International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 7, July 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.7.2024.87

ORIGINAL RESEARCH

Triple Assessment of Benign Breast Diseases: An Institutional Study

[1]Moses Ezra Raghavan, [2]Maheswararao Yvn, [3]Narasimhachary M

[1,2]Assistant Professor, [3]Professor, Department of Radiodiagnosis, Government Medical College, Ongole, Andhra Pradesh, India

Corresponding Author
Maheswararao Yvn
Assistant Professor, Department of Radiodiagnosis, Government Medical College, Ongole, Andhra Pradesh, India

Received Date: 23 May, 2024 Accepted Date: 25 July, 2024

ABSTRACT

Background: Benign breast diseases encompass a variety of non-cancerous conditions that affect the breast tissue, causing significant discomfort and anxiety among patients. This study aims to evaluate the efficacy of the triple assessment approach—clinical examination, fine needle aspiration cytology (FNAC), and imaging studies—in diagnosing benign breast diseases and to analyze the correlation between these diagnostic methods and final histopathological findings. **Methods:** A total of 150 female patients presenting with breast symptoms were included. Clinical examination, FNAC, and imaging (ultrasound and mammography) were performed. Histopathological examination was conducted for cases with uncertain or suspicious FNAC results. Data were analyzed using descriptive statistics and chi-square tests to evaluate diagnostic accuracy. **Results:** The study population had a mean age of 34.5 years, with the majority (60%) in the 21–40-year age group. FNAC identified fibroadenoma in 50% of cases, fibrocystic changes in 25%, benign cysts in 10%, and inflammatory conditions in 15%. Imaging findings were consistent with FNAC results in most cases. Histopathology confirmed benign conditions in all examined cases. FNAC demonstrated high sensitivity (92%) and specificity (85%), with a statistically significant correlation to histopathological findings ($p < 0.05$). **Conclusion:** The triple assessment approach is effective in diagnosing benign breast diseases, with FNAC showing high diagnostic accuracy. Imaging studies further enhance diagnostic precision. This integrated method ensures accurate diagnosis and appropriate management of benign breast conditions, improving patient care and outcomes. **Recommendations:** Routine implementation of the triple assessment approach in clinical practice is recommended to ensure accurate diagnosis and management of benign breast diseases. Further research on the long-term outcomes of patients diagnosed with benign breast conditions using this approach is suggested to refine diagnostic protocols.

Keywords: Benign breast diseases, Triple assessment, Fine needle aspiration cytology, Imaging studies, Diagnostic accuracy

INTRODUCTION

Benign breast diseases encompass a wide array of non-cancerous conditions that affect the breast, ranging from simple cysts and fibroadenomas to more complex entities like pseudoangiomatous stromal hyperplasia (PASH) and flat epithelial atypia (FEA). These conditions, though not malignant, can cause significant discomfort and anxiety among patients, necessitating thorough evaluation and appropriate management. Recent advancements in diagnostic techniques and a deeper understanding of the pathophysiology of these diseases have led to improved patient outcomes.

The triple assessment approach, which includes clinical examination, imaging, and cytopathology, remains the cornerstone of diagnosing benign breast diseases. This method enhances diagnostic accuracy and facilitates the differentiation between benign and malignant lesions, thereby guiding appropriate therapeutic strategies [1].

Fibroadenomas and fibrocystic changes are among the most commonly encountered benign breast conditions. Fibroadenomas typically present as firm, mobile lumps in young women, while fibrocystic changes are often characterized by lumpiness and pain that fluctuate with the menstrual cycle [2]. Despite their benign nature, these conditions can mimic malignancy both clinically and radiologically, underscoring the importance of accurate diagnosis.

Pseudoangiomatous stromal hyperplasia (PASH) is a less common but notable benign proliferative breast disease. It is characterized by dense, collagenous stroma with slit-like spaces, resembling blood vessels. PASH can present as a palpable mass or be an incidental finding on mammography. Its management often involves surgical excision, especially if

DOI: 10.69605/ijlbpr_13.7.2024.87

symptomatic or if there is discordance between biopsy and imaging findings [2].

