

ARTICLE

Limitations of Fine-Needle Aspiration Cytology to Diagnose Metaplastic Carcinoma of the Breast

Alfredo RIBEIRO-SILVA, Felipe LUZZATTO, Daniel CHANG, Sérgio ZUCOLOTO

Department of Pathology of Faculty of Medicine of Ribeirão Preto, University of São Paulo (FMRP/USP), Brazil

Metaplastic carcinoma is a very rare breast neoplasm that is often confused with benign and others malignant entities on both clinical and conventional histopathologic basis. Three cases of metaplastic carcinoma of breast are presented. The diffi-

culties found on fine needle aspiration cytology and the limitations of this procedure are discussed as well the main features of this tumor. (Pathology Oncology Research Vol 7, No 4, 298–300, 2001)

Keywords: metaplastic carcinoma, breast, fine-needle aspiration

Introduction

Metaplastic carcinoma is a very rare breast neoplasm accounting for less than 1% of all breast malignancies.¹ This neoplasm is an overt infiltrating ductal carcinoma with extensive squamous differentiation and/or spindle cell proliferation with or without chondroid or osseous heterologous elements.² Metaplastic carcinoma is often confused with benign and other malignant entities on both a clinical and a conventional histopathologic basis.³ Fine needle aspiration (FNA) cytology is frequently the first diagnostic approach to mammary lumps in many hospitals. We describe three cases where it was impossible to diagnosis metaplastic carcinoma by cytology even after histopathologic examination.

Case report 1

The first patient was a 44 year-old female who presented with a 3 months history of a painless right breast mass. Physical examination showed mammary asymmetry. The right breast was bigger than the left one and there was a visible bulge on right-upper quadrant. Palpation revealed

a well-defined smooth cystic mass, measuring 9 cm at greatest diameter. There were no palpable lymph nodes. Ultrasonography showed an echogenic lobulated image with irregular edges. FNA diagnosis was performed. The slides were stained according to May-Grünwald-Giemsa. The cytology material was composed of a high number of clusters of cells sketching ducts. These cells had large and irregular nuclei with chromatin coarsely granular. The cytoplasm was strongly eosinophilic. The diagnosis of ductal infiltrating carcinoma was given. Screening for metastasis was negative. The surgeon decided to excise only the mass. Due to extensive fragmentation of the specimen received by the Pathology Service it was impossible to define whether the margins were free or not. So the patient was submitted to an enlarged lumpectomy with axillary node dissection followed by chemotherapy. The mastectomy specimen showed that the remaining tumor extended to the pectoral muscle and contained a large cyst filled with mucus and blood partially covered by a protuberant necrotic mass. Microscopic examination revealed atypical squamous cells entrapped in a myxoid stroma with chondroid differentiation. The histologic diagnosis was metaplastic carcinoma with homologous and heterologous elements. The lymph nodes were negative.

Case report 2

The patient is a 69 year-old female with a painless left breast mass of fast growing (two months). The physical examination revealed a mobile ill-defined lump on left-upper quadrant breast. The fine-needle aspiration was per-

Received: Sept 4, 2001; *accepted:* Nov 19, 2001

Correspondence: Alfredo RIBEIRO-SILVA, Serviço de Patologia do Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (HCFMRP/USP). Av. Bandeirantes, s/n – Campus Universitário Monte Alegre. CEP 14048-900, Ribeirão Preto – SP, Brasil. Tel: 55 16 6023240, fax: 55 16 6330095; E-mail: ardsilva@rpa.fmrp.usp.br.

