



A RETROSPECTIVE ANALYSIS OF MUCINOUS CARCINOMA BREAST

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ABSTRACT

Background: Mucinous carcinoma of the breast, a rare histological subtype characterized by extracellular mucin production, typically presents in postmenopausal women and carries a more favorable prognosis than invasive ductal carcinoma of no special type.

Objective: To analyze the clinicopathological features of mucinous carcinoma breast cases over a two-year period in a tertiary care setting.

Methods: A retrospective review was conducted on histologically confirmed cases of mucinous carcinoma breast from September 2020 to September 2022. Clinical presentation, tumor subtype, nodal status, treatment, and hormone receptor profile were assessed.

Results: A total of 9 mucinous carcinoma cases were identified. The majority were postmenopausal women, with a mean age of 61.7 years (range 48–76). Pure mucinous carcinoma was diagnosed in 3 patients, while 6 had mixed mucinous carcinoma. Tumor sizes ranged from 2.5 cm to 6.8 cm. Lymph node involvement was seen in 2 cases, both from the mixed subtype. Estrogen receptor positivity was observed in 8 patients, and all tumors were HER2-negative. Surgical treatment included mastectomy in 7 cases and breast-conserving surgery in 2.

Conclusion: Mucinous carcinoma breast, although rare, has a favorable prognosis, especially in pure forms. Distinguishing pure from mixed variants is essential for clinical management due to differences in aggressiveness and nodal involvement.

Keywords: mucinous carcinoma, breast cancer, pure mucinous, mixed mucinous, histopathology

INTRODUCTION

Breast cancer is the most prevalent malignancy in women globally and exhibits considerable heterogeneity in histopathological subtypes. Mucinous carcinoma of the breast (also termed colloid carcinoma) is a special subtype of invasive ductal carcinoma characterized by neoplastic epithelial cells suspended in abundant extracellular mucin^{1,2}. This type accounts for 1–7% of all invasive breast cancers and tends to affect older, postmenopausal women²⁻⁴. Mucinous carcinoma is subclassified into pure and mixed types based on the mucin content. The pure type contains >90% mucinous component and is associated with an indolent course, lower incidence of lymph node metastases, and excellent prognosis^{3,4,5}. In contrast, mixed mucinous carcinoma contains both mucinous and non-mucinous (usually invasive ductal) components and tends to behave more aggressively^{5,6}.

Given its low incidence, mucinous carcinoma is underrepresented in clinical studies. This two-year retrospective study aims to provide a clinicopathological profile of mucinous carcinoma breast cases encountered at a tertiary center from September 2020 to September 2022, focusing on tumor size, subtype, receptor status, nodal involvement, and treatment patterns.

In the Indian subcontinent, limited institutional data exist on the clinicopathological features of mucinous carcinoma. Understanding local trends in tumor biology, receptor expression, and treatment response is essential for improving patient outcomes and guiding individualized therapy. Hence, this study was undertaken to evaluate the clinicopathological profile, receptor status, nodal involvement, and treatment patterns of patients diagnosed with mucinous carcinoma of the breast in a tertiary care setting.

MATERIALS AND METHODS

This retrospective study was conducted in the Departments of Pathology, Sher-i-Kashmir Institute of Medical Sciences (SKIMS) Medical College and Hospital, Bemina, Srinagar. The hospital's pathology records and patient medical files were screened to identify all histologically confirmed cases of mucinous carcinoma of the breast diagnosed between September 2020 to September 2022.

Relevant clinical and pathological information was retrieved from institutional medical records and pathology archives. Data collected included patient demographics such as age and menopausal status, as well as tumor characteristics including laterality, size as recorded on histopathology, histological subtype, axillary lymph node involvement, and hormone receptor status. The receptor profile included estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) status, determined using immunohistochemical methods. Details of surgical management, whether modified radical mastectomy or breast-conserving surgery, and adjuvant treatments such as endocrine therapy, chemotherapy, or radiotherapy, were also noted.

Histological subtyping was based on established morphological criteria. Tumors composed of 90% or more mucinous component were classified as pure mucinous carcinoma, while those containing less than 90% mucinous component and admixed with non-mucinous elements, such as invasive ductal carcinoma of no special type, were categorized as mixed mucinous carcinoma. Female patients of any age with a definitive histopathological diagnosis of mucinous breast carcinoma, either pure or mixed subtype, and with complete clinical, pathological, and treatment documentation were included in the study. Patients were excluded if they had recurrent disease, a history of prior breast cancer treatment, or incomplete or inaccessible medical records^{3,5}.

All data collected were compiled using Microsoft Excel and subsequently analyzed using IBM SPSS Statistics version 25.0. Categorical variables such as histological subtype, tumor laterality, lymph node status, hormone receptor expression (ER, PR, HER2), and type of surgery were summarized as frequencies and percentages. Continuous variables such as age and tumor size were expressed as means with standard deviations (SD) and ranges, depending on the distribution. Comparisons between pure and mixed mucinous carcinoma groups were made using the Chi-square test or Fisher's exact test for categorical variables, and the independent samples t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of nine patients met the eligibility criteria and were included in the final analysis. All patients were female, with a mean age at diagnosis of 61.7 years, ranging from 48 to 76 years. The majority of patients (seven out of nine, 77.8%) were postmenopausal at the time of diagnosis. In terms of laterality, five tumors (55.6%) were located in the left breast, while the remaining four (44.4%) involved the right breast, as shown in **Table 1**. The tumor sizes varied between 2.5 cm and 6.8 cm in greatest dimension, based on histopathological examination. Histologically, three patients (33.3%) were diagnosed with pure mucinous carcinoma, while six patients (66.7%) had mixed mucinous carcinoma, also presented in **Table 1**.

Axillary lymph node metastasis was observed in two patients (22.2%), both of whom had mixed mucinous carcinoma. None of the patients with the pure subtype showed lymph node involvement.

This distribution of nodal status according to histological subtype is detailed in **Table 2**. Estrogen receptor (ER) positivity was noted in eight of the nine cases (88.9%), while progesterone receptor (PR) positivity was seen in seven patients (77.8%). All tumors were HER2-negative. These immunohistochemical findings are summarized in **Table 3**.

Surgical management included modified radical mastectomy in seven patients (77.8%) and breast-conserving surgery in two patients (22.2%), as shown in **Table 4**. The choice of surgical approach was determined based on tumor size, patient preference, and breast-to-tumor ratio. All patients received appropriate adjuvant therapy, guided by hormone receptor status and pathological stage. Endocrine therapy with tamoxifen or aromatase inhibitors was initiated for hormone receptor-positive cases. Radiotherapy was administered to patients who underwent breast-conserving surgery and those with nodal involvement. Chemotherapy was reserved for selected cases in the mixed subtype with adverse pathological features.

Table 1: Laterality, Tumor Size and Histological Subtype Distribution

Parameters		No. of Cases	Percentage
Laterality	Left-sided tumor	5	55.6
	Right-sided tumor	4	44.4
Mean Tumor size range (cm)		2.5 – 6.8	
Histological Subtype	Pure mucinous carcinoma	3	33.3%
	Mixed mucinous carcinoma	6	66.7%

Table 2: Axillary Lymph Node Metastasis by Subtype

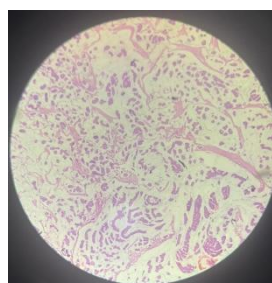
Subtype	Lymph node	
	Positive	Negative
Pure mucinous carcinoma	0	3
Mixed mucinous carcinoma	2	4

Table 3: Hormone Receptor and HER2 Status

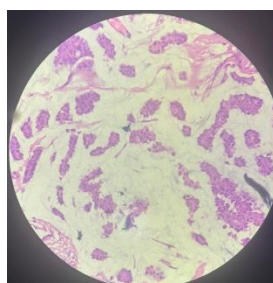
Marker	Positive Cases	Percentage
ER-positive	8	88.9%
PR-positive	7	77.8%

Table 4: Surgical Management

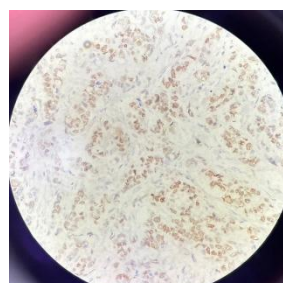
Type of Surgery	No. of Cases	Percentage
Modified radical mastectomy	7	77.8%
Breast-conserving surgery	2	22.2%