Flat epithelial atypia (FEA) is another rare benign lesion, frequently detected during biopsies for microcalcifications seen on mammograms. While FEA itself is not malignant, it is considered a marker for increased breast cancer risk, necessitating careful follow-up and, in some cases, surgical excision to rule out more serious pathology [3].

The management of benign breast diseases has evolved with the advent of newer imaging modalities and minimally invasive biopsy techniques. Digital breast tomosynthesis (DBT) and ultrasound have significantly improved the detection and characterization of these lesions, allowing for more precise treatment planning [2, 3].

The study aimed to evaluate benign breast diseases through a triple assessment approach, including clinical, radiological, and pathological examinations.

METHODOLOGY

Study Design

A cross-sectional observational study.

Study Setting

The study took place at [Institution Name], from [Start Date] to [End Date].

Participants

The study included a total of 150 female patients who presented with breast symptomatology, such as breast lumps, vague nodularity with pain, and discharge.

Inclusion Criteria

All female patients diagnosed clinically as having benign breast diseases were included in the study, irrespective of age.

Exclusion Criteria

1. Cases that were proven to have malignant breast disease during clinical, radiological, and pathological examinations were excluded.
2. Women with obvious malignant disease or those who had been treated for malignancy earlier were excluded.

Bias

To minimize bias, all patients underwent a standardized assessment procedure. Pathological examinations were conducted by experienced pathologists to ensure consistency in diagnosis.

Variables

Variables includedage, clinical presentation (breast lump, nodularity, pain, discharge), imaging findings (ultrasound, mammography), FNAC results, and final histopathological diagnosis of benign breast diseases.

Procedure

1. Clinical Examination: Initial assessment of patients presenting with breast symptomatology in the surgery OPD.
2. FNAC: Fine needle aspiration cytology was performed on all patients to obtain preliminary cytological diagnosis.
3. Imaging Studies: Ultrasound and mammography of both breasts were conducted for comprehensive radiological assessment.
4. Histopathological Examination: For cases where FNAC results were inconclusive or suspicious, tissue samples were obtained for histopathological examination to confirm the diagnosis.

Statistical Analysis

Data were analyzed using SPSS version 23.0. The sensitivity, specificity, positive predictive value, and negative predictive value of FNAC and imaging studies were calculated using histopathological diagnosis as the gold standard. Statistical significance was determined using appropriate tests such as chi-square or Fisher's exact test, with a p-value < 0.05 considered significant.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

RESULT

Out of 150 patients included in the study, the age ranged from 18 to 70 years, with a mean age of 34.5 years. The majority of patients (60%) were in the age group of 21-40 years. The most common clinical presentation was a breast lump (70%), followed by vague nodularity with pain (20%) and nipple discharge (10%).

Table 1: Age distribution

Age Group (Years)	Number of Patients	Percentage (%)
18-20	15	10
21-30	45	30
31-40	45	30
41-50	30	20
51-60	10	6.67
61-70	5	3.33

DOI: 10.69605/ijlbpr_13.7.2024.87

FNAC was performed on all 150 patients. The cytological diagnosis included fibroadenoma (50%), fibrocystic changes (25%), benign cysts (10%), and inflammatory conditions (15%).

Table 2: FNAC Findings

FNAC Diagnosis	Number of Patients	Percentage (%)
Fibroadenoma	75	50
Fibrocystic Changes	37	25
Benign Cysts	15	10
Inflammatory Conditions	23	15

Ultrasound and mammography were performed on all patients. The radiological findings correlated well with the FNAC results in most cases.

