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**Original research article**

# Spectrum of breast lesions: A three-year retrospective study

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**Abstract**

**Introduction:** Breast lesions constitute one of the prominent surgical pathologies encountered in day-to-day clinical practice. Both benign and malignant conditions may pose a diagnostic challenge or prove difficult to manage. The high mortality associated with breast cancer is linked to aggressiveness of the tumour which depends to a large extent on the histopathological types and stages.

**Aim:** This study is to evaluate the frequency of different breast lesions & to highlight the unusual breast lesions encountered in our study.

**Materials & Methods:** 3 years of retrospective study was conducted in the department of Pathology of our institution. Total 348 breast specimens are studied. The sample size was taken based on the convenience of the study.

**Result:** Out of total 348 specimens, 342 (98.28%) belonged to female breast and 6 (1.72%) specimens belonged to male patients. 254 (72.99%) were non-malignant lesions, 92 (26.44%) were malignant lesions & the remaining 2 (0.57%) were borderline lesions. The special subtypes encountered were Medullary carcinoma (3 cases), Paget's disease of nipple (1 case), Metaplastic carcinoma (1 case), Clear cell carcinoma (1 case) and Mucinous carcinoma (1 case).

**Conclusion:** Study of the unusual and less appreciated lesions in addition to usual lesions is important in today's era has an important role to reduce the morbidity & mortality associated breast lesions.

**Keywords:** Mastectomy, fibroadenoma, atypical, mucinous carcinoma, metaplastic carcinoma

## Introduction

Breast is a heterogeneous organ which is susceptible to hormonal changes throughout the reproductive period of a woman, undergoing numerous morphological and physiological changes from puberty to menopause. Breast lesions constitute one of the prominent surgical pathologies encountered in day-to-day clinical practice. In India, breast cancer forms the second common malignancy after cervical cancer and is detected in 20 per 1, 00,000 women. [1] Breast lesions are the leading cause of morbidity and mortality among women worldwide with few cases being reported in males.

Both benign and malignant conditions may pose a diagnostic challenge or prove difficult to manage. It is important to distinguish those conditions requiring reassurance and supportive treatment from those diseases which require definitive management. For early diagnosis, diagnostic methods such as mammography, ultrasonography, and fine-needle aspiration cytology are being progressively used now-a-days.

The high mortality associated with breast cancer is linked to aggressiveness of the tumour which depends to a large extent on the histopathological types and stages. [2] Most of the tumours are derived from mammary ductal epithelium, principally the terminal duct lobular unit (TDLU) and up to 75% of the diagnosed infiltrating duct carcinoma, not otherwise specified (IDC-NOS). The second most common epithelial type is invasive lobular carcinoma which comprises 5-15% of the lumps. However, there are more than dozen variants which are less common but still very well defined by world health organization (WHO) classification.

## Aim

This study is to evaluate the frequency of different breast lesions & to highlight the unusual breast lesions encountered in our study.

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**Materials and Methods**

3 years of retrospective study was conducted in the department of Pathology of our institution from August 2018 to July 2021. Total 348 breast specimens are studied. The sample size was taken based on the convenience of the study. All mastectomy specimens, wide local excision specimens and true cut biopsies from lesions of the breast during the study period were included in the study. The study was approved by Ethical Committee and informed consent was obtained. Women those who had been treated for malignancy earlier were excluded from the study.

Among the 348 specimens, 256(73.56%) specimens were those of lumpectomy specimens and 74(21.26%) specimens were mastectomy specimens. Remaining 18(5.18%) were core biopsy specimens. The clinical details and examination findings, magnetic resonance imaging (MRI), fine-needle aspiration cytology (FNAC), mammography findings, and other relevant information were acquired from the histopathology registration form. All the specimens of breast which were received in Pathology department in different forms were processed by standard protocol and formalin fixed paraffin embedded tissue sections stained with haematoxylin and eosin were studied and assessed. The histopathological features were noted and the tumours were diagnosed on the basis of WHO classification [3]. Invasive breast carcinoma was graded according to Nottingham modification of Bloom-Richardson grading system. Immunohistochemistry (ER, PR, HER2/neu) and special stains were performed whenever required and as per availability. During this study, we came across uncommon and interesting lesions which were studied in detail. Descriptive analysis of all uncommon or rare breast lesions are emphasised. The obtained data were used to tabulate and analyse the results.

