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Case Report

Mucinous Carcinoma of the breast with micropapillary pattern and psammomatous calcification

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ABSTRACT

Mucinous carcinoma with a micropapillary pattern is an unusual form of Invasive breast cancer exhibiting dual mucinous and micropapillary differentiation. The present case is of a 47-year-old nulliparous female who presented with an incidental finding of a hard lump in her left breast. Mammography revealed a BIRADS 4 lesion. Modified radical mastectomy was done and the specimen was grossed, revealing a tumor of 3x2.6x2.6 cm in the outer quadrant. Microscopy revealed the tumor having extracellular mucin pools with floating psammoma bodies and focal micropapillary pattern. Four of the twenty-six lymph nodes sampled were found to have tumor deposits. The micropapillary pattern was maintained in the metastatic deposits. Immunohistochemistry revealed ER and PR positivity and Her2Neu negativity. EMA corroborated the findings. It is important to recognize the micropapillary pattern in mucinous carcinomas of the breast as these tumors tend to be more aggressive than pure mucinous breast lesions.

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INTRODUCTION

Breast cancer is the most common female cancer worldwide with an estimated 1.67 million new cases in 2012 and represents a quarter (25%) of all cancers.[1] There is a significant increase in the incidence and cancer-associated morbidity and mortality in the Indian subcontinent as described in global and Indian studies.[2,3] The estimated number of breast cancer cases in India during 2012 was 145,000 cases with an age-standardized incidence rate of 25.8 per 100,000. It has surpassed cervical cancer in India.4 Mucinous carcinoma of the breast is relatively rare in clinical practice, comprising approximately 4% (range 1% to 7%) of all invasive breast cancers, with its incidence in women under 35 years of age being 1%.[5] The two subtypes of Mucinous carcinoma, pure type, and mixed type, differs in the quantification of cellularity, mainly the mucoid component.[6]

Mucinous Micropapillary carcinoma (MUMPC) is an unusual variant of the tumor which shows vascular invasion

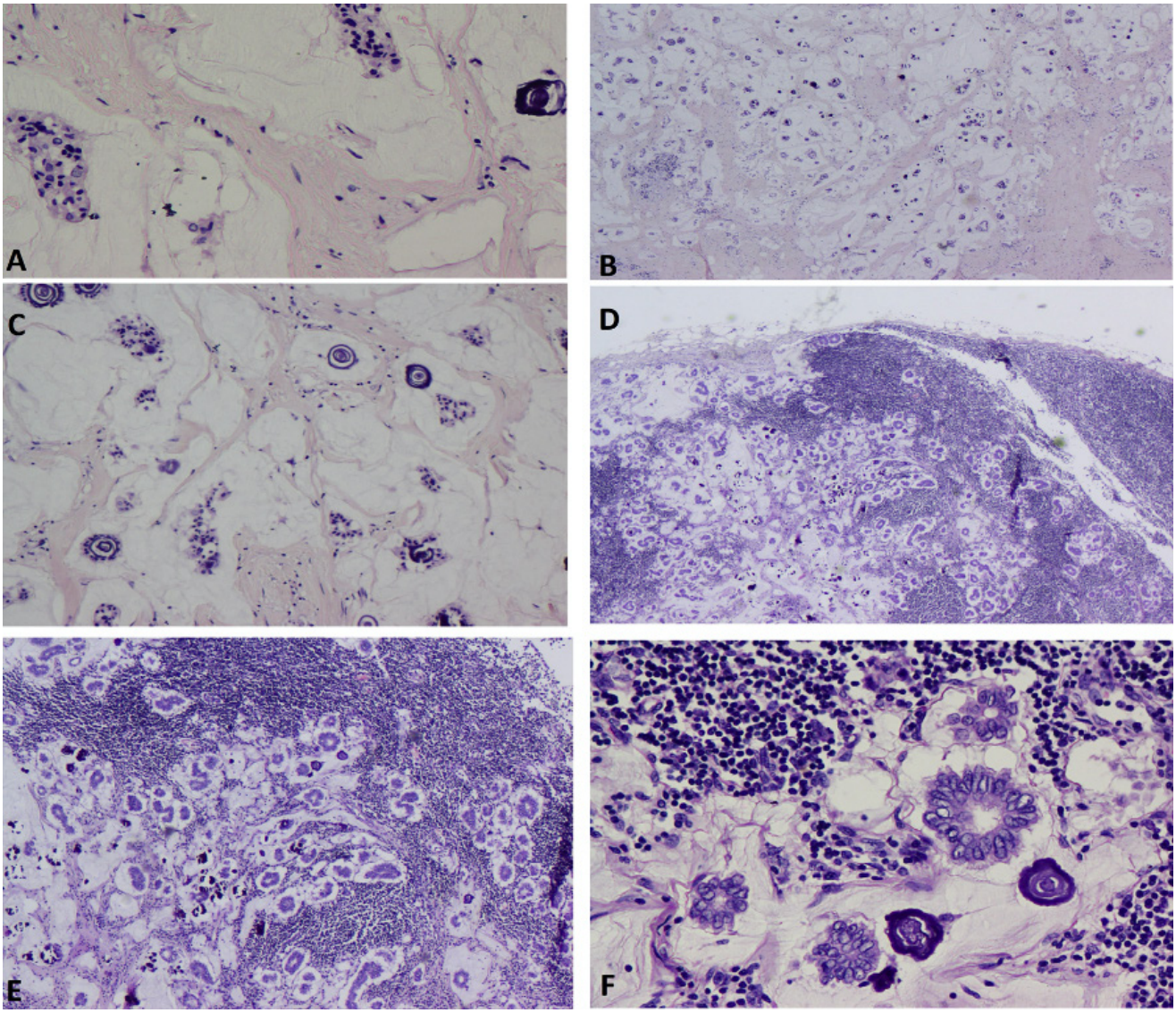

Figure 1: *Microscopy of the tumor and lymph node. A- Tumor with mucinous areas (HE stain; X400) B- Tumor with mucinous areas and psammomatous calcification (HE stain; X200) C- Tumor with mucinous areas and psammomatous Calcification (HE stain X400) D- Lymph node metastasis (HE stain; X40) E- Lymph node metastasis (HE stain; X100) F- Lymph Node metastasis with tumor cells and psammoma bodies (HE stain; X400)*

and lymph node affection with a worse prognosis.[7] Here we are presenting a case of MUMPC with psammomatous calcification since it is a rare and aggressive variant of Mucinous carcinoma.

CASE REPORT

A 47-year-old nulliparous female presented with a hard lump in her left breast. It was an incidental finding on self-examination. The patient gave a history of her sister having a tumor in her breast. Subsequent mammography revealed a BIRADS 4 lesion. The patient underwent a modified radical mastectomy and the specimen was grossed as per protocol. The modified radical mastectomy specimen weighed 841 grams and measured 21x11.5x9.5 cm. A unifocal tumor of 3x2.6x2.6 cm in the upper outer quadrant was found. The tumor was ill-circumscribed and the cut surface was homogenous grey-white with hemorrhagic specks. Further dissection of the attached pad of fat revealed 26 lymph nodes, the largest measuring 1.6x1 cm.

Microscopy revealed the tumor having extracellular mucin pools with floating psammoma bodies and focal micropapillary pattern. Four of the twenty-six lymph nodes sampled were found to have tumor deposits with micropapillary pattern and extensive psammomatous calcification. (fig. 1) All margins and the base were free of tumor and there was no lymphovascular or perineural invasion. The Immunohistochemistry findings were as follows: ER-positive: Allred Score 7/8, PR-positive: Allred Score 3/8, Her2Neu: Negative (weak barely perceptible staining), and EMA corroborated the micropapillary findings with membranous positivity at the stroma-mucinous interface. (fig. 2) The TNM staging was pT2N2a. On Follow-up 6 months post-surgery, the patient was receiving routine chemotherapy and was found to be doing well.

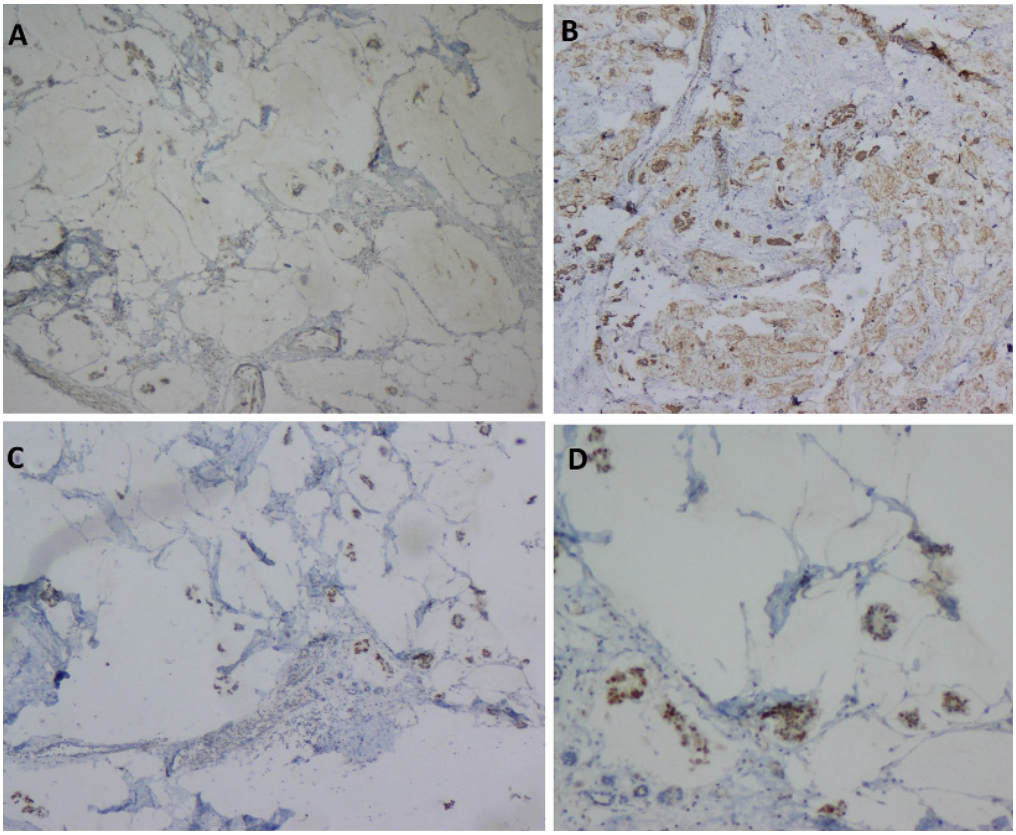

Figure 2: *Tumor Immunohistochemistry. A- HER-2 NEU Negative (X100) B- ER positive (X100) C- PR Positive (X100) D- PR positive (X200)*

Mucinous carcinoma of the breast also known as colloid carcinoma is a rare form of invasive ductal carcinoma. The difference between the pure and mixed varieties is important as the Pure mucinous breast carcinomas (PMBC) has a much better prognosis compared to MUMPC.[8] Conversely, the prognosis for patients with the mixed type of mucinous carcinoma does not differ from the prognosis for patients with conventional invasive ductal carcinoma. The metastatic foci often consist of non-mucinous elements.

Histologically, in PMBC, the tumor cells are arranged in ribbon-like cell cords, trabeculae, cribriform structures, and solid lobules. They sometimes show neuroendocrine differentiation, especially if there is a prominent, organoid, cellular arrangement. MUMPC has recently been described by various authors[9-12] as an unusual form of invasive breast cancer sharing features of both micropapillary and mucinous tumors. They usually comprise less than 1% of all breast carcinomas and tend to affect the younger individuals as compared to PMBC with median values of 44-55 years.[9,10] Micropapillary carcinoma is known for its ability to extensively permeate lymphatic vessels leading to massive lymph node metastases and early recurrences in the skin and chest wall.[11]

The salient features to label a tumor as MUMPC include:

1. Predominantly mucinous appearance (> 90% mucinous component)
2. Tumor cells forming a distinctive micropapillary pattern
3. Presence of hobnail cells
4. Nuclear grade-frequently intermediate to high
5. Frequent psammomatous calcifications[7]

Histologically, psammomatous microcalcifications are observed in various carcinomas like ovary, thyroid, and lung but rarely in breast malignancies except for invasive micropapillary carcinoma.[10] Immunohistochemical studies with EMA often show a reverse polarity staining pattern, confirming its true micropapillary nature.

Barbashina et al[7], in a study done in 2013, tried to highlight the differences between this rare variant and conventional pure mucinous carcinoma. Their study included 15 cases examined retrospectively. They observed Her2 positivity in 20% cases and p53 positivity in 23% of cases. 60% of mucinous micropapillary carcinoma cases demonstrated lymphovascular invasion while axillary lymph node metastases were found in 33% of patients. They also found that the diagnostic accuracy could be improved by the

assessment of cellular morphology and proliferative ability of tumor cells determined by Ki-67 (MIB-1) labeling, both of which demonstrated statistically significant differences between MUMPC and PMBC. They concluded that MUMPC is a more aggressive variant of mucinous carcinoma.

In our study, we observed weak Her^2 positivity, lymphatic infiltration was seen in 4 of the 26 lymph nodes sampled and microscopy showed a micropapillary pattern with extensive psammomatous calcification as seen by Rao et al.[12]

Pillai et al[13] in a case report published in 2007 reported a similar case in a 65-year-old postmenopausal woman in Kerala. Studies have reported micropapillary mucinous carcinoma based on cytological findings alone which were later confirmed histopathologically. Both benign and malignant breast lesions can display microcalcifications, however, the occurrence of psammoma bodies in breast lesions is a rare phenomenon and has been observed usually in papillary neoplasms.[13,14]

A retrospective study conducted at Tata Memorial Hospital, Mumbai[15] attempted to differentiate between mucinous carcinomas based on the cytological examination. They analyzed 50 cases out of which 37 (74%) had a micropapillary pattern. This group included 27 cases of MUMPC, 8 MUMPC associated with ductal invasive micropapillary carcinoma (IMPC), and 2 cases of mixed mucinous carcinomas with MUMPC and a solid variant of papillary carcinoma (SVPC) component. Cytologically, both IMPC and MUMPC demonstrated the micropapillary pattern in the form of angulated clusters or abortive papillae along with ball-like clusters and had psammomatous calcifications. However, the IMPC smears revealed numerous singly scattered tumor cells and larger fragments with branching. The mixed MUMPC and SVPC showed the classic cytologic features of MUMPC admixed with abundant singly dispersed tumor cells in the background representing the SVPC component. They concluded that mixed carcinomas, mucinous micropapillary carcinomas, and IMPC are parts of the same spectrum and show similar nuclear grade but vary in their content of mucin and the cell dispersal pattern.

CONCLUSIONS

Mucinous Carcinoma of the breast with micropapillary pattern and psammomatous calcification is a rare form of Mucinous carcinoma which tends to be more aggressive and hence needs close follow-up and adequate treatment. Hence it is important to recognize the micropapillary pattern in Mucinous carcinomas.

Conflict of interest: None

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