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Pattern of benign breast diseases in a tertiary care hospital in upper Assam and comparison of their clinical-pathological-radiological findings

Dr. Arzu Ara Ahmeda[1*], Dr. Uttam Konwar[2],Dr. Pronami Borah[3],Dr. Lucky Moni Duara[4]

[1*](P.G, Final Year Student, Department of surgery, Assam Medical College & Hospital, Dibrugarh, 786002, India

[2](Associate Professor,Department of surgery,Nagaon Medical College & Hospital, Nagaon,India)

[3](Professor, Department of Radiodiagnosis, Assam Medical College & Hospital, Dibrugarh,India)

[4](Associate Professor, Department of Pathology, Tezpur Medical College &Hospital, Tezpur, India)

**Corresponding Author and reprint request to Dr. Arzu Ara Ahmeda, P.G, Final Year Student, Department of surgery, Assam Medical College & Hospital, Dibrugarh, 786002, India. Email Id-iarzuahmeda@gmail.com.*

Abstract:

Background*: Benign breast diseases constitute the majority of breast complaints presented by young females to a surgical OPD. Much concern is given to malignant lesions of the breast because breast cancer is the most common malignancy occurring in women; however, benign lesions are 10 times more common than cancerous conditions and deserve attention due to their high prevalence, impact on women's lives, associated anxiety, and possibility of some turning into malignancy. In this study, we aim to find out the pattern of benign breast diseases regarding prevalence, age distribution, clinical presentation and comparison with pathological (FNAC) and radiological (USG) studies.*

Materials and Methods*:The 90 female patients with benign breast diseases between the ages of 10 and 49 years underwent a triple assessment consisting of clinical examination, ultrasonography, and fine needle aspiration cytology.*

Results: *The highest number of cases were found among 90 patients aged 20–29) years**.** Lump was the most common presentation; fibroadenoma was the most common benign lesion, followed by fibroadenoma with fibroadenosis, only fibroadenosis, breast cysts, mastitis, galactocele and breast abscess.*

Conclusion:*Benign breast diseases are common breast problems in young female patients. All three modalities of the triple assessment are complementary to each other. Most of the diagnoses were confirmed when the results of all three modalities were combined.*

Key words*:benign breast diseases; fine needle aspiration cytology (FNAC); ultrasonography (USG); lump; fibroadenoma; fibroadenosis; breast cyst; mastitis; galactocele; breast abscess.*

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I. Introduction

The majority of the breast lesions are benign. In the West, the prevalence of benign breast diseases is nearly ten times that of breast cancer. The term "benign breast diseases" encompasses a heterogeneous group of lesions that includes benign tumors, fibrocystic changes, abscesses, and inflammatory conditions. They present a wide range of symptoms which may include a palpable mass, swelling, erythema, thickening, pain, discharge and nipple retraction. Breast tissue is composed of different kinds of structures, like connective tissue and glands, which grow and change in cycles under the control of hormones[2]. Hormones are also believed to be the main cause of the most common benign and cancerous breast diseases[3]. More often, there are benign lesions and fibrocystic changes are by far the most common[2,4]. Most of the time, they are associated with adenosis, fibrosis, cysts, and hyperplasia, but they vary in extent. So, each patient's clinical, pathological and radiographic presentation is very different from the other.

The majority of patients can be diagnosed with benign breast disease without surgery using clinical examination, radiological, and pathological investigations[5]. Though much concern is given to malignant lesions of the breast, benign breast diseases deserve attention due to their high prevalence, impact on women's life-associated anxiety and the possibility of some turning into malignancy. It is important for pathologists, radiologists, and surgeons to recognize benign lesions, to distinguish them from breast cancer and to assess a patient's risk of developing breast cancer, so that the most appropriate treatment modality for each case can be

established and unnecessary surgeries can be avoided. Even though the final diagnosis is usually based on the histopathological examination (HPE) of the removed tissue, it wouldn't sound right to routinely remove all breast lumps because most of them are harmless[6,7]. So, there needs to be a less painful and more cost-effective way to diagnose the lump than an open biopsy, which is more painful and invasive. This method should be accurate, easy to use, valid, and not require much preparation.Hence, we have considered fine needle aspiration cytology (FNAC) as a first pathological mode of investigation. Ultrasonography is a relatively less expensive and reliable imaging modality and has no radiation exposure. To avoid unnecessary cost and radiation exposure for young females with benign breast diseases, we considered ultrasonography as a more appropriate radiological method, which also gives information about tumor size, extent and number.
This study is done to observe any changes in the pattern of BBDs in our population regarding age distribution, clinical presentations and factors influencing them and to compare the clinical, radiological and pathological findings in their diagnosis.

II. Material and Methods

The study was conducted among all female cases of benign breast diseases who attended the indoor or outpatient Department of General Surgery, Assam Medical College and Hospital, Dibrugarh, from June 1, 2021 to May 31, 2022. Patients were selected on the basis of inclusion and exclusion criteria.
Study Design:A hospital based observational study.
Sample size: 90 patients.
Sample size calculation: Considering 95% confidence interval with absolute precision of 10% and fibroadenoma to be the most common type of benign breast disease, the sample size for the present study was calculated to be 90.
Methods of Data Collection and Questionnaire: Patient data was collected regardingage, gender, complaints, past surgical history, past history of breast disease, history of oral contraceptive pills, menstrual history, obstetric history, diabetes and other co-morbidities. A specially designed proforma was used for recording the findings of the history and clinical examination and the data was analyzed to study the details of benign breast diseases in the group surveyed.
Inclusion criteria:

- Female patients who have lump in the breast and are clinically diagnosed to have Benign Breast Disease.
- Patients who was willing to participate.

Exclusion criteria:

- Patients with Signs and symptoms suggestive of Carcinoma Breast.
- Patients who was not willing to participate.

Approval for the study: Ethical clearance was obtained. All 90 patients were subjected to clinical, pathological and radiological evaluation after written and informed consent were obtained.
Procedure methodology: All female patients who attended the OPD underwent detailed history-taking and clinical examination and a clinical diagnosis was made. Subsequently, she was sent to FNAC and USG. Appropriate treatment was given on the basis of the diagnosis, which was confirmed by the combined results of the above three methods. In the case of excised lesions, biopsies were sent for HPE. The clinical diagnosis of BBDs was compared with the cytological and radiological findings. The statistical data were calculated regarding the sensitivity, specificity and accuracy of the clinical, pathological and radiological diagnosis of BBDs and the correlation of these findings was evaluated.

III. Result

During the study period, a total of 90 patients with clinically palpable breast lumps were selected. All 90 patients were subjected to USG and FNAC. The final data analysis was done for all 90 cases. In thisstudy, the youngest patient was 13 years old and the eldest one was 47 years old. The age group of (20-29) years had the most patients, followed by (10-19) years. The age-wise distribution of patients is given below.

Table no 1 Age distribution of the patients with benign breast disease

Age Group(Years)	Nos.	Percentage
10-19	24	26.67
20-29	39	43.33
30-39	21	23.33
40-49	06	06.67
Total	90	100

The symptoms of the patient were broadly divided into lumps, pain, lumps plus pain and lumps plus pain plus discharge.

Table No 2 Symptoms distribution of the patients

Symptoms	No. of cases	Percentage
Lump	26	28.89
Pain	3	3.33
Lump + Pain	59	65.56
Lump+Pain + Discharge	2	2.22
Total	90	100

Many of the patients presented a combination of two or more symptoms. A breast lump with or without other symptoms was the most common presentation, accounting for 96.67 percent of all cases. There were 26 patients (28.89%) who only had a breast lump, while the remaining 61 patients (67.78%) had a breast lump and associated symptoms. Hence, it was found that more patients presented with painful lumps than painless lumps.

Table No 3 Pattern of pain

Pattern of pain	Nos.	Percentage
Cyclical	26	40.625
Noncyclical	38	59.375
Total	64	100

The pain pattern was mostly noncyclical (59.375%). 26 patients (40.625%) reported cyclical pain. Three (3.33%) patients presented with only pain and no lump. In 71 (78.88%) cases, lumps were unilateral and in 19 (21.11%) cases, bilateral lumps were presented.

