

Features of Diagnostics of Benign Breast Tumors in Women with Gynecological Pathologies

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Abstract This study investigates the diagnostic and prognostic features of benign breast tumors in women with concurrent gynecological pathologies. A total of 115 women with BI-RADS-2 classification were selected and divided into three clinical groups. The first group included patients with fibroadenomas, intraductal papillomas, and lipomas. The second group comprised women with nodular proliferative mastopathy, a condition associated with high malignancy risk and considered a precancerous process. The findings indicate a strong correlation between benign breast lesions and gynecological disorders such as uterine fibroids, adenomyosis, endometrial hyperplasia, and inflammatory pelvic diseases. Moreover, aspects of menstrual function, sexual health, and reproductive history were found to significantly affect breast pathology development. A prognostic matrix based on Bayes' probabilistic method was developed to assess the risk of breast neoplasms. This tool enables the identification of individual risk profiles and supports early diagnosis and targeted monitoring in women with gynecological disorders.

Keywords Benign breast tumors, Fibroadenoma, Nodular mastopathy, Gynecological pathology, Uterine fibroids, Endometrial hyperplasia, Hormonal imbalance, Breast cancer risk, Prognostic matrix, Bayes method

1. Introduