Original Article

Analysis of Breast Disease

A Cytological Analysis of Breast Disease

Abdul Rauf and Muhammad Adnan Zaman

ABSTRACT

Objective: To study the cytological pattern of disease in females presenting with breast lumps/ swellings.
Study Design: A retrospective / descriptive study
Place and Duration of Study: This study was conducted at the Pathology Department, Nawaz Sharif Medical College, University of Gujrat from Jan 2015 to Dec 2017.
Materials and Methods: It consisted of 1046 patients having 1085 breast lumps/ swellings. Sampling was done in Aziz Bhatti Shaheed Teaching Hospital and a private hospital in Gujrat. The records of all the patients were retrieved, compiled and analyzed with respect to the types of pathology, age and various diagnostic entities.
Results: We analyzed 1085 breast lesions. More lesions were seen on left side (53.6%). Mean age of patients was 39.07 years. Most patients presented in fourth decade (27.2%), followed by third decade (24.9%). We divided the lesions into five main categories. Benign category (C2) was the largest with 56.8% of the lesions. It was followed by the malignant category (C5%) with 33.5% of the patients. The C3 and C4 categories contained 4.7% of the lesions each. C1 category contained only 0.3% of the lesions. Fibroadenoma was the commonest lesion in the benign neoplastic group. Inflammatory lesions were commonest lesion in the benign non-neoplastic group. Ductal carcinoma was the most prominent lesion in the malignant category with 69% of the cases.
Conclusion: Our findings of benign lesions being the commonest and malignant second to them is in conformity with most other studies. There are variations in the frequencies of various categories of lesions and age incidences in literature.

Key Words: FNAC Breast, Fibroadenoma, Ductal carcinoma, Proliferative breast disease, Phylloides tumor.

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INTRODUCTION

Most diseases of the breast present as lumps or swellings. Although most of these lesions are benign or non neoplastic, breast cancer is the most common cancer of the females.[1] The non-surgical methods used to evaluate the breast lesions include physical examination, mammography, USG, FNAC and core needle biopsy. The FNAC and CNB are the two main options that can provide a definitive pathological diagnosis. Various studies have been done to compare these two techniques as each of these has some advantages over the other as well as some limitations. A multidisciplinary approach like triple assessment provides a better accuracy of diagnosis than any of these modalities alone.[2,3,4] FNAC has a high sensitivity, specificity and overall accuracy.[5] Most patients of breast disease are females and a few are males.

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Mean age of the patients falls mostly in fourth decade.[6] Benign lesions are found at a younger age than the malignant cases. Benign lesions are found mostly in third decade and malignant in fifth and sixth decades.[7] More lesions are found on left side than right side and a few patients present with bilateral lesions.[8]

The breast lesions are generally divided into five cytological categories i.e. unsatisfactory, benign, atypial probably benign, suspicious of malignancy and malignant.[9] Benign category is the largest of these categories and fibroadenoma is the most common entity in this group. Malignant lesions are mostly carcinomas and ductal carcinoma ranks first amongst these lesions.[8,10] Other lesions that form significant proportion of cases include inflammatory lesions including pyogenic as well as granulomatous lesions, cystic/ fibrocystic lesions and benign proliferative lesions.[8]

Although FNAC has several advantages like simplicity, rapidity, cost effectiveness, least complications and high overall accuracy, the possibility of false negative as well as false positive diagnoses in a few cases should be kept in mind while interpreting a report.[8,11]

MATERIALS AND METHODS

It is a retrospective, cross-sectional laboratory-based study of FNA cytology of breast lesions. It was carried out in the Department of Pathology, Nawaz Sharif

Medical College (NSMC), University of Gujrat, Pakistan. The procedures were performed in Aziz Bhatti Shaheed Teaching Hospital (affiliated with NSMC) and a private hospital in Gujrat. A total of 1046 female patients with complaints of breast lump/swelling underwent FNAC during three years (Jan 2015-Dec 2017).

Sampling was done using 23 G needles with 5 cc disposable syringes in most cases. In some cases, 21 G and 22 G needles with 10cc syringes were also used. Lymph nodes (axillary and cervical) were also sampled when feasible. Before allowing the patient to leave, we assessed the adequacy of aspirate by using R-O-S-E (Rapid On Site Evaluation) concept.12 The smears were stained mostly with hematoxylin & eosin (H&E) stains. May Grunwald Giemsa and Pap stain was used in some cases. All smears were examined and reported by the author himself. We used Microsoft Excel, Minitab 14, and SPSS 24 for data analysis. The results were presented in frequency tables/ cross-tabulations and compared with foreign and local studies.

RESULTS

There were 1046 female patients included in this study. We had 39 patients with more than one breast lesion yielding us a total of 1085 lesions. Left side contained more lesions (53.6%) than right side. Mean age of patients was 39.07 years with most patients presenting in fourth decade (27.2%), followed by third decade (24.9%). We reported the cases in five categories as per NHS/ RCPath recommendations for FNAC breast reporting. 9 We also tried to sub-classify the lesions into definite breast disease entities wherever possible e.g. fibroadenoma in benign (C2) category. Benign category was the largest with 56.8% of the lesions followed by malignant category with 33.5% of the patients. (Table 1).

Table No. 1: Frequency distribution of breast aspirates according to diagnostic category and age.

Diagnostic Category	Up to 20*	21-30	31-40	41-50	51-60	>60	Total (Count)	Total %
C1 Inadequate	1	2	0	0	0	0	03	0.3
C2 Benign	101	219	177	70	33	16	616	56.8
C3 APB	0	10	19	10	6	6	51	4.7
C4 SoM	0	14	15	18	3	1	51	4.7
C5 Malignant	0	25	84	104	86	65	364	33.5
Total Count	102	270	295	202	128	88	1085	100
Total %	9.4	24.9	27.2	18.6	11.8	8.1	100	100.0

*=Age in Years, APB= Atypia Probably Benign, SoM= Suspicious of Malignancy

Table No.2: Frequency distribution of lesions according to diagnosis and age.

Category	Diagnosis	Up to 20*	21-30	31-40	41-50	51-60	>60	Total Count	Total %
Inadequate		1	2	0	0	0	0	03	0.3
Benign Non Neoplastic Lesions	Inflammatory lesions	7	79	76	31	14	8	215	19.8
	Cystic lesions	2	32	27	14	4	3	82	7.6
	PD/NPD w/o atypia	10	25	21	9	9	1	75	6.9
	Others	6	16	11	4	4	2	43	4
Benign Neoplastic Lesions	Fibroadenoma	75	66	26	4	0	0	171	15.8
	Phylloides tumor	0	0	5	3	0	0	08	0.7
	Lipoma	0	0	6	5	1	1	13	1.2
	Misc. benign tumors	1	1	5	0	1	1	09	0.8
APB		0	10	19	10	6	6	51	4.7
SoM		0	14	15	18	3	1	51	4.7
Malignant Lesions	Carcinoma	0	4	20	31	21	19	95	8.8
	Ductal Ca	0	20	62	65	63	41	251	23.1
	Lobular Ca	0	0	0	0	0	1	1	0.09
	Medullary Ca	0	1	1	1	2	0	5	0.5
	Mucinous Ca	0	0	0	6	0	4	10	0.9
	Sarcoma	0	0	1	1	0	0	2	0.1
	Total Count	102	270	295	202	128	88	1085	100
	Total %	9.4	24.9	27.2	18.6	11.8	8.1	100	100.0

*=Age in Years, **PD=** Proliferative disease, **NPD=** Non Proliferative disease, **Ca=** Carcinoma

Table No.3: Frequency Distribution of Benign Non-neoplastic lesions according to diagnosis and age (n=415)

Categories	Diagnosis	Up to 20*	21-30	31-40	41-50	51-60	>60	Total	Total %
Inflammatory lesions (n=215, 19.8%)	Pyogenic/NOS	3	35	35	18	8	4	103	24.9
	SGI	2	19	17	4	3	2	47	11.3
	GI	2	23	24	6	3	1	59	14.2
	CGI	0	2	0	3	0	1	06	1.4
		7	79	76	31	14	8	215	
Cystic lesions (n=82, 7.6)	Simple Cyst	0	4	13	9	2	2	30	7.2
	Fibrocystic Change	0	2	2	1	0	0	05	1.2
	EIC	1	5	5	4	2	1	18	4.3
	Galactocele	1	21	7	0	0	0	29	07
		2	32	27	14	4	3	82	
PD / Non-PD (n=6.9%)	PD without Atypia	6	8	6	3	0	0	23	5.5
	NPD	4	17	15	6	9	1	52	12.5
		10	25	21	9	9	1	75	
Others. (n=43, 4%)		6	16	11	4	4	2	43	10.4
Total Count		25	152	135	58	31	14	415	100.0
Total %		6.0	36.7	32.5	14	7.4	3.4	100.0	100.0

*= Age in Years, **NOS**=Nonspecific Inflammation, **SGI**= Suspicious for Granulomatous Inflammation, **GI**= Granulomatous Inflammation, **CGI**= Caseating Granulomatous Inflammation, **EIC**=Epidermal Inclusion Cyst, **PD**= Proliferative disease, **NPD**= Non Proliferative disease, **Misc**= Miscellaneous

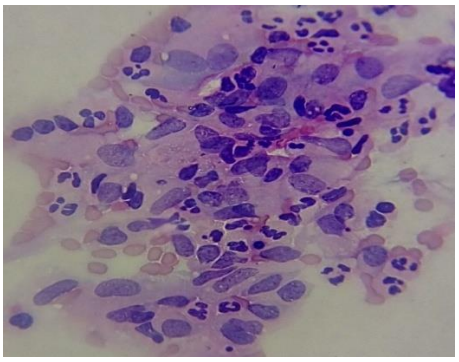

Figure No. 1: Granulomatous inflammation (H&E, X400) containing epithelioid cells and other inflammatory cells.

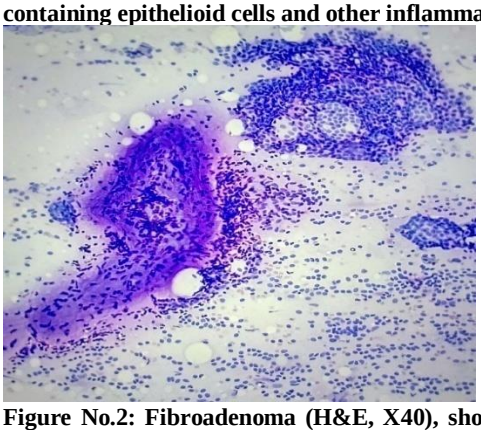

Figure No.2: Fibroadenoma (H&E, X40), showing sheets of uniform ductal cells, a myxoid stromal fragment and many bipolar naked nuclei.

Mean age of patient with benign lesions were 32.54 years. Among benign non-neoplastic lesions, most common lesions were inflammatory (Fig 1) lesions (n=215, 19.8%) followed by cystic lesions (n=82, 7.6%).

Most cases of benign non-neoplastic lesions were reported in third decade (n=152, 36.7%) followed by fourth decade (n=135, 32.5%).

However, while encountering benign neoplastic lesions, most of the cases were reported in second decade of life (76/201, 37.8%). Fibroadenoma was the most common neoplastic lesion. (Fig 2)(Table 2&3)

There were 364 cases of malignancy (Fig 3 and 4). Mean age of patient with malignant lesions was 49.84 years. Most malignant cases were found in fifth decade of life (n=104, 28.6%) followed by sixth decade (n=86, 23.6%) and fourth decade (n=84, 23.1%). The overwhelming majority of malignant cases were carcinomas (362/364) and the remaining two cases were of sarcomas (Gig 3 and 4). The most common carcinoma was ductal carcinoma (251/364, 69.1%). (Table 2)

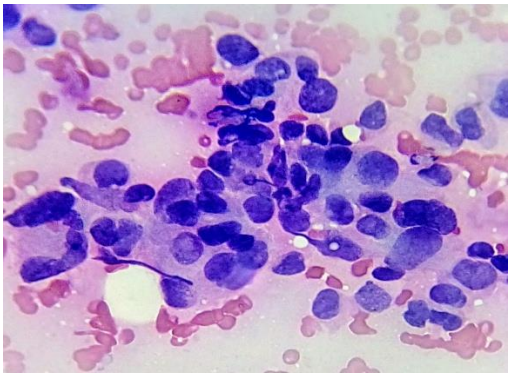

Figure No. 3 : Ductal carcinoma smear (H&E, X400) with pleomorphism and hyperchromasia.

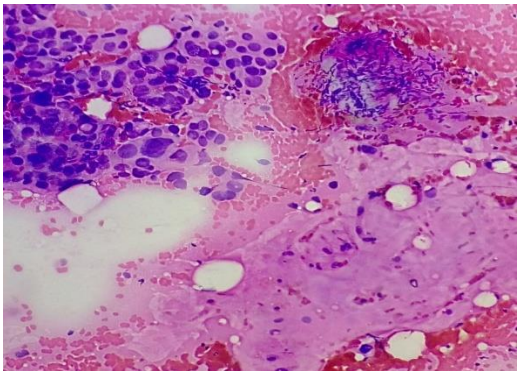

Figure No.4: Mucinous carcinoma (H&E, X400) showing thick mucinous material with cellular features of malignancy.

