondroid differentiation. Neoplastic chondroid cells exhibited a positive reaction for S-100, patchy positive reaction for pan-cytokeratin (AE1/AE3) and negative reaction for epithelial membrane antigen. Both carcinomatous and chondroid cells exhibited p53 overexpression. Sentinel lymph node biopsy revealed no tumorous involvement.

BACKGROUND

Metaplastic breast carcinoma (MBC) is an aggressive, rare and generally high-grade breast carcinoma that occurs mostly in women older than 50 years.^{1–3} The ultrasound characteristics of MBCs are very similar to those of infiltrative ductal carcinomas or benign tumours, such as fibroadenoma.^{4,5} MBCs are usually negative for oestrogen receptor (ER), progesterone receptor (PR) and Her2neu, a feature similar to that of the basal-like subtypes of breast carcinoma.^{5,6} The rarity of this tumour type causes difficulties in treatment and management; however, patients with MBCs benefit from surgery and adjuvant radiotherapy.⁷ Although the prognosis of MBCs is poorer than that of infiltrative ductal carcinomas, lymph node involvement is unusual in this type of breast carcinoma.^{7,8} Here we present a case of MBC with chondroid differentiation in a 38-year-old woman, with an ultrasound evidence of a benign tumour; she underwent breast quadrantectomy and sentinel lymph node biopsy.

CASE PRESENTATION

A 38-year-old woman was referred to the surgery ward with a lump in her left breast. Her medical history was unremarkable, and she had no history of familial breast carcinoma.

INVESTIGATIONS

An ultrasound examination using a 15 MHz probe revealed a hypoechoic solid lesion measuring

55×45 mm, with cystic components measuring 43×33 mm; this lesion was located at the 10 o'clock position on the lateral margin of the left breast (figure 1). A tentative diagnosis of giant fibroadenoma with necrotic changes or premalignant lesions was considered. The patient underwent surgery and frozen sectioning. The frozen sections comprised breast tissue with firm, glistening and cream-to-greyish tumorous areas, and the largest tumour measured 60×45 mm in diameter. A microscopic examination revealed that the tumorous lesion comprised neoplastic cells with small-to-medium, dark nuclei, and the cells were arranged in poorly formed glandular and solid nest patterns. In addition, the lesion contained large areas of chondroid differentiation comprising chondrocytes with large nuclei and mitotic figures (figures 2 and 3). Furthermore, necrotic areas were observed. On the lateral surgical border, a fibroadenoma was also noted adjacent to the tumorous area. The patient underwent breast quadrantectomy with safe, clear margins, which were confirmed through frozen sectioning and axillary sentinel lymph node resection. Immunohistochemical staining was performed on paraffin-embedded blocks of tumour tissue, and the dark carcinomatous epithelial cells displayed a positive reaction for pan-cytokeratin, p53 (in 20%–30% of cells) and Ki-67 (strong reaction in 80%–90% of cells), and a negative reaction for ER, PR and Her2neu. The chondroid cells exhibited a positive reaction for S-100 (in 98% of cells) and p53 (in 75%–80% of cells), patchy positive reaction for pan-cytokeratin and negative reaction for epithelial membrane antigen (EMA) (figures 4–6).

DIFFERENTIAL DIAGNOSIS

The sarcomatous component of MBCs resembles those of spindle cell sarcomas, such as malignant phyllodes tumour, chondrosarcoma, fibrosarcoma, rhabdomyosarcoma with chondroid metaplasia, malignant fibrous histiocytoma, and myoepithelial carcinoma, which exhibit negative staining for epithelial markers, such as EMA and pan-cytokeratin. Malignant phyllodes tumours can be differentiated from MBCs through negative staining for high-molecular-weight keratin and p63. Although chondrosarcoma cells exhibit positive staining for S-100, they exhibit negative staining for EMA and pan-cytokeratin (AE1/AE3).

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Figure 1 Ultrasound reveals complex solid and cystic breast mass.

TREATMENT

Left breast quadrantectomy with safe, clear margins and sentinel lymph node resection were performed. After surgery, the patient underwent adjuvant radiotherapy.

OUTCOME AND FOLLOW-UP

Seventeen months after diagnosis, no recurrence was detected and her general health was good.

DISCUSSION

MBC is a rare subtype of infiltrating breast carcinoma with distinct histopathological features.^{1,2,9} It accounts for <5% of all breast malignancies and occurs mostly in women aged 48–59 years.^{4,5} The ultrasound findings of MBC are not characteristic, and it could present as a well-circumscribed lesion or a non-encapsulated, ill-defined lesion with or without calcifications.^{10,11} According to the WHO classification, MBC has two subtypes with different histopathological features: epithelial and mixed.^{2,3} The epithelial type comprises neoplastic epithelial cells arranged in solid and glandular patterns admixed

Figure 2 Metaplastic breast carcinoma composed of epithelial cells arranged in solid nests in the periphery of tumorous area with chondroid differentiation in the centre of tumour (H&E staining, magnification $\times 10$).

