

Histomorphological Spectrum of Benign Breast Lumps in a Tertiary Care Center

Mosammat Mira Pervin¹, Mohd Mejbahul Bahar²

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Correspondence to
Mohd Mejbahul Bahar

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ABSTRACT

Background: Benign breast diseases comprise diverse pathological conditions that present as palpable breast lumps and account for many breast-related clinical consultations. These non-malignant lesions often mimic breast cancer clinically and radiologically, creating anxiety for patients and diagnostic challenges for clinicians. Histopathological evaluation is critical in identifying these lesions' nature and guiding appropriate management. This study aimed to evaluate the histomorphological spectrum of benign breast lumps in patients at a tertiary care center. **Methods & Materials:** This cross-sectional observational study was conducted in the Department of Surgery at Bangladesh Medical University, Dhaka, Bangladesh, from January to December 2025. A total of 175 patients with clinically suspected benign breast lumps who underwent surgical excision or biopsy were included. Histopathological examination was performed using standard hematoxylin and eosin staining techniques. Data were analyzed using SPSS version 25.0. **Results:** The majority of patients were younger than 40 years (70.9%), with a mean age of 35.1 ± 11.0 years. Inflammatory and infectious lesions were the most common category, accounting for 59.4% of cases, with chronic breast abscess being the most frequent diagnosis. Fibrocystic changes constituted 21.1% of lesions, while benign neoplasms accounted for 16.0%. Fibroadenoma was the most common benign tumor, representing 12.6% of cases. A small proportion of cases consisted of other rare benign lesions including epidermal inclusion cyst and granulomatous inflammation. **Conclusion:** Benign breast lesions show a wide histomorphological spectrum, with inflammatory conditions being the most prevalent. Histopathological examination remains essential for accurate diagnosis and appropriate clinical management of breast lumps.

Keywords: Benign breast disease, breast lump, fibroadenoma, fibrocystic change, histopathology

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1. Associate Professor, Department of Surgical Oncology, Bangladesh Medical University (BMU), Dhaka, Bangladesh (ORCID: 0009-0002-9869-6570)
2. Assistant Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh (ORCID: 0009-0000-1638-2507)

INTRODUCTION

Breast diseases represent a significant component of surgical and pathological practice worldwide, encompassing a wide spectrum of conditions ranging from inflammatory disorders to benign and malignant neoplasms. Among these, benign breast diseases constitute the majority of breast-related clinical presentations and are frequently encountered in women of reproductive age [1,2]. Although benign in nature, these lesions often cause considerable anxiety among patients because of their clinical similarity to breast cancer, making accurate diagnosis and histopathological evaluation essential. Globally, breast cancer remains the most frequently diagnosed cancer among women, accounting for a substantial burden of morbidity and mortality [3]. However, benign breast lesions occur far more frequently than malignant conditions and represent a major proportion of breast clinic visits and surgical specimens [4]. These lesions include a diverse group of pathological entities such as inflammatory conditions, fibrocystic changes and benign tumors, each characterized by distinct morphological and clinical features [5]. Benign breast diseases encompass a heterogeneous group of lesions with varying etiologies and pathological

characteristics. Common non-neoplastic conditions include inflammatory disorders such as mastitis, breast abscess and fat necrosis, which often arise due to infection, trauma, or hormonal influences [6]. Fibrocystic changes represent another major category and are considered one of the most prevalent benign breast conditions, particularly among women in the reproductive age group [7]. These lesions are often associated with hormonal fluctuations and may present with cyst formation, fibrosis and epithelial proliferation. Benign breast tumors also contribute significantly to the overall spectrum of breast pathology. Fibroadenoma is the most common benign breast tumor, typically occurring in young women and adolescents [8]. It is characterized by a proliferation of both stromal and epithelial components and usually presents as a well-circumscribed, mobile breast lump. Other benign neoplasms include tubular adenoma, intraductal papilloma and other rare epithelial lesions [9]. Although benign, some of these conditions may share clinical and radiological features with malignant tumors, necessitating histopathological confirmation for definitive diagnosis. Histopathological examination remains the gold standard for diagnosing breast lesions and determining their precise

morphological classification. Detailed histological assessment allows for accurate differentiation between inflammatory, proliferative and neoplastic conditions, thereby guiding appropriate management strategies [10]. Furthermore, certain benign breast lesions may be associated with an increased risk of subsequent breast cancer, highlighting the importance of accurate pathological characterization and long-term follow-up [11].

The distribution and pattern of benign breast diseases vary across different populations and geographic regions. Studies conducted in developing countries have demonstrated that inflammatory breast lesions and fibrocystic changes are among the most frequently encountered benign conditions in surgical practice [12,13]. Several clinicopathological studies from South Asia have also reported a high prevalence of benign breast lesions among younger women, particularly those under 40 years of age [14]. However, variations in environmental factors, reproductive patterns, lifestyle and healthcare accessibility may influence the epidemiological profile of these diseases.

Despite the high frequency of benign breast lesions, comprehensive histomorphological studies from Bangladesh remain limited. Understanding the local spectrum of benign breast pathology is important for improving diagnostic accuracy, guiding clinical management and reducing unnecessary patient anxiety. Therefore, this study was conducted to evaluate the histomorphological spectrum of benign breast lumps in patients attending a tertiary care center in Bangladesh.

OBJECTIVES

The objective of this study was to evaluate functional outcomes and early postoperative complications following primary total hip arthroplasty in adult patients.

METHODS & MATERIALS

This cross-sectional observational study was conducted in the Department of Surgery at Bangladesh Medical University (BMU), Dhaka, Bangladesh. The study was carried out over one year from January to December 2025. The study population consisted of patients presenting with clinically suspected benign breast lumps who subsequently underwent surgical excision or biopsy and histopathological examination. A total of 175 patients with histopathologically confirmed benign breast lesions were included in the final analysis.

Sample Selection

Inclusion criteria

- Patients presenting with clinically detectable breast lumps suspected to be benign
- Patients who underwent surgical excision or biopsy with histopathological confirmation

Exclusion criteria

- Patients with histopathologically confirmed malignant breast lesions
- Patients with recurrent breast malignancy

- Patients with incomplete clinical or histopathological data

Data Collection Procedure

Data were collected prospectively from patients presenting with breast lumps to the Department of Surgery at Bangladesh Medical University during the study period. Patients initially underwent detailed clinical evaluation including history taking and physical examination. Information regarding demographic characteristics, presenting symptoms, duration of breast lump and clinical findings was recorded using a structured data collection form.

All patients underwent standard diagnostic evaluation, including radiological assessment where indicated, such as ultrasonography or mammography depending on age and clinical suspicion. Surgical excision or core biopsy specimens were obtained from patients with breast lumps requiring histopathological confirmation. The excised specimens were preserved in 10% formalin and transported to the pathology laboratory for detailed examination.

Histopathological analysis was performed using standard tissue processing techniques. Tissue samples were embedded in paraffin, sectioned and stained with hematoxylin and eosin for microscopic evaluation. Each specimen was examined by experienced pathologists to determine the precise histomorphological diagnosis according to established pathological classification criteria.

All relevant clinical and pathological findings were documented systematically. Particular attention was given to the classification of lesions into inflammatory or infectious lesions, fibrocystic changes, benign neoplasms and other miscellaneous lesions. Data accuracy was ensured through cross-verification between surgical records, pathology reports and laboratory documentation.

Participation in the study was voluntary. Informed consent was obtained from all participants before inclusion. Confidentiality and anonymity of patient information were strictly maintained throughout the study.

Statistical Analysis

Collected data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were used to summarize demographic characteristics and histopathological findings. Frequencies, percentages, means and standard deviations were calculated where appropriate. Results were presented using tables and figures to illustrate the distribution of age groups, laterality and histomorphological patterns of benign breast lesions.

RESULT

Table 1 presents the age distribution of the study population. The majority of patients were younger than 40 years, representing 70.9% (n=124) of cases. Patients aged 40–49 years accounted for 18.3% (n=32), while those aged 50 years or older comprised 10.9% (n=19). The mean age of the study population was 35.1 ± 11.0 years.

Table – I: Age Distribution of Patients with Benign Breast Lesions (n=175)

Age (Years)	Frequency (n)	Percentage (%)
<40	124	70.9
40–49	32	18.3
≥50	19	10.9
Mean ± SD	35.1 ± 11.0	

Figure 1 illustrates the distribution of benign breast lesions according to breast laterality among the study population. The

figure depicts the relative frequency of lesions involving the right breast, left breast, or bilateral involvement.

Figure - 1: Distribution of cases based on laterality

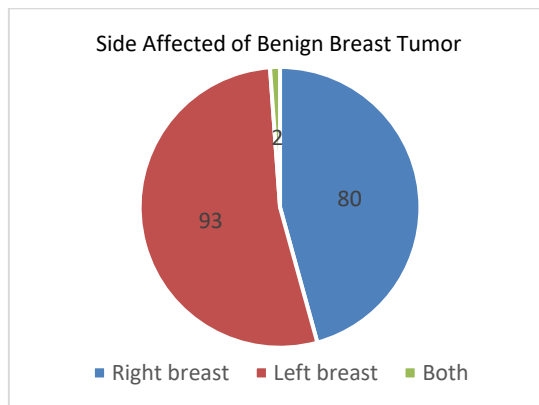


Table II presents the histomorphological spectrum of benign breast lesions. Inflammatory and infectious lesions were the most common category, accounting for 59.4% (n=104) of cases. Among these, chronic breast abscess was the most frequent lesion, representing 28.6% (n=50), followed by granulomatous mastitis with abscess (16.0%, n=28). Other inflammatory lesions included periductal mastitis (4.6%), unspecified abscess (2.3%), fat necrosis (1.7%) and other inflammatory conditions such as duct ectasia and chronic nonspecific mastitis (6.3%). Fibrocystic changes constituted the second most common category, accounting for 21.1% (n=37) of cases. Among these, fibrocystic disease or fibrocystic changes with or without lactational changes represented 18.3% (n=32), while

fibrocystic disease associated with periductal mastitis accounted for 2.9% (n=5). Benign neoplasms represented 16.0% (n=28) of the cases. Fibroadenoma was the predominant benign tumor, accounting for 12.6% (n=22), whereas other benign neoplasms such as tubular adenoma and intraductal papilloma constituted 3.4% (n=6). A small proportion of cases (3.4%, n=6) belonged to miscellaneous lesions, including gynecomastia (0.6%), epidermal inclusion cyst (1.1%), seborrheic keratosis (0.6%), lobular hyperplasia with fibrocystic change and papilloma with atypia (0.6%) and granulomatous inflammation consistent with tuberculosis (0.6%).

Table - II: Histomorphological Spectrum of Benign Breast Lumps (n=175)

Diagnostic Category	Frequency (n)	Percentage (%)
Inflammatory/Infectious Lesions		
Chronic breast abscess (all variants)	50	28.6
Granulomatous mastitis with abscess/breast abscess (all variants)	28	16.0
Periductal mastitis/mastitis (with or without abscess/FCD)	8	4.6
Abscess (unspecified/suppurative)	4	2.3
Fat necrosis	3	1.7
Others (duct ectasia, Chronic nonspecific mastitis etc)	11	6.3
Subtotal	104	59.4
Fibrocystic Changes		
Fibrocystic disease/changes (with or without lactational change)	32	18.3
Fibrocystic disease with periductal mastitis	5	2.9
Subtotal	37	21.1
Benign Neoplasms		
Fibroadenoma (with or without FCD/lactational change)	22	12.6
Others (tubular adenoma, intraductal papilloma etc)	6	3.4
Subtotal	28	16.0
Others		
Gynecomastia	1	0.6
Epidermal inclusion cyst	2	1.1
Seborrheic keratosis	1	0.6
Lobular hyperplasia with FCD, papilloma, atypia	1	0.6
Granulomatous inflammation (TB-consistent)	1	0.6
Subtotal	6	3.4

DISCUSSION

Benign breast diseases constitute a diverse group of pathological conditions that frequently present as palpable breast lumps and account for a substantial proportion of breast-related clinical consultations. Understanding their histomorphological spectrum is essential for accurate diagnosis, appropriate management and differentiation from malignant breast lesions. The present study evaluated the

histomorphological patterns of benign breast lumps in a tertiary care setting and demonstrated that inflammatory lesions constituted the most common diagnostic category, followed by fibrocystic changes and benign neoplasms. The age distribution in the present study revealed that the majority of patients were younger than 40 years, with a mean age of 35.1 years. This finding is consistent with the epidemiological pattern of benign breast diseases reported in

several studies, where younger women constitute the predominant affected group. Guray and Sahin reported that benign breast lesions are particularly common in women of reproductive age due to hormonal influences on breast tissue [5]. Similarly, Stachs et al. observed that benign breast diseases frequently occur in younger women and represent the most common cause of breast complaints in this population [4]. Comparable observations were also reported by Poojasree et al., who found that most benign breast lesions occur before the age of 40 years [14]. These findings support the observation that hormonal activity and reproductive factors may significantly influence the development of benign breast lesions.