Table No 4 Number of lumps detected in the patients

No. of lesions	Nos	Percentage
Single	62	68.89
Multiple	22	24.44
No lump (ND)	06	06.67
Total	90	100

Single lumps,62(68.89%)was found predominantly.22 (24.44%) cases presented with multiple lumps.

Table No 5 Quadrants involved

Quadrant	No. of cases	Percentages
UO	35	38.89
UI	15	16.67
LO	7	7.78
LI	6	6.67
Multiple	25	27.78
Axillary tail of Spence	2	2.22
Total	90	100

Most of the lumps involved the upper and outer quadrants of the left breast. In 25 (27.78%) cases, lumps involved multiple quadrants. In 2 (2.22%) cases, lumps were found in the axillary tail of Spence.

Table No 6 Lump size (in cm) of all patients.

Lump size (in cm)	No. of cases	Percentage
<3	46	51.11
3-5	39	43.33
>5	05	5.56
Total	90	100

Most of the lumps were <3 cm in size (51.11%). There were 5 (5.56%) giant fibroadenomas. More than 50% of patients were homemakers, followed by students and workers. 55.56% of patients were married.

Table No 7 Treatment received by the patients

Treatment	Nos	Percentage
Conservative	51	56.67
Excision	34	37.78
Aspiration	4	4.44
Incision and drainage	1	1.11
Total	90	100

Most of the benign breast diseases were managed conservatively (56.67%). If necessary, lumps were excised and abscesses were incised and drained.

Table No 8 Comparison of total cases of BBDs diagnosed in each method of triple assessment

No.	Benign Breast Diseases	Clinical	Pathology	USG	Final Diagnosis
1	Fibroadenoma	61	65	51	52
2	Fibro adenosis	4	4	6	5
3	Nonspecific mastitis	3	1	1	1
4	Granulomatous mastitis	0	2	2	2
5	Galactocele	2	3	3	3
6	Benign epithelial hyperplasia	0	2	2	2
7	Breast cyst	5	5	5	5
8	Phyllodes tumour	0	0	1	1
9	Breast abscess	2	2	2	2
10	Fibroadenoma with fibro adenosis	11	5	17	17
11	Not detected	2	1	0	0
	Total	90	90	90	90

In the present study, the most common benign breast disease diagnosed clinically and further correlated with radiological and pathological examination was fibroadenoma 52 (57.78%), followed by fibroadenoma with fibroadenosis 17 (18.89%), only fibroadenosis 5 (5.56%) and breast cyst 5 (5.56%). The incidence of various types of benign breast diseases is shown above.

Table No 9 Correlation of USG and FNAC findings

Radiological Diagnosis		FNAC											Total (USG)
		FA	FDN	NM	GM	GAL	EH	BC	PT	BA	FA+FDN	ND	
USG	FA	51	-	-	-	-	-	-	-	-	-	-	51
	FDN	2	3	-	-	-	-	-	-	-	-	1	6
	NM	-	-	1	-	-	-	-	-	-	-	-	1
	GM	-	-	-	2	-	-	-	-	-	-	-	2
	GAL	-	-	-	-	3	-	-	-	-	-	-	3
	EH	-	-	-	-	-	2	-	-	-	-	-	2
	BC	-	-	-	-	-	-	5	-	-	-	-	5
	PT	1	-	-	-	-	-	-	-	-	-	-	1
	BA	-	-	-	-	-	-	-	-	2	-	-	2
	FA+FDN	11	1	-	-	-	-	-	-	-	5	-	17
	ND	-	-	-	-	-	-	-	-	-	-	-	0
Total(FNAC)		65	4	1	2	3	2	5	0	2	5	1	90

***FA= Fibroadenoma, FDN= Fibroadenosis, NM= Nonspecific mastitis, GM= Granulomatous mastitis, GAL=Galactocele, EH= Epithelial Hyperplasia, BC= Breast cyst, PT= Phyllodes tumour, BA= Breast abscess, FA+FDN= Fibroadenoma with Fibroadenosis, ND= Not Detected.*

In FNAC, we found 65 fibroadenoma cases, but in USG, 51 cases were detected as fibroadenomas. 51 cases were found to be fibroadenomas in both the FNAC and the USG. Among the 65 cases that were detected as fibroadenomas in FNAC, 14 cases were found to be other benign breast diseases in USG; one case was detected

as fibroadenosis, one case as a Phyllodes tumor and 11 cases as fibroadenoma with fibroadenosis in combination. All of them were managed on the basis of this diagnosis. All 51 cases of fibroadenomas that were detected in the USG were reported as fibroadenomas in the FNAC as well. Hence, USG could detect all the fibroadenomas very accurately.

Table No 10 Comparison of Clinical and FNAC findings

Clinical Diagnosis		FNAC											Total (Clinical)
		FA	FDN	NM	GM	GAL	EH	BC	PT	BA	FA+FDN	Not Detected	
Clinical	FA	56	-	-	-	-	2	1	-	-	2	-	61
	FDN	2	1	-	-	-	-	-	-	-	-	1	4
	NM	-	-	1	2	-	-	-	-	-	-	-	3
	GM	-	-	-	-	-	-	-	-	-	-	-	0
	GAL	-	-	-	-	2	-	-	-	-	-	-	2
	EH	-	-	-	-	-	-	-	-	-	-	-	0
	BC	-	-	-	-	1	-	4	-	-	-	-	5
	PT	-	-	-	-	-	-	-	-	-	-	-	0
	BA	-	-	-	-	-	-	-	-	2	-	-	2
	FA+FDN	7	1	-	-	-	-	-	-	-	3	-	11
	ND	-	2	-	-	-	-	-	-	-	-	-	2
Total(FNAC)		65	4	1	2	3	2	5	0	2	5	1	90

***FA= Fibroadenoma, FDN= Fibroadenosis, NM= Nonspecific mastitis, GM= Granulomatous mastitis, GAL=Galactocele, EH= Epithelial Hyperplasia, BC= Breast cyst, PT= Phyllodes tumour, BA= Breast abscess, FA+FDN= Fibroadenoma with Fibroadenosis, ND= Not Detected.*

Clinically, we found 61 fibroadenoma cases, but in the FNAC, 65 cases were detected as fibroadenomas. 56 cases were found to be fibroadenomas in both the clinical examination and the FNAC. Among the 61 cases that were detected as fibroadenomas clinically, 5 cases were found to be other benign breast diseases in the FNAC: 1 case was detected as a breast cyst, 2 cases as epithelial hyperplasia, and 2 cases as fibroadenoma with fibroadenosis in combination. Among the 65 cases of fibroadenomas that were detected in FNAC, 2 cases were diagnosed as fibroadenosis and 7 cases were diagnosed as fibroadenomas with fibroadenosis in clinical diagnosis.

IV. Discussion

Benign Breast diseases include various kinds of conditions. The various presentations of BBDs include breast lumps, breast pain and nipple discharge. Many patients present with a combination of symptoms. After a detailed history is taken, The patients should undergo a triple assessment so that a quick diagnosis can be made.

The most common disease in our study was fibroadenoma, with peak incidence in the 2nd and 3rd decades of life, which is consistent with other studies. In a study done by Das N et al.[8] (2017), the author concluded that the peak incidence of fibroadenoma ranged from the 2nd to the 3rd decade of life. ArujAlam et al.[9] (2018) found that most of the patients with benign breast diseases are in the younger age group of 21–30 years and fibroadenoma is the leading diagnosis (34%). In a study done by Krishna et al.[10] (2017), it was found that 52.6% of cases of fibroadenoma presented in the age group of 21–30 years, followed by 35.5% in the age group of 11–20 years. In our study, the majority of patients are 20–29 years old and account for 39 percent (43.33%). The youngest patient was 13 years old, and the eldest one was 47 years old. The majority of the cases in the present study were in the reproductive age group (10–49 years). Four women complained of irregular menstrual cycles, and none of them had any significant change in the size of the swelling during or before menstruation. Krishna et al.[10] (2017) found in their study that most of the patients belonged to the reproductive age group and two patients complained of menstrual irregularities.