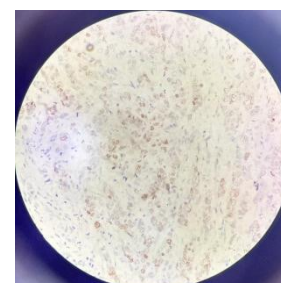
Mucinous carcinoma breast...H.E (obX10



Mucinous carcinoma breast. H.E ObX40



Estrogen Receptor(ER) positive



Progesterone Receptor(PR) positive

DISCUSSION

Mucinous carcinoma of the breast is a rare histological subtype, accounting for approximately 1–7% of all breast cancers globally^{1,2,4}. In our hospital-based series, nine cases of mucinous carcinoma were identified over a two-year period, which aligns well with the globally reported incidence range. All patients in our study were female, and the mean age at diagnosis was 61.7 years. This is in agreement with previous literature that describes mucinous carcinoma as predominantly affecting postmenopausal women, with peak incidence typically in the sixth to seventh decades of life^{3,6}. In our cohort, 77.8% (7 out of 9) of the patients were postmenopausal, reinforcing this demographic pattern.

With regard to histological subtype, pure mucinous carcinoma accounted for 33.3% (3 out of 9 cases), while mixed mucinous carcinoma constituted the majority at 66.7% (6 out of 9 cases). This distribution is consistent with previous studies that report a higher frequency of the mixed subtype in routine clinical practice^{7,8}. Importantly, all cases of pure mucinous carcinoma in our study were node-negative (0/3), whereas two of the six mixed mucinous carcinoma cases (33.3%) demonstrated axillary lymph node metastases. These findings mirror those of Ranade et al. and Tse et al., who observed that pure mucinous carcinoma has a significantly lower propensity for lymphatic spread and a more indolent clinical course compared to its mixed counterpart^{8,9}. Hormone receptor analysis revealed that 88.9% of tumors were ER-positive and 77.8% were PR-positive, with all cases testing negative for HER2. This hormone receptor profile is characteristic of mucinous carcinoma and comparable to rates described in the literature, which typically show ER and PR positivity in over 80% of cases and very low HER2 expression^{10,11}. The favorable hormone receptor status, particularly in the pure subtype, justifies the routine use of endocrine therapy, as was administered in all eligible patients in our cohort. This therapeutic approach is well supported by existing evidence favoring hormonal treatment as a cornerstone of management in hormone receptor-positive mucinous tumors¹¹.

Surgical management in our study primarily involved modified radical mastectomy, performed in 77.8% of patients, while breast-conserving surgery was feasible in the remaining 22.2%. The high mastectomy rate reflects both tumor size (ranging from 2.5 to 6.8 cm) and patient preference, especially in the presence of limited breast volume. Although literature supports breast conservation in mucinous carcinoma due to its favorable biology^{3,4}, surgical decisions are often individualized based on clinical and anatomical considerations. Our findings further emphasize the clinical distinction between pure and mixed mucinous carcinoma. The pure variant, by virtue of its lack of nodal involvement and uniformly hormone-positive status, is associated with excellent prognosis and low recurrence risk. In contrast, the mixed subtype exhibits more aggressive behavior, including nodal metastasis, necessitating a more comprehensive treatment plan including consideration for chemotherapy in selected cases. This reinforces previous reports that underscore the prognostic importance of accurate histological subclassification^{7,8}.

Finally, it is crucial to recognize that mucinous carcinomas may pose diagnostic challenges on imaging. These tumors often appear as well-circumscribed, hypoechoic lesions mimicking benign cysts on mammography and ultrasonography, potentially leading to underestimation of malignancy¹². Hence, definitive diagnosis relies on histopathology, highlighting the importance of tissue diagnosis in guiding treatment decisions. In summary, our two year institutional experience underscores the need for heightened awareness and accurate pathological classification of mucinous carcinoma. The differential clinical behavior and treatment response between pure and mixed subtypes warrant individualized management strategies to optimize outcomes.

CONCLUSION

Mucinous breast carcinoma, particularly the pure subtype, is a distinct histological entity with favorable outcomes. The mixed variant behaves more aggressively and warrants closer follow-up. Proper histological classification, hormone receptor profiling, and stage-appropriate treatment are essential for optimized patient care.

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