**Result**

During the period of 3 years from August 2018 to July2021, a total of 348 breast specimens were received. The age ranged from 17 to 78years. Out of total specimens, 342 (98.28%) belonged to female breast and 6 (1.72%) specimens belonged to male patients. The commonest presenting symptom was lump in breast in both benign and malignant groups.

The additional presenting symptoms were nipple discharge, pain & fever noted in a small percentage of cases. Out of total 348 specimens, there were 254 (72.99%) non-malignant lesions, 92 (26.44%) were malignant lesions & the remaining 2 (0.57%) were borderline lesions. Spectrum of all the histopathological lesions is depicted in Table no 1.

**Table 1:** Spectrum of histopathological lesions of breast

| | Lesions | Number of cases | Percentage in each category (%) | Percentage in total number of cases (%) |
|---|---|---|---|---|
| Non-malignant (non-neoplastic & benign lesions (N-254) 72.99% | Granulomatous | 05 | 1.98 | 1.45 |
| | Fibroadenoma | 174 | 68.50 | 50.0 |
| | Fibrocystic disease | 48 | 18.90 | 13.80 |
| | Fibroadenosis | 12 | 4.72 | 3.44 |
| | Intraductal papilloma | 08 | 3.15 | 2.29 |
| | Gynaecomastia | 02 | 0.78 | 0.57 |
| | Benign phyllodes | 05 | 1.97 | 1.43 |
| Borderline Lesions (N-2) 0.57% | Borderline phyllodes | 02 | 100 | 0.57 |
| Malignant lesions. (N-92) 26.44% | Invasive ductal carcinoma NOS | 85 | 92.38 | 24.42 |
| | Medullary carcinoma | 3 | 3.26 | 0.86 |
| | Metaplastic carcinoma | 1 | 1.09 | 0.30 |
| | Mucinous carcinoma | 1 | 1.09 | 0.30 |
| | Clear cell carcinoma | 1 | 1.09 | 0.30 |
| | Paget's disease of nipple | 1 | 1.09 | 0.30 |

Of the total 348 cases, 254 cases had non-malignant lesions among which 6 cases were granulomatous mastitis and remaining 248 were benign neoplastic lesions. Fibroadenoma was the most common among the benign neoplastic lesions (174 Cases) followed by fibrocystic disease (48 cases).

Under borderline category, we observed 2 cases of borderline phyllodes in our study.

Total 92 malignant tumours were observed. The majority of cases with malignant breast tumours had Invasive Ductal Carcinoma-NOS type (85 cases). The special subtypes encountered were Medullary carcinoma (3 cases), Paget's disease of nipple (1 case), Metaplastic carcinoma (1 case), Clear cell carcinoma (1 case) and Mucinous carcinoma (1 case).

**Discussion**

This study evaluated the clinical presentation and estimated the incidence and relative distribution of different breast lesions within the spectrum of benign and malignant pathology. Breast lesions always show a female preponderance when compared to incidence in males and the histopathological spectrum

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of breast lesions varies among different countries and ethnic group [4]. The common predisposing conditions for breast lesions include multiparty, low parity, low age at first childbirth and late menopause, all these to only highlight the fact toward excessive circulating oestrogen [5].

In our study, the commonest presenting symptom was lump in breast in both benign and malignant groups. The additional presenting symptoms were nipple discharge, pain & fever noted in a small percentage of cases. Other Indian studies have also reported somewhat similar clinical presentation of their respective cases [6, 7].