Fibroadenoma is the most common lesion, followed by fibroadenoma with fibroadenosis in combined form, which does not correspond to most of the other studies where fibroadenosis alone is the 2nd most common benign breast disease. A total of 69 (76.67%) cases of fibroadenoma, which is the highest in number and 22 (24.44%) cases of fibroadenosis were found. Amongst which 17(8.89%) cases were in combined form i.e., fibroadenoma found in a background of fibro adenosis. 52 cases were only fibroadenomas and 5 cases were only fibroadenosis. In the present study, the most common presentation of the benign breast disorders was a lump, which comprised 87 (96.67%) patients and may be painful or painless. Though many studies say that a painless

lump is more common than a painful lump, we found painful lumps (65.56%) to be more common than painless lumps (28.89%). In their study (2017–18), Kumar et al.[1] (2018) discovered that the most common presentation of benign breast diseases was a breast lump, which comprised 264 (88%). Out of these 176, 58.66% presented with a painless breast lump. In our study, 64 of the total patients (71.1%) reported pain, which is inconsistent with other studies. In a study done by Kumar et al.[1] (2018), the author observed the incidence of breast pain (37.3%) at a slightly higher level than the breast pain series, which ranged from 12.8% to 30.3%. A portion of painful fibroadenomas, as well as a significant number of fibroadenomas in the background of fibroadenosis and other inflammatory benign conditions, may contribute to the increased prevalence of painful lumps. Though most of the patients complained of pain in the breast, only a minority of lumps were tender to palpation, i.e., most breast lumps in the present study are non-tender. Regarding the laterality of the disease, the lesion is commonly unilateral (78.89%). 45.55% had left-sided breast pathology, 33.33% had right-side pathology, and 21.11% had bilateral lesions. In their study, Krishna et al.[10] (2017) discovered similar results: 49.7% of cases presented on the left side, followed by 48.3% on the right side, but BL cases were extremely rare in comparison to our study, which found only 2.5%. Bhavuk Kapoor et al.[13] (2020) in their study found that 46.6% of the patients had involvement of the left breast and 43.3% had involvement of the right breast, while only 10% of the patients had bilateral benign breast diseases. Two cases were detected in menopausal women, which proves that menopausal age is no exception to the occurrence of benign breast disease. On examination, most of the breast lumps were found in the upper outer quadrant of the breast (55.5%), followed by the upper inner quadrant (16%). Bhavuk Kapoor et al.[13] (2020) found in their study that the upper outer quadrant of the breast was involved in 60% of the cases. This was also observed in other studies, in which the upper outer quadrant was the most commonly involved part of the breast[4,14].

In our study, clinical examination identified 61 cases as fibroadenomas, 51 of which were correctly identified as fibroadenomas and 10 of which were incorrectly identified as fibroadenomas. In FNAC and USG, one case that was clinically diagnosed as fibroadenosis was reported as a fibroadenoma. Clinical examination of cases of fibroadenoma had a sensitivity of 98.08% and a specificity of 73.68%. It had a positive predictive value of 83.61% and a negative predictive value of 96.55%. The accuracy rate is 87.78%. This was in accordance with the study by Mima MBS et al.[12] (2013), in which the sensitivity of the clinical diagnosis in cases of fibroadenoma was 92%. Bhavuk Kapoor et al.[13] (2020) found in their study that the clinical diagnosis of fibroadenoma had a sensitivity of 87.5% and a specificity of 92.8%. It had a positive predictive value of 93.3% and a negative predictive value of 86.6%. In our study, clinical examination is highly sensitive for fibroadenomas, but specificity is low. Though clinical examination is seen as being less specific for fibroadenomas, with respect to other benign breast diseases, the specificity of clinical examination is very high. It also has a very high NPV for all benign breast diseases, including fibroadenomas. Hence, clinical examination is a reliable method to assess the breast lump, as it has high specificity and a negative predictive value.

Ultrasound examination is a very useful investigation. Most cases were fibroadenomas on USG breasts; multiple lesions were detected in 17 cases (18.89%) and a single lesion in 73 cases (81.11%). This USG finding correlates with the Krishna et al.[10] (2017) study, with 94.17 percent of solitary lesions and 5.83 percent of multiple lesions. All the multiple lesions in our study were found to be fibroadenomas on a background of fibroadenosis. In our study with respect to fibroadenoma, USG is 98.08% sensitive, 100% specific, PPV 100, NPV 97.44, and accuracy is 98.89%. This is comparable with the study done by RounakKalwani et al[15]. (2016), where the final results of USG revealed the sensitivity to be 92%, specificity to be 100%, positive predictive value (PPV) to be 100%, and the negative predictive value (NPV) to be 93.75%, with an overall diagnostic accuracy of 96.36%. In the Krishna et al. (2017) study, USG was 100% sensitive and 93% specific (for fibroadenomas). In the present study, ultrasound was very useful to differentiate between breast cysts and solid lesions because it is 100% sensitive and 100% specific in detecting breast cysts. It was also 100% sensitive in detecting fibroadenoma when fibroadenosis was present. With respect to fibroadenoma with fibroadenosis, clinical examination shows a sensitivity of 64.71%, whereas FNAC was only 29.41% sensitive. All three modalities were 100% specific in detecting fibroadenoma that coexisted with fibroadenosis. The USG diagnosed all cases of fibroadenoma with fibroadenosis.

There are a wide range of variations in the results of USG, FNAC and clinical examination in different studies. These wide variations amongst different studies could be due to different methods of case selection, different resolution powers of ultrasound equipment used and the fact that ultrasound is an operator-dependent technique and FNAC also depends on the technique used by the aspirator. In a study by Reinikainen et al[16] (1999), to evaluate the role of USG and FNAC in the diagnosis of palpable solid breast lesions, the sensitivity and specificity of FNAC were reported as 92 and 83%, respectively. In our study, these values of FNAC were 100% and 65.79%, respectively, with respect to fibroadenomas.

In our study, USG had the highest accuracy, followed by clinical examination and then FNAC. In a study done by RounakKalwani et al[15](2016) it was found that the overall diagnostic accuracy of USG was higher than

FNAC (96.36% vs. 94.73%). These results could be due to the advancement of techniques like the use of Doppler in USG and the good experience of the radiologist.

All three methods of the triple assessment are complementary to each other. Although the results of the triple assessment were discordant in the cases of fibroadenoma on a background of fibroadenosis in the current study, they were found to be concordant in the cases of other benign breast diseases. The accuracy of diagnosing benign breast diseases increases when all three methods are employed together.

V. Conclusion

Benign breast diseases mostly occur during the 2nd and 3rd decades of a woman's life, though no age is immune to their occurrence. Fibroadenoma occurs at a slightly earlier age group than fibroadenosis, which occurs at the peak of repeated cyclical changes in reproductive life. The most common presentation of a benign breast disorder is a painful or non-painful lump in the breast, followed by mastalgia without a lump. Pain in the breast is usually noncyclical. Unilateral breast complaints are more common than bilateral complaints. Most of the breast lumps involved the upper and outer quadrants of the left side with most being non-tender. The role of family history and use of OCP in the causation of benign breast disease is not significant in our series of studies. Most of the lumps were less than 3 cm in size. We found 5 giant fibroadenoma cases. The majority of patients were married homemakers with basic educational qualifications. Most of them belong to low socioeconomic groups. Ultrasound is useful to differentiate solid from cystic lesions, to differentiate malignant from benign lesions and to locate deep-seated abscesses. It was also helpful in detecting mild fibroadenosis cases that did not come to be positive in FNAC. The majority of benign breast diseases (56.67%) were treated conservatively, with only a few requiring intervention, such as excision, aspiration, and abscess drainage. All excised breast lumps were sent for HPE.Though USG was found to be most accurate in diagnosing BBDs, it was also seen that all three modalities of the triple assessment are complementary to each other. Most of the diagnoses were confirmed when the results of all three modalities were combined.

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