A total of 79 ipsilateral axillary lymph nodes were sampled. Out of these, 65 (82.3%) were proven metastatic.

DISCUSSION

Breast disease is mainly a disease of females. The study comprised 1046 female patients that contained 1085 breast lesions.

The left sided predominance of breast lesions in our study (53.6%) is in conformity with most authors while a few like Rahman has described a little majority right sided lesions.[13]

The mean age of our patients at 39.07 years is closest to the studies of Elmadhoun at 38.2 years, Hamdani at 38 and Shah at 38.1 years.[6,10,11] The fourth decade contained highest proportion of 27.2% of lesions in our study. Shah has also reported maximum number of his cases in fourth decade while Rahman described most cases in third decade.[10,13] Rahman has attributed this finding to the lower life expectancy in his country. The finding of benign lesions at lower age than malignant is common to our and almost all other studies.

Benign category of lesions was the largest in our study with 56.8% of the lesions, a finding similar to most studies except a few like the study of Challa who has mentioned malignant category as the largest.[5-8,14]

There were 18.5 % (201/1085) benign neoplastic cases in our study and most of these (171/1085, 15.8%) were fibroadenomas. The frequency of fibroadenomas is our study is in concordance with Bukhari i.e. 16%.[15] Our study also showed benign phylloides in 0.7 % of cases and lipoma of 1.2%. Elmadhoun showed Phylloides tumor 1.7 % and Lipoma 1.3%.[11]

Our study found 19.8% inflammatory cases which is in concordance with Bukhari at 20%, Rahman 21,1% and Punjvani 22.5%.[13,15,16] Our study showed granulo-matous inflammation in 5.4 % cases. Punjvani showed it at 5.9%, Rahman at 6.52% and Bukhari at 2.3%.[13,15,16] Fibrocystic disease of breast in our study is 1.2%. There is variable frequency in literature like 4.96% in the study of Punjvani, 11.8% in the study of Rehman and 21.2% in that of Bukhari.[13,15,16]

The malignant category was second largest in our study like most other studies. The frequency of 33.5% malignant lesions in our study is almost similar to the studies of Madubogwu (34.6%), Panjvani (31.1%) and Naz (36.9%).[5,16,17]

Some authors have described fewer malignant cases in their studies e.g. Kamra as well as Kumari at 11.2 % each and Choudhary at even lower at 5.6%.[18,19,20]

Mean age of our patients with malignant lesions was 49.84 years, a finding in correspondence with Naz with a mean age of 47 in her study.[17] Fifth decade contained higher proportion of malignant cases than all other decades in our study (28.6%, 104). Rahman and Kujur have reported most cases in 4th decade, Shah in 5th and 6th and Kumari in 6th decade.[10,13,19, 21]

The most common carcinoma is ductal carcinoma in our study comprising 69% of the malignancies (251/364). Our finding is in conformity with that of Yusuf at 69.9% and Madubogwu at 73.7% ductal carcinomas in their studies.[5,23] Some studies have described a very high frequency of ductal carcinomas in their studies like Rahman at 99.6% (251/252) and Kamra at 98.1% (151/154).[13,18]

In our study, 17.9% cases (65/364) of malignancy revelaed metastatic axillary lymph node disease. There is variable frequency in literature like the studies of Rahman, Challa and Elmadhoun revealed metastatic axillary disease in 10.3% (26/252), 37.7% (170/451) and 50.8% (33/65) of the cases respectively.[11,13,14]

CONCLUSION

The general pattern of breast pathology in our study is proportionate with majority of the studies in literature like benign category being the commonest and followed by malignant in frequency. Inflammatory lesions are commonest in benign non neoplastic and fibroadenoma in benign neoplastic category. Ductal carcoinoma is the predominant malignancy. Significant variations were observed in the frequencies of fibrocystic disease and metastatic axillary disease.

Author's Contribution:

Concept & Design of Study:	Abdul Rauf
Drafting:	Muhammad Adnan Zaman
Data Analysis:	Muhammad Adnan Zaman
Revisiting Critically:	Abdul Rauf, Muhammad Adnan Zaman
Final Approval of version:	Abdul Rauf

Conflict of Interest: The study has no conflict of interest to declare by any author.

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