Figure 3 Chondroid cells with large nuclei (H&E staining, magnification $\times 20$).

with spindle cells; this condition is known as adenocarcinoma admixed with spindle cells or adenosquamous carcinoma. The mixed type comprises carcinomatous epithelial cells with areas of chondroid or osseous metaplasia; this condition is also known as carcinosarcoma.^{6,7} Chondroid differentiation is the rarest variant of metaplastic breast carcinoma components.^{1,2} In some MBCs, the zone of spindle cells between the epithelial cells and osseous or cartilaginous matrix is absent; therefore, this type of MBC is known as matrix-producing carcinoma; as our case, that spindle cell component was absent. Epithelial cells mostly react negative for ER, PR and Her2neu (as observed in the basal-like subtype) and exhibit a high Ki-67 labelling index, as reported in the case series by Gwin *et al* and other similar studies.^{2–5,12} Immunohistochemistry is essential to differentiate the mesenchymal components. Chondroid cells exhibit a positive reaction for pan-cytokeratin (AE1/AE3) and S-100 and a negative reaction for EMA. Kim *et al*¹³ reported p53 overexpression in approximately 20%–40% of conventional breast carcinoma cells, and p53 overexpression in >60% of both epithelial and chondroid cells in MBC.

The lymph node involvement in MBCs is less frequent than that in other infiltrative carcinomas.^{3,6} MBCs exhibit a poorer

Figure 4 Chondroid cells reveal positive reaction for S-100 (immunohistochemical staining method, magnification $\times 20$).

Figure 5 Both epithelial and chondroid cells overexpression p53 (immunohistochemical staining method, magnification $\times 10$).

prognosis than other infiltrating carcinomas, with earlier distant metastasis and visceral involvement over the course of time. However, MBCs with chondroid differentiation exhibit a better prognosis than other subtypes.¹⁰ The rarity of this type of breast invasive carcinoma makes treatment challenging in the absence of definitive treatment guidelines. Conservative surgery with radiotherapy has been considered for tumours smaller than 5 cm, and total mastectomy followed by chemotherapy and radiotherapy for tumours larger than 5 cm.^{12 13}

Figure 6 Both epithelial and metaplastic chondroid cells staining positively for pan-cytokeratin (AE1/AE3) (immunohistochemical staining method, magnification $\times 10$).

Learning points

- Metaplastic breast carcinoma (MBC) is a rare subtype of invasive breast carcinoma with variable histopathological components, including both epithelial and mesenchymal cells.
- MBCs present as large tumours with aggressive behaviour, less lymph node involvement and a basal-like phenotype; they spread via a hematogenous route.
- However, when MBCs reveal well-circumscribed borders on ultrasound, they could be misdiagnosed as fibroadenoma or infiltrative ductal carcinomas, and the ultrasound findings of MBCs are not characteristic.

Contributors Both authors had contributed in case presentation, clinical investigation and writing the manuscript.

Competing interests None declared.

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REFERENCES

- 1 Agrawal T, Shrinivas T, Permi HS, *et al.* Metaplastic Carcinoma of breast with extensive chondroid differentiation: a Case Report with Review of Literature. *J Clin Diagn Res* 2015;9:ED11–13.
- 2 Schwartz TL, Mogal H, Papageorgiou C, *et al.* Metaplastic breast cancer: histologic characteristics, prognostic factors and systemic treatment strategies. *Exp Hematol Oncol* 2013;2:31.
- 3 Jung SY, Kim HY, Nam BH, *et al.* Worse prognosis of metaplastic breast cancer patients than other patients with triple-negative breast cancer. *Breast Cancer Res Treat* 2010;120:627–37.
- 4 Bae SY, Lee SK, Koo MY, *et al.* The prognoses of metaplastic breast cancer patients compared to those of triple-negative breast cancer patients. *Breast Cancer Res Treat* 2011;126:471–8.
- 5 Edenfield J, Schammel C, Collins J, *et al.* Metaplastic breast Cancer: molecular typing and identification of potential targeted therapies at a single Institution. *Clin Breast Cancer* 2016;8209:30197–5.
- 6 Cimino-Mathews A, Verma S, Figueroa-Magalhaes MC, *et al.* A clinicopathologic analysis of 45 patients with metaplastic breast carcinoma. *Am J Clin Pathol* 2016;145:365–72.
- 7 Song Y, Liu X, Zhang G, *et al.* Unique clinicopathological features of metaplastic breast carcinoma compared with invasive ductal carcinoma and poor prognostic indicators. *World J Surg Oncol* 2013;11:129.
- 8 Paul Wright G, Davis AT, Koehler TJ, *et al.* Hormone receptor status does not affect prognosis in metaplastic breast cancer: a population-based analysis with comparison to infiltrating ductal and lobular carcinomas. *Ann Surg Oncol* 2014;21:3497–503.
- 9 Myint ZW, Raparla S, Kamugisha LK. Metaplastic breast cancer with chondroid differentiation. *J Community Hosp Intern Med Perspect* 2015;5:28935.
- 10 Shin HJ, Kim HH, Kim SM, *et al.* Imaging features of metaplastic carcinoma with chondroid differentiation of the breast. *AJR Am J Roentgenol* 2007;188:691–6.
- 11 Choi BB, Shu KS. Metaplastic carcinoma of the breast: multimodality imaging and histopathologic assessment. *Acta Radiol* 2012;53:5–11.
- 12 Gwin K, Wheeler DT, Bossuyt V, *et al.* Breast carcinoma with chondroid differentiation: a clinicopathologic study of 21 triple negative (ER-, PR-, Her2/neu-) cases. *Int J Surg Pathol* 2010;18:27–35.
- 13 Kim YJ, Shim HS, Lee H, *et al.* Metaplastic carcinoma with extensive chondroid differentiation in the breast (chondroid carcinoma). *Yonsei Med J* 2006;47:259–63.

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