We came across a variety of different lesions including benign and malignant tumours, as well as non-neoplastic lesions.

In the present study, 348 cases of breast lesions were included over a period of three years out of 348 breast lesions, 346(99.43%) were female breast lesions and only 02(0.57%) were male breast lesions. A similar result was observed by Dharmakanta Kumbhakar *et al*. [8] The benign as well as non-neoplastic lesions constituted 254 (72.99%) cases whereas malignant were92(26.44%) and2 (0.57%) cases of borderline/intermediate category. This observation was almost similar to the study conducted by Dhiraj B *et al*. [9].

In our study benign tumours outnumbered all the other lesions, with fibroadenoma being the commonest entity. Studies by Sulhyan K.R. *et al*. [10], Siddique *et al*. [11] Mudholkar *et al*. [12] also have observed the highest frequency of Fibroadenomas among the benign breast tumours. The second most common benign lesion was fibrocystic breast disease (48 cases) comprising 18.9% of benign lesions. Study of Arunima Mukhopadhyay *et al*. [6] also reported as fibrocystic disease is second most common benign breast lesion comprising 30% of total benign lesions.

Fibro adenosis, Intraductal papilloma, Gynaecomastia & Benign Phyllodes are the other benign lesions in lesser number encountered in our study. We also came across 5 breast specimens showing granulomatous inflammatory lesion. One among the granulomatous lesions was seen in association with infiltrating duct cell carcinoma no special type. This observation is also mentioned in study of Sulhyan K.R. *et al*. [10].

Surgical textbooks have mentioned that the most common histological variant of breast carcinoma is invasive ductal carcinoma (not otherwise specified). Likewise the most common malignant lesion in our study was invasive ductal carcinoma (not otherwise specified). Out of 92 malignant lesions 84 cases were invasive ductal carcinoma NOS type comprising 91.3% among malignant lesions and 24.12% among total lesions studied. This observation is comparable to that of studies by Letha Padmom *et al*. [13].

Other than the usual invasive ductal cell carcinoma we encountered few uncommon histological types of breast malignant lesions. they are medullary carcinoma-3 cases (0.86%), Paget disease of nipple-1 case (0.3%), mucinous caricinoma-1 case (0.3%), -Clear cell carcinoma-1case (0.3%) and Metaplastic carcinoma-1case (0.3%). In Borderline category, we diagnosed 2 cases of borderline phyllodes tumour comprising 0.57% of total breast lesions.

In the present study, we have enlightened these uncommon cases in detail and their incidences were compared with other original articles. (Table. 2)

**Table 2:** Comparison of Unusual breast lesions with other original articles

| Unusual lesions % | Dhiraj B. Nikumbh [9] | Desai M [1] | Malik R & Bharadwaj VK [14] | Present study |
|---|---|---|---|---|
| Benign | 1.12 | 1.17 | -- | -- |
| Borderline | 0.2 | -- | -- | 0.57 |
| Malignant | 5.48 | -- | 13.0 | 2.33 |

**Medullary carcinoma of breast**

Medullary carcinoma is a rare and distinct subgroup of breast carcinomas accounting for less than 5% of all invasive breast cancers [14]. This unique histologic subtype has very strict criteria for diagnosis, including complete circumscription, the syncytial growth pattern of at least 75% of the tumour, intermediate to high nuclear grade, an associated increased number of activated cytotoxic lymphocytes, and most of the lymphoid infiltrate consists of T cells which reflects an active host response to the tumour and may account for its favourable prognosis.

Our study included 3 cases of medullary carcinoma. presented in mastectomy specimens belonged to women of 50-55 age group. All three lesions were unicentric and well circumscribed measuring 3x2cm, 3x3cm & 4x3cm in size. The cut surfaces were fleshy and grey-tan. Foci of haemorrhage, necrosis and cystic degeneration were seen.