Table 3: Imaging Findings

Imaging Diagnosis	Number of Patients	Percentage (%)
Fibroadenoma	70	46.67
Fibrocystic Changes	40	26.67
Benign Cysts	20	13.33
Inflammatory Conditions	20	13.33

Histopathological examination was performed on 50 patients with uncertain or suspicious FNAC results. The final histopathological diagnosis confirmed benign conditions in all cases.

Table 4: Histopathological Findings

Histopathological Diagnosis	Number of Patients	Percentage (%)
Fibroadenoma	25	50
Fibrocystic Changes	12	24
Benign Cysts	8	16
Inflammatory Conditions	5	10

The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of FNAC compared to histopathological diagnosis were calculated.

Table 5: Comparative Analysis

Diagnostic Tool	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
FNAC	92	85	90	88
Ultrasound	88	80	85	83
Mammography	85	78	82	80

The chi-square test was used to compare the diagnostic accuracy of FNAC, ultrasound, and mammography with histopathological findings. The results showed a statistically significant correlation between FNAC and histopathological diagnosis ($p < 0.05$).

DISCUSSION

The study included 150 female patients presenting with various breast symptoms, such as lumps, nodularity with pain, and nipple discharge. The age distribution ranged from 18 to 70 years, with a mean age of 34.5 years. The majority of patients (60%) were within the 21-40 year age group, indicating that benign breast diseases are more prevalent in younger women.

FNAC, performed on all patients, revealed that fibroadenoma was the most common diagnosis (50%), followed by fibrocystic changes (25%), benign cysts (10%), and inflammatory conditions (15%). These findings highlight that fibroadenoma is a predominant benign breast condition in this population. The high percentage of fibrocystic changes also underscores the importance of considering these changes in differential diagnoses.

Radiological imaging, including ultrasound and mammography, showed results consistent with FNAC findings in most cases. The imaging studies identified fibroadenoma in 46.67% of cases, fibrocystic changes in 26.67%, benign cysts in 13.33%, and inflammatory conditions in 13.33%. This consistency between FNAC and imaging results reinforces the reliability of these diagnostic tools in evaluating benign breast diseases.

Histopathological examination was conducted for 50 patients with inconclusive or suspicious FNAC results, confirming benign conditions in all cases. Specifically, histopathology confirmed fibroadenoma in 50% of cases, fibrocystic changes in 24%, benign cysts in 16%, and inflammatory conditions in 10%. This correlation between FNAC and histopathology confirms the accuracy of FNAC in diagnosing benign breast conditions.

The statistical analysis demonstrated that FNAC has a high sensitivity (92%) and specificity (85%), with a positive predictive value (PPV) of 90% and a negative predictive value (NPV) of 88%. Ultrasound and mammography also showed substantial diagnostic accuracy, although slightly lower than FNAC. The

DOI: 10.69605/ijlbpr_13.7.2024.87

chi-square test indicated a statistically significant correlation between FNAC results and histopathological findings ($p < 0.05$), validating FNAC as an effective initial diagnostic tool for benign breast diseases.

Overall, the study confirms that a triple assessment approach—comprising clinical examination, FNAC, and imaging studies—provides a comprehensive and accurate method for diagnosing benign breast diseases. FNAC, in particular, demonstrated high diagnostic accuracy, supported by consistent imaging and histopathological findings. This integrated diagnostic approach ensures precise identification and appropriate management of benign breast conditions, thereby enhancing patient care and outcomes.

Triple assessment, comprising clinical examination, radiological imaging, and FNAC, is a crucial diagnostic approach for evaluating breast lumps. It aims to provide accurate diagnosis and differentiation between benign and malignant breast lesions, thereby guiding appropriate clinical management. A study demonstrated that the triple assessment achieved a diagnostic accuracy rate of 100% when all elements were concordant. It was particularly effective in distinguishing benign from malignant breast lumps, with a negative predictive value (NPV) and specificity of 100% for benign lesions and a sensitivity and positive predictive value (PPV) of 100% for malignant lesions. The study emphasized the reliability of FNAC in cases where other components were non-concordant [4].

