

Histopathological Profile of Neoplastic and Non-Neoplastic Lesions of Breast – A One Year Study in a Tertiary Care Center

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ABSTRACT

BACKGROUND

Breast lesions have gained importance globally due to significant increase in mortality and morbidity associated with breast cancer which is now the commonest malignancy worldwide. Previously, cervical cancer was the most common cancer in Indian women but now the incidence of breast cancer has outnumbered cervical cancer and is the leading cause of death in women due to cancer. Although advances in imaging techniques and increased use of fine needle aspiration cytology have greatly assisted the preoperative evaluation of breast lesions, histopathology remains the gold standard in differentiating benign and malignant lesions. The present study was carried out to know the frequency, age distribution and histopathological profile of neoplastic as well as non-neoplastic lesions of breast.

METHODS

This retrospective one-year study was conducted in the Department of Pathology at a tertiary health care institute from January 2017 - December 2017. All specimens of mastectomy, lumpectomy, and Tru-Cut biopsies were studied except treated cases of malignancy. Detailed gross examination was done followed by thorough sampling and processing. Tissue sections were stained with haematoxylin and eosin. Different lesions were studied by microscopic examination. Neoplastic lesions were classified based on the WHO (World Health Organization) classification (2012).

RESULTS

A total of 980 cases was studied out of which 951 were females and 29 were males. The benign neoplasms constituted 329 cases (33.57 %), malignant neoplasms 521 cases (53.16 %) and non-neoplastic lesions 130 cases (13.26 %). In our study fibroadenoma was the most common benign neoplasm (n = 292) and fibrocystic disease formed the major population of non-neoplastic benign lesion (n = 66). Vast majority of cases with malignant neoplasms had invasive carcinoma of no special type (NST) (n = 479). Significantly higher incidence of malignancy was noted in the age group of 41 - 80 years and benign tumours were mostly seen in 2nd and 3rd decade. The ratio of malignant to benign lesions was slightly higher in our study.

CONCLUSIONS

Large number of carcinoma breast was seen in our study which is a serious concern. So, design and implementation of screening programs and control of the risk factors seem essential. This study emphasizes the importance of early and accurate histopathological diagnosis of breast lesions.

KEYWORDS

Neoplastic, Non-Neoplastic, Breast Lesions, Histopathology, Invasive Carcinoma Breast

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BACKGROUND

Breast lesions encompasses a spectrum of histologic entities with different characteristics ranging from inflammatory lesions to life threatening malignancies. They are more prevalent among females compared to males. Breast diseases are showing a rising trend worldwide due to increasing public awareness of breast cancer and availability of proper screening methods. Breast cancer is currently the most common cancer among Indian females with age adjusted rate as high as 25.8 per 1,00,000 women and mortality 12.7 per 1,00,000 women.¹

Breast cancer is a multifactorial disease and its incidence, mortality and survival rates vary considerably among different parts of the world.² This could be due to various factors such as population structure, genetic factors, lifestyle, and environment.³ Benign lesions are more common than malignancies which commonly occur in the age group 20 - 40 years as opposed to malignant lesions for which the incidence rises as the age advances.⁴ The most common risk factors for breast cancer are age over 40, history of breast diseases, history of cancer in first degree relatives, early menarche and late child bearing age. Benign lesions usually present with palpable nodularity, thickening, mass, pain, nipple discharge or the patient may be completely asymptomatic. They include cysts, galactoceles, fibroadenomas other benign tumours, fat necrosis, duct ectasias, papillomas, adenosis, radial scar, sclerosing adenosis, and spectrum of epithelial hyperplasias with or without atypia. Benign epithelial lesions are broadly classified into 3 groups, according to the subsequent risk of developing breast cancer; non proliferative breast lesions, proliferative breast lesions without atypia and proliferative breast lesions with atypia.⁵ Majority of breast lesions in men are benign and Gynecomastia is the most common aetiology. Breast malignancies are rare in males, accounting for less than 1 % of all breast cancer cases.⁶

Diagnostic modalities such as mammography, ultrasonography, fine-needle aspiration cytology and core needle biopsy are being increasingly used based on which the management of the patient is planned. Timely and accurate diagnosis will help in early management of this disease thereby alleviating anxiety and psychological stress in these patients.⁷ It is important to distinguish benign lesions from in situ and invasive breast carcinomas and to assess a patient's risk of developing breast cancer so that the most appropriate treatment modality for each case can be established. As histopathological examination is the gold standard for the confirmation of diagnosis this study was planned to appreciate the histomorphology of non-neoplastic as well as neoplastic breast lesions.

METHODS

The present study was a retrospective study of 980 cases undertaken at the Department of Pathology, Government Medical College, Thiruvananthapuram. Duration of study was from January 2017 to December 2017. The study was

approved by the Research & Ethical Committee. The specimens were received in different forms such as Tru-Cut biopsy, excision biopsy, modified radical mastectomy and simple mastectomy. The clinical information was obtained from the biopsy requisition forms. Specimens were fixed in 10 % neutral buffered formalin. Detailed gross examination was done. The standard tissue processing protocols were followed. Sections were cut at 4 - 5 micron thickness and were stained with Haematoxylin and Eosin. All breast lesions were analysed according to age distribution, nature of specimen, and histopathology. Treated cases of malignancies were excluded. Breast lesions were broadly categorised into non neoplastic and neoplastic lesions. Neoplasms again were classified into benign and malignant. The neoplastic lesions were classified according to WHO classification 2012. Invasive breast carcinoma of NST was graded according to Nottingham modification of Bloom-Richardson grading system. The results of NSTs were analysed using descriptive statistics.

RESULTS

In the present study 980 samples were studied among which, males constituted 2.95 % (n = 29) and female patients constituted 97 % (n = 951) with male: female ratio of 1: 32.79. Among the 29 males, 58.6 % (n = 17) cases had gynecomastia, 24.1 % (n = 7) cases had invasive ductal carcinoma, 4 cases had fibrocystic disease and one case had fibroadenoma. The age of patients ranged from 12 to 90 years with majority falling in the 4th decade, 23.8 % (n = 233). The number of patients aged more than 80 years was 0.8 % (n = 8). The distribution of patients according to age is depicted in Table 1.

Age	Number of Cases	Percentage
10 - 20	106	10.7
21 - 30	108	120
31 - 40	168	17.1
41 - 50	233	23.8
51 - 60	196	20
61 - 70	121	12.34
71 - 80	40	4
> 80	8	0.8
Total	980	100

Table 1. Distribution of Patients According to Age

Type of Specimens	Benign Lesions	Malignant Lesions
Tru-Cut Biopsy	12 (2.6 %)	189 (36.27 %)
Excision Biopsy	443 (96.5 %)	7 (1.34 %)
Simple Mastectomy	4 (0.87 %)	12 (2.6 %)
Modified Radical Mastectomy	0	320 (61.4 %)
Total	459	521

Table 2. Distribution of Cases According to Specimen Type

Out of 980 cases 39 cases had bilateral disease (3.97 %) and 941 cases had unilateral disease (96 %). The breast specimens we received were Tru-Cut biopsy, excision biopsy, simple mastectomy and modified radical mastectomy specimens. The distribution of the benign and malignant lesions according to type of specimens is depicted in Table 2. Among benign lesions 96.5 % cases (n = 443) underwent excision biopsy and none underwent radical mastectomy,

while in malignant lesions 61.4 % (n = 320) underwent radical mastectomy and 36.27 % (n = 189) underwent Tru-Cut biopsy.

The histopathologic spectrum of breast lesions is depicted in Table 3. The lesions were broadly classified into neoplastic and non-neoplastic lesions. Neoplasms were again categorised into benign and malignant. The benign neoplasms constituted 33.57 % (n = 329), malignant neoplasms constituted 53.16 % (n = 521) and non-neoplastic lesions constituted 13.26 % (n = 130). Fibroadenoma was the most common benign neoplasm constituting 29.2 % of total cases (n = 292) and there was one case of lipoma in breast. Invasive carcinoma of NST type was the most common histologic type of breast cancer constituting 48.8 % of total cases (n = 479) followed by metaplastic carcinoma 1.3 % (n = 13). Ductal carcinoma in situ was seen in 8 cases and malignant phyllodes tumour constituted 8 numbers. Invasive lobular carcinoma, invasive papillary carcinoma and secretory carcinoma constituted 2 cases each. Among the non-neoplastic lesions various proliferative and inflammatory lesions like mastitis, granulomas were seen among which fibrocystic disease formed major population 6.73 % (n = 66) and least observed lesions were duct ectasia and galactoceles. Benign proliferative lesions (1.2 %, n = 12) were constituted by sclerosing adenosis and usual ductal hyperplasia. Gross and microscopic picture of a few cases are depicted in Figure 1.

	Diagnosis	No. of Cases	%
Benign Neoplasms N = 329	Fibroadenoma	292	29.2
	Complex Fibroadenoma	11	1.1
	Juvenile Fibroadenoma	10	1.02
	Intraductal papilloma	2	0.2
	Lipoma	1	0.1
	Benign phyllodes tumour	13	1.3
Malignant Neoplasms N = 521	Invasive carcinoma NST	479	48.8
	Mixed ductal & lobular carcinoma	3	0.3
	Metaplastic carcinoma	13	1.3
	Invasive lobular carcinoma	2	0.2
	Mucinous carcinoma	5	0.5
	Invasive papillary carcinoma	2	0.2
	Encapsulated papillary carcinoma	2	0.2
	Secretory carcinoma	2	0.2
	Malignant Phyllodes tumour	4	0.4
	DCIS	8	0.8
	LCIS	1	0.1
	Benign epithelial proliferative lesion	12	1.2
Non Neoplastic Lesions N = 130	A / C mastitis / C / C mastitis	13	1.3
	Fibrocystic disease	66	6.7
	Granulomatous mastitis	9	0.9
	Duct ectasia	1	0.1
	Galactocoele	1	0.1
	Breast abscess	3	0.3
	Fat necrosis	2	0.2
	Epidermal cyst	6	0.6
	gynecomastia	17	1.7
Total		980	100

Table 3. Histopathological Spectrum of Breast Lesions

The three categories of breast lesions were analysed with the age to study whether there is age predilection for different types of breast lesions. The age wise analysis of the three categories of the breast lesion is depicted in Table 4. Analysis of patients in 11 to 30 years of age showed higher incidence of benign neoplasms followed by non-neoplastic lesions. We observed significantly higher incidence of malignancies from 40 to 80 years of age with comparatively

lesser occurrence of benign and non-neoplastic lesions. After 80 years all cases showed only malignant neoplasms.

Age Group	Benign Neoplasm	Malignant Neoplasm	Non Neoplastic
11 - 20	94 (28.5 %)	0	12 (9.2 %)
21 - 30	120 (36.4 %)	5 (0.9 %)	23 (17.6 %)
31 - 40	79 (24 %)	52 (9.9 %)	37 (28.4 %)
41 - 50	26 (7.9 %)	143 (27.4 %)	34 (26.1 %)
51 - 60	7 (2.1 %)	165 (31.6 %)	14 (10.7 %)
61 - 70	2 (0.6 %)	114 (21.8 %)	5 (3.8 %)
71 - 80	1 (0.3 %)	34 (6.5 %)	5 (3.8 %)
> 80	0	8 (1.53 %)	0
Total	329	521	130

Table 4. Distribution of Three Categories of Breast Lesions According to Age

Modified Bloom Richardson grading system was mandatorily followed in all cases of invasive ductal cancers undergoing lumpectomy or mastectomy. The grading was done in Tru-Cut biopsy tissues which showed high grade carcinoma only. Out of 479 cases invasive ductal cancer of NST type, 339 had Bloom Richardson grading. Grade II cancer was seen in most cases of breast cancers 71 % (n = 240) and least common grade observed was grade I; 4 % (n = 14). 25 % (n = 85) cases showed grade III.