Histologically the tumour was diagnosed as medullary carcinoma as there was syncytial growth pattern, lack of glandular/tubular arrangement of tumour cells & there was dense lymphocytic infiltrate. In one case, out of the 12 axillary lymph nodes resected, only one node showed the presence of metastasis. The other two cases did not show lymph node metastasis. The resected margins including tumour bed were free of tumour in all the lesions.

**Paget disease of nipple (Mammary Paget disease)**

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Paget's disease of the breast, a disorder of the nipple-areola complex, first described by Sir James Paget in 1874, [15] is an uncommon disease, accounting for 1-4.3% of all the breast carcinomas. It is often associated with underlying ductal carcinoma *in situ* and/or invasive ductal cancer [16].
One case of Paget disease of nipple was included in the present study. It was a full thickness skin biopsy taken from the edge of the eczematous lesion in the nipple areola complex of right breast, in a woman of age 45yrs, suspected as Paget disease. There was no significant breast mass on clinical examination. Microscopically, the biopsy showed typical large clear cells (Paget's cells) with pale and abundant cytoplasm and hyperchromatic nuclei with prominent nucleoli are found in the epidermal layer. Simple mastectomy was performed & biopsy revealed underlying in situ duct cell carcinoma.

**Clear cell carcinoma**
Glycogen rich clear cell (GRCC) carcinoma is a rare subtype of breast cancer in which more than 90% of the neoplastic cells have abundant clear cytoplasm containing glycogen [17]. The first case of GRCCC was reported by Hull *et al*. [18]. in 1981. Clear cell carcinoma of the breast is rare, accounting for 1.4-3% of all breast tumors and commonly affecting women in the 5th decade of life.
We encountered a case of clear cell carcinoma in a left radical mastectomy specimen in a 42year old woman. The tumour was measuring 3x3cm in the upper inner quadrant of left breast.
The microscopic examination showed a poorly differentiated carcinoma of the breast composed of malignant cells with abundant clear cytoplasm. There were areas of necrosis. No lympho vascular invasion was seen. All the resected margins were free of tumour. None of the 6 resected lymph nodes showed tumor deposits.

**Metaplastic carcinoma**
Metaplastic breast carcinoma is a rare but heterogeneous group of neoplasm of breast, accounting for about 1% of all breast carcinomas [19].
This malignancy is characterized by the histological presence of at least two cellular types, typically epithelial and mesenchymal components. MpBC is typically a triple-negative breast cancer (TNBC), meaning the tumor lacks the expression of estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor 2 receptor (HER2). WHO Classification of Breast Tumors classifies MpBC as mixed metaplastic carcinoma, low-grade adenosquamous carcinoma, fibromatosis-like, squamous cell carcinoma, spindle cell carcinoma and metaplastic carcinoma with mesenchymal differentiation [20]. All of these metaplastic variants are aggressive and chemoresistant and have a high propensity to metastasize, except fibromatosis-like carcinoma and low-grade adenosquamous carcinoma [21].
We reported a case of metaplastic carcinoma in a right sided radical mastectomy specimen of a 55 year old woman. Gross examination of the specimen showed an irregular grey white growth in upper inner quadrant of size 3x3 cm. Microscopic examination revealed malignant glandular epithelial component with increased mitotic activity & focal poorly differentiated tumour component composed of disorganised sarcomatoid spindle cells & osteoclastic tumour gaint cells. Also areas of tumour necrosis. Out of 8 resected lymph nodes 3 lymph nodes showed tumour deposits, of epithelial component.

**Mucinous carcinoma of breast**
Mucinous breast carcinoma (MBC) is an uncommon form of breast cancer that has a good prognosis compared to the common invasive ductal carcinoma. It is also known as colloid carcinoma of the breast. According to the WHO classification of tumors of the breast (2019) [22]. MBC is classified as a special type of breast cancer and based on its cellularity, can be divided into two subtypes:
1) The pure type (PMBC), which is composed entirely of tumor cells with extracellular and intracellular mucin in over 90% of the tumor mass and is more frequent.
2) The mixed type (MMBC) which also includes infiltrating components such as ductal or lobular breast cancer-like and contains less than 90% of mucin [23].