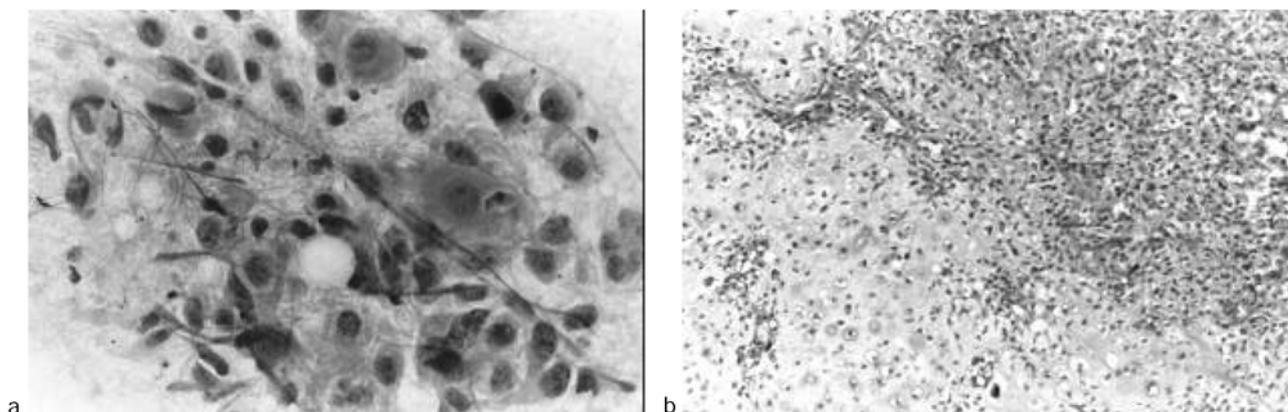


Figure 1. a) Fine-needle aspiration showing a cluster of malignant cells sketching ducts (May-Grünwald-Giemsa stain, X40). **b)** Histology shows a malignant neoplasm with areas of chondroid differentiation (left) (HE, X10).

formed and revealed only squamous cells without any feature suggesting malignancy. The diagnosis was benign squamous metaplasia. Despite this result the surgeon decided to perform a lumpectomy and the frozen sections made during the surgery confirmed the malignant nature of the neoplasm. The patient underwent Patey mastectomy with axillary node dissection. Grossly the lump measured 6 cm at greatest diameter with several cystic cavities. Microscopically the tumor was composed of glands clearly malignant besides atypical squamous cells. There were large areas of necrosis. The diagnosis was adeno-squamous metaplastic carcinoma. Lymph nodes were negative.

Case report 3

A 64 year-old woman presented with fast growing a mass in the right breast (2 months). Physical examination revealed mammary asymmetry with a palpable lump in the left-upper breast. The rest of the clinical examination was unremarkable. Fine needle aspiration was performed

and revealed squamous cells without malignant features permeated by abundant plugs of keratin. The diagnosis was benign cyst (probably epidermal cyst). Despite the FNA, result the patient underwent lumpectomy and during the surgery the pathologist saw malignant cells on frozen sections. Axillary node dissection followed by adjuvant chemotherapy. Grossly the tumor measured 4 cm at greatest diameter and had multiple cystic cavities. Microscopic examination showed bizarre and atypical squamous cells with dyskeratosis and abundant keratin. The possibility of metastasis from another primary site was discharged. The diagnosis of primary squamous carcinoma of breast was given.

Discussion

Metaplastic carcinoma (MC) of the breast manifests as a rapidly growing round mass with associated architectural distortion on mammograms. Complex echogenicity with solid and cystic components may be seen sono-

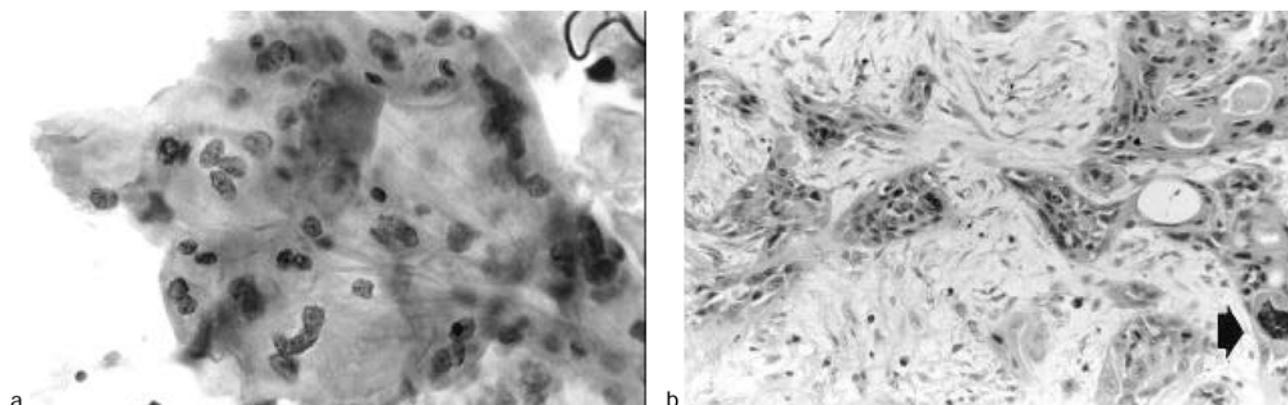


Figure 2. a) Squamous cells without clearly identifiable features of malignancy on cytology (May-Grünwald-Giemsa stain, X40). **b)** Otherwise ordinary ductal carcinoma exhibiting squamous cells with large and irregular nuclei and cytoplasmic keratinization (arrow) (HE, X20).

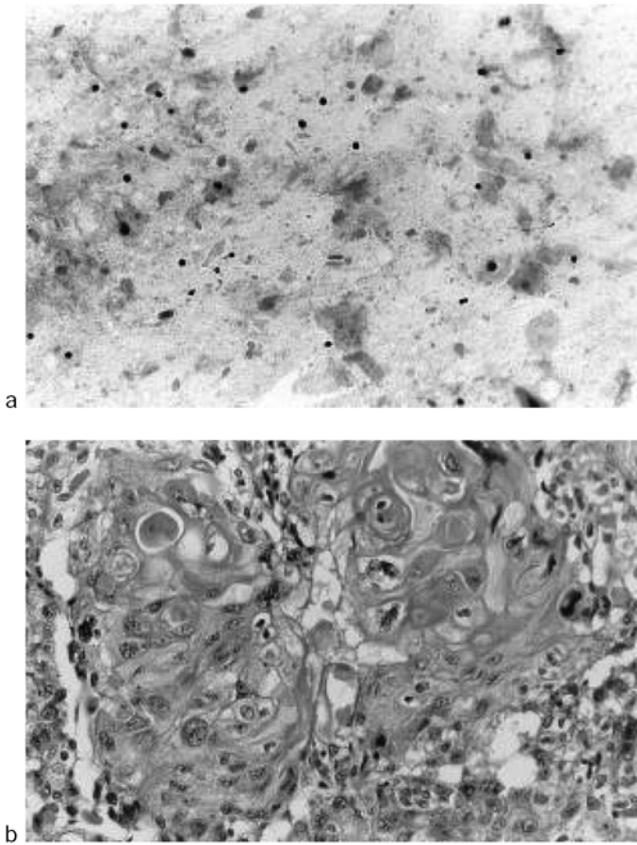


Figure 3. a) Cytologic examination revealing plugs of keratin among sparse mononuclear inflammatory cells (May-Grünwald-Giemsa stain, X20). **b)** Microscopic examination showing bizarre and atypical squamous cells with dyskeratosis (HE, X20).

graphically and is related to hemorrhagic or cystic necrosis seen pathologically.⁴ MC may be misinterpreted as a benign process because clinically the lump is frequently well defined and mobile³. There is no consensus in literature about the prognosis of metaplastic carcinoma. The majority of authors affirm that the outcome is favorable.⁵ Others say that despite lymph nodes negativity, the prognosis of metaplastic carcinoma is not so good because this neoplasm does not generally respond to ordinary chemotherapy.⁶ All of our three patients had a favorable outcome.

Fine-needle aspiration (FNA) has been successful in diagnosing epithelial lesions of the breast. However, breast lesions with a mesenchymal component are rarely encountered in FNA posing a diagnostic dilemma when this occurs.⁷ MC are very frequently misdiagnosed because they show a myriad of cytomorphologic patterns in aspiration samples.⁸⁻¹⁰ Heterologous elements must be searched for in all smears because in many cases the differential diagnosis with ordinary ductal carcinoma is not possible without them.¹¹ In FNA smears, only 57% of cases show both ductal carcinoma and metaplastic carci-

noma. This, in almost one half of the cases, the diagnosis is not possible by FNA.¹ That occurred in case 1. After the histologic confirmation of the diagnosis of MC we made an exhaustive review of the smears and we could not find any clue in the cytology to diagnose MC.

Squamous cells must be carefully interpreted on FNA. In the second and third cases the squamous cells did not have enough cellular pleomorphism to make the diagnosis of a malignant neoplasm. In the third case due to the large amount keratin of plugs the possibility of epidermic cyst was raised. If squamous cells are atypical and abundant on smears the possibility of a metastatic neoplasm must be investigated prior to diagnosis squamous carcinoma primary of breast because this condition is much less common.¹²⁻¹³

It is important to bear in mind the diagnosis of metaplastic carcinoma in the analysis of FNA smears. If malignant breast aspirates on careful examination show two or more distinct neoplastic elements, metaplastic carcinoma must be considered in the diagnosis.¹⁰

References

1. Castellà E, Gómez-Plaza MC, Urban A, et al: Fine-needle aspiration biopsy of metaplastic of the breast: Report of a case with abundant myxoid ground substance. *Diagn Cytopathol* 14:325-327, 1996.
2. Yen H, Florentine B, Kelly LK, et al: Fine-needle aspiration of a metaplastic breast carcinoma with extensive melanocytic differentiation: a case report. *Diagn Cytopathol* 23:46-50, 2000.
3. Brenner RJ, Turner RR, Schiller V, et al: Metaplastic carcinoma of the breast: report of three cases. *Cancer* 82:1082-1087, 1998.
4. Park JM, Han BK, Moon WK, et al: Metaplastic carcinoma of the breast: mammographic and sonographic findings. *J Clin Ultrasound* 28:176-186, 2000.
5. Chao TC, Wang CS, Chen SC, et al: Metaplastic carcinomas of the breast. *J Surg Oncol* 71:220-225, 1999.
6. Rayson D, Adjei AA, Suman VJ, et al: Metaplastic breast cancer: prognosis and response to systemic therapy. *Ann Oncol* 10:413-419, 1999.
7. Chhieng DC, Cangiarella JF, Waisman J, et al: Fine-needle aspiration cytology of spindle cell lesions of the breast. *Cancer* 87:359-371, 1999.
8. Jøhansen PW, Hagmar BM, Nesland JM: Metaplastic breast carcinoma. A diagnostic problem in fine needle aspiration biopsy. *Acta Cytol* 35:396-402, 1991.
9. Straathof D, Yakimets WW, Mourad WA: Fine-needle aspiration cytology of sarcomatoid carcinoma of the breast: a cytologically overlooked neoplasm. *Diagn Cytopathol* 16:242-246, 1997.
10. Gupta RK: Cytodiagnosis patterns of metaplastic breast carcinoma in aspiration samples: a study of 14 cases. *Diagn Cytopathol* 20:10-12, 1999.
11. Chhieng C, Cranor M, Lesser ME, et al: Metaplastic carcinoma of the breast with osteocartilaginous heterologous elements. *Am J Surg Pathol* 22:188-194, 1998.
12. Gupta RK: Fine needle aspiration cytodiagnosis of primary and metastatic squamous cell carcinoma of the breast. *Acta Cytol* 41:692-696, 1997.
13. Kokufu I, Yamamoto M, Fukuda K, et al: Squamous cell carcinoma of the breast: three case reports. *Breast cancer* 6:63-68, 1999.