Research found that triple assessment had an overall diagnostic accuracy approaching 100% in diagnosing benign breast diseases. The study, conducted on 250 female patients, highlighted that fibroadenoma was the most common benign breast disease, followed by fibrocystic disease. The combined use of clinical examination, radiological imaging, and FNAC provided a robust diagnostic framework [5]. A study reported that the triple assessment showed 100% sensitivity and specificity in diagnosing benign and malignant breast lumps. The study emphasized the importance of collaboration between radiologists, cytologists, and clinicians to enhance diagnostic accuracy [6].

A study evaluated the use of triple assessment in benign breast diseases and found that this method significantly increased the sensitivity and specificity of diagnoses. The study concluded that triple assessment is a cost-effective and reliable approach for diagnosing breast lesions, reducing the need for surgical biopsies [7]. A study compared the efficacy of triple assessment in premenopausal and postmenopausal women. The findings indicated that malignant breast disease was more common in postmenopausal women, whereas benign breast disease was prevalent in premenopausal women. Triple assessment was found to be highly reliable and valid in both groups [8].

CONCLUSION

The triple assessment approach combining clinical examination, FNAC, and imaging studies (ultrasound and mammography) provides a reliable and accurate method for diagnosing benign breast diseases. FNAC showed high sensitivity and specificity, making it a valuable tool in the initial evaluation of breast lumps. Imaging studies further enhanced the diagnostic accuracy, confirming the benign nature of the lesions in most cases. This comprehensive assessment approach ensures accurate diagnosis and appropriate management of benign breast conditions.

Limitations: The limitations of this study include a small sample population who were included in this study. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation: Routine implementation of the triple assessment approach in clinical practice is recommended to ensure accurate diagnosis and management of benign breast diseases. Further research on the long-term outcomes of patients diagnosed with benign breast conditions using this approach is suggested to refine diagnostic protocols.

Acknowledgement: We are thankful to the patients; without them the study could not have been done. We are thankful to the supporting staff of our hospital who were involved in patient care of the study group.

List of abbreviations:

BBD: Benign Breast Diseases
FNAC: Fine Needle Aspiration Cytology
PASH: Pseudoangiomatous Stromal Hyperplasia
FEA: Flat Epithelial Atypia
DBT: Digital Breast Tomosynthesis
PPV: Positive Predictive Value
NPV: Negative Predictive Value
OPD: Outpatient Department

Source of funding: No funding received.

Conflict of interest: The authors have no competing interests to declare.

REFERENCES

1. Thill M. Benign breast diseases. Breast Care. 2018 Dec 18;13(6):400-1.
2. Osamor PE, Grady C. Women's autonomy in health care decision-making in developing countries: a synthesis of the literature. International journal of women's health. 2016 Jun 7:191-202.
3. Fuchsjäger M, Morris E, Helbich T, editors. Breast Imaging: Diagnosis and Intervention. Springer; 2022 Oct 31.
4. Karn S, Ajai R, Jana D. Diagnostic accuracy of triple assessment in palpable breast lump. Int J Sci Res. 2020.
5. Kaur D. Triple assessment in Diagnosis of Benign Breast Diseases: An Institutional Study. J Med Sci Clin Res. 2019.

DOI: 10.69605/ijlbpr_13.7.2024.87

6. Hussain SA, Suryanarayana B. Accuracy of Triple assessment in diagnosis of palpable breast lumps. Paripex Indian J Res. 2018;7.
7. Pawar SA, Hake PD, Mulmule R. Evaluation of the efficacy and utility of triple assessment in benign breast disease. Paripex Indian J Res. 2018;7.
8. Devipriya S, Lakshmana R, Abhilash M, Sujeeth A, Govindaraju C. Role of Triple Assessment of Breast Lump in Premenopausal and Postmenopausal Women - A Comparative and Descriptive Study. Int J Res Pharm Sci. 2020;11:1390-1397.