Our study included a case of mucinous carcinoma in a left radical mastectomy specimen of woman of age 60years. Gross examination showed an irregular mass measuring 6x4 cm in the upper outer quadrant, with gelatinous, mucoid cut surface. Microscopy revealed clusters and nests of cells with low to intermediate grade nuclei, floating in a mucin pool, separated by fibrous septa. There was neither lympho-vascular tumour invasion, nor tumour deposits in the resected 5 lymph nodes.

**Conclusion**
Histopathology plays an important role in the diagnosis, predicting prognosis and treatment of breast diseases along with mammography, MRI, and FNAC findings. More importance should be given to assess and diagnose breast carcinoma by routine clinical, radiological, cytological and histological methods so that appropriate treatment modalities can be initiated.
In the present study, the most common benign lesion is fibroadenoma with 68.50% incidence and the

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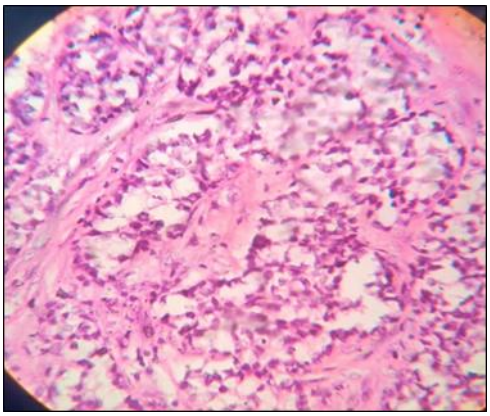
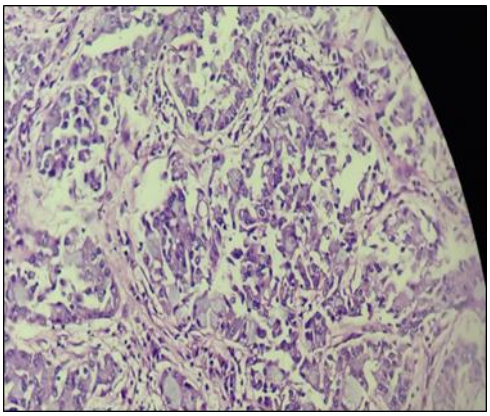
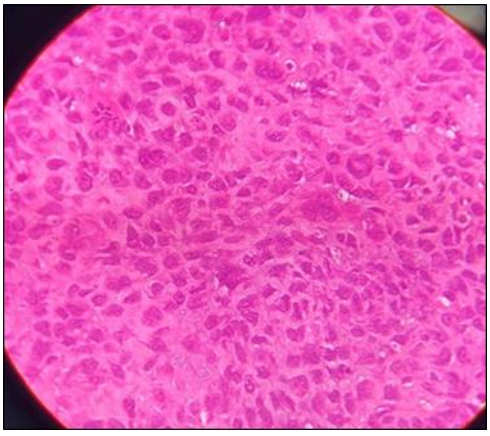
most common malignant lesion is infiltrating ductal carcinoma with 92.38%. We have summarized, the unusual lesions encountered by us over a period of three years. These features will be useful in the management of patients as well as carry prognostic value. Understanding of these unusual and less appreciated lesions is important in today's era of varied differentials and different prognosis of the lesion. The need of the hour is to conduct breast cancer screening programmes and basic training and motivation to the women to report to the doctor at an early stage in case any breast lump is noticed on palpation which, in turn, can reduce the morbidity and mortality associated with breast tumours.



**A. Clear cell carcinoma**



**B. Mucinous carcinoma**



**C. Metaplastic carcinoma**

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