Figure 1.
Gross Picture of Breast with Benign Phyllodes Tumour

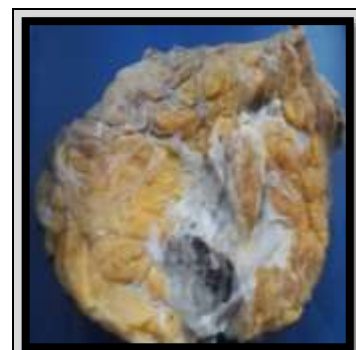


Figure 2.
Gross Picture of Breast with Mucinous Carcinoma

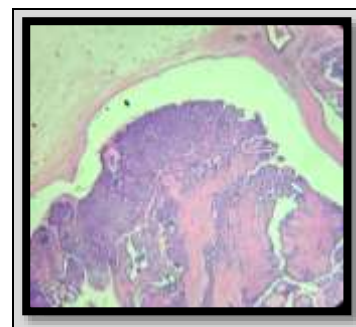
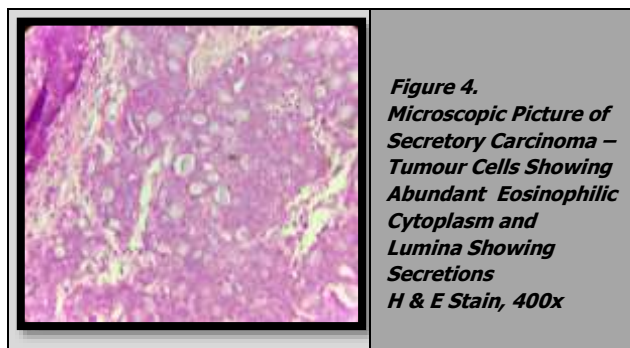


Figure 3.
Microscopic Picture of Intraductal Papilloma – Cystically Dilated Ducts Showing Papillae with Fibrovascular Cores. H & E Stain, 40x



DISCUSSION

In present study males were affected by 2.9 % (n = 29). Literature review shows male breast lesions in various studies ranged 2.7 % to 3.7 %. Various studies done in different parts of world reports incidence of female breast lesions around 96.3 to 97.3 % and is significantly higher than males. Our findings are in concordance with Yogalekshmi et al, Pathak et al and Nahar et al studies^{8,9,10} Though the incidence of breast cancer is in rising trend globally affecting even pubertal age groups, generally benign breast lesions outnumber malignancies in younger age group. As the age advances incidence of breast cancer also increases. Fibroadenomas are the most common benign neoplasm described in all previous studies with peak incidence occurring in first and second decades. Our study also observed highest incidence of fibroadenoma in 10 - 30 years of age. Fibrocystic disease is described as a benign lesion of breast tissue not exactly a neoplasm like adenomas. Fibrocystic disease is more common in third decade and it is second most common benign lesion described in breast in many studies. In our study, carcinoma breast occurrence was highest in the age group of 50 - 80 years with peak incidence in the fifth decade which is similar to the observations made by Mudholkar et al, Sharma K et al and Gaikwad et al.^{11,12,13} Mean age of carcinoma breast described is 53.78 years in Nishitha et al, 51.5 years in Sree ND et al and 51 years in Ayadi et al studies.^{14,15,16}

Our study observed 3.97 % of bilateral breast lesions while a five-year analysis study of breast carcinoma with emphasis on bilaterality of lesion done by Upasham et al observed it in 2.3 % of cases.¹⁷ The type of biopsy done in case of breast lumps depends on the clinical, radiologic and cytologic findings of the breast lesions. Radical mastectomy is considered only in lesions confirmed as cancer by cytology or Tru-Cut biopsy. Ghodsara et al in a study of histopathological analysis of 230 lesions of breast described Modified radical mastectomy done in 59.09 % cases of malignant breast lesions.¹⁴ But in our study modified radical mastectomy was done in 61.4 % of malignant neoplasms. Rest of the malignancies were diagnosed from Tru-Cut biopsy (36.27 %), excision biopsy (1.34 %) and simple mastectomy cases (2.6 %).

Our observations showed incidence of benign, malignant and non-neoplastic lesions of breast as 33.57 %, 53.1 % and 13.2 % respectively. Various studies have been conducted all over the world shows incidence of benign neoplasms

ranging from 60 – 80 %, malignant neoplasms ranging from 16 to 37 % and non-neoplastic lesion incidence range from 2 - 7 %. Most of the similar studies observed fibroadenoma as the most common benign neoplasm and NST type of Invasive ductal carcinoma as the most common malignant neoplasms. Our studies are in concordance with many other studies done in various parts of the world in terms of fibroadenoma and invasive ductal carcinoma. We observed higher incidence of fibrocystic lesion in our population than other inflammatory conditions. It is important to distinguish them from the proliferative changes associated with an increased risk of breast cancer. In MS Siddiqui et al studies conducted in 2003 in 3279 samples, 71.8 % cases showed neoplastic lesions and 28.2 % showed non neoplastic lesions.¹⁸ Naseer Sheik et al observed 81 % incidence in neoplastic lesions and 18.83 % incidence in non neoplastic lesion in breast in a study conducted in 2186 patients in 2012.¹⁹ Amin et al described fibrocystic disease in 13.7 % cases and Geethanjali et al described incidence in 6.06 % of case.^{20,21} The most common types of breast lesions in present study is compared with other studies in Table 5.

Studies	Sample Size	Non Neoplastic	Benign	Malignant
Awatif A Jamal 2001 ²²	1084	Chronic Mastitis 3.2 %	Fibroadenoma 25 %	IDC NST 24.7 %
Sulhyan et al 2017 ²³	161	Acute / Chronic Mastitis 7.5 %	Fibroadenoma 37.6 %	IDC NST 16.6 %
Gaikwad SL et al 2018 ¹³	218	Acute / Chronic Mastitis 6.4 %	Fibroadenoma 54.12 %	IDC NST
Nandam et al ²⁴	104	Chronic Inflammation 4.5 %	Fibroadenoma 59 %	IDC NST 22 %
Present Study 2020	980	Fibrocystic Disease 6.73 %	Fibroadenoma 29.2 %	IDC NST 48.8 %

Table 5. Comparison of Most Common Lesions of The Present Study with Those of Other Studies

Modified Bloom Richardson grading system is followed in invasive ductal carcinoma of non-specific type. Other histologic types of breast cancer is graded according to the grading system specified for such lesions in WHO. Modified Bloom Richardson grading is not done in low grade carcinomas detected in Tru-Cut biopsy lesion, since the actual lesion can have higher grade areas. In the present study we included grading system in mastectomy and excision biopsy specimens only. Our observations regarding higher occurrence of grade II lesions (71 %) is in concordance with Ahmed Z et al (75.83 %) and Ayadi et al (63.2 %) studies.^{25,16} But Ghodsara et al's study in 230 patients reported grade I, II, III lesions as 19.56 %, 23.92 % and 56.52 % respectively.¹⁴ Higher occurrence of grade III lesions was also reported by Mudhuwa et al who got 49 % grade III, 36.4 % grade II and 14.6 % grade I tumours.²⁶ The ratio of malignant: benign lesions in our study is 1.15: 1 which is in discordance with observations made by Godhasara and Sree ND et al who reported ratio of benign lesions: malignant lesions as 2.4:1 and 4.4:1 respectively.^{14,15} Kumar et al observed in Indian population benign breast diseases are 5 to 10 times common than malignant lesions.²⁷ Aisha Mmon's study in a tertiary health care centre in Pakistan also reported tenfold increase incidence of benign lesions compared to breast cancer.²⁸ Geographical, racial and cultural variations occur in the

incidence of breast lesions as described in many studies in literature. The influence of education in women resulting in early detection of breast lumps was reported by Kumar et al studies.

Summary

Based on observations in our study we concluded that breast lesions have sex and age predilections with female breast showing higher incidence of pathological lesions than male breast. The benign neoplasms and non-neoplastic lesions are dominant breast pathology in age less than 40 years while breast cancers are the main pathological lesions from fifth decade onwards. We observed fibroadenoma as the most common benign neoplasm, invasive ductal carcinoma as the most common malignant neoplasm and fibrocystic disease as the most common non neoplastic lesion of breast in our study. For males, gynaecomastia was the most common pathology observed and all malignancies were of invasive ductal carcinoma–NST type. Grade II was the most common grade of cancer observed in our study. Unlike many other studies conducted in different parts of India we observed higher malignant: benign ratio in breast lesions.

CONCLUSIONS

Breast lesions have multiple genetic and environmental aetiologic factors. Lack of awareness and education, cultural inhibitions all play crucial roles in the early detection of breast lumps especially malignancy. Kerala being one of the most educationally and economically forward states in India with a large population of educated and economically independent women, increased detection of cancer may be one of the reasons for the higher incidence. Other contributory cultural, genetic and environmental factors need to be analysed in depth for unravelling aetiological factors.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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