In the present study, inflammatory and infectious lesions constituted the largest proportion of benign breast conditions, accounting for 59.4% of cases. Among these, chronic breast abscess was the most frequently encountered lesion, followed by granulomatous mastitis with abscess. Inflammatory breast conditions often arise due to infection, ductal obstruction, trauma, or lactational factors. Scott described that inflammatory disorders such as mastitis and breast abscess are common benign conditions and may clinically mimic malignant lesions, thereby requiring histopathological confirmation [6]. Similar findings were reported by Hatim et al., who observed that inflammatory breast lesions formed a significant proportion of benign breast pathology in their study population [12]. These observations highlight the importance of careful histological evaluation in distinguishing inflammatory lesions from other breast pathologies.

Fibrocystic changes represented the second most common category in the present study, accounting for 21.1% of cases. Fibrocystic disease is widely recognized as one of the most prevalent benign breast conditions and is particularly common among women in the reproductive age group. Dev et al. noted that fibrocystic changes are characterized by a spectrum of morphological alterations including cyst formation, stromal fibrosis and epithelial proliferation [7]. These changes are often associated with hormonal fluctuations and may present clinically as nodular or painful breast lumps. Several clinicopathological studies have also reported fibrocystic disease as a major component of benign breast pathology. For instance, Koppalkar et al. observed that fibrocystic changes represent a significant proportion of non-neoplastic breast lesions in tertiary care settings [13].

Benign breast tumors accounted for 16.0% of cases in the present study. Among these, fibroadenoma was the most common neoplasm, comprising 12.6% of cases. Fibroadenoma is widely recognized as the most common benign breast tumor, particularly in adolescents and young women. Ramala et al. reported that fibroadenoma typically presents as a well-defined, mobile breast mass composed of proliferating epithelial and stromal elements [8]. Similarly, Ajmal and Khan described fibroadenoma as a hormonally responsive tumor that frequently occurs during the reproductive years [15]. The predominance of fibroadenoma in the present study aligns with findings from multiple histopathological studies conducted in different populations. Boral and Jagtap also reported fibroadenoma as the most common benign neoplasm in their clinicopathological evaluation of breast lesions [16].

A small proportion of cases in the present study included other rare benign lesions such as epidermal inclusion cyst, gynecomastia, seborrheic keratosis and granulomatous inflammation consistent with tuberculosis. Although uncommon, these lesions contribute to the overall diversity of benign breast pathology. According to Rosen, the breast can be affected by a wide range of rare benign conditions that may

occasionally mimic neoplastic processes clinically or radiologically [10]. Recognition of these unusual lesions is important to avoid diagnostic confusion and unnecessary aggressive treatment.

The findings of this study emphasize the broad histomorphological spectrum of benign breast diseases and highlight the importance of histopathological examination in establishing an accurate diagnosis. Histological evaluation remains the gold standard for differentiating benign conditions from malignant lesions and for identifying specific pathological entities that may require distinct clinical management. Kumar et al. emphasized that detailed microscopic examination provides critical information regarding the nature and biological behavior of breast lesions [2]. Furthermore, certain benign lesions have been associated with an increased risk of future breast cancer development, making accurate classification particularly important for patient counseling and surveillance strategies. Hartmann et al. demonstrated that some proliferative benign breast lesions may be associated with an elevated risk of subsequent breast carcinoma [11].

Overall, the present study contributes valuable data regarding the pattern of benign breast lesions in a tertiary care setting. The predominance of inflammatory lesions, followed by fibrocystic changes and fibroadenoma, reflects the diverse pathological spectrum encountered in routine surgical practice. These findings are broadly consistent with previous clinicopathological studies conducted in different geographical regions and underscore the continued importance of histopathological assessment in the evaluation of breast lumps.

CONCLUSION

This study demonstrates that benign breast lesions predominantly affect younger women and exhibit a wide histomorphological spectrum. Inflammatory breast lesions were the most common findings, followed by fibrocystic changes and fibroadenoma. Histopathological examination remains essential for accurate diagnosis and classification of breast lumps, enabling appropriate clinical management and differentiation from malignant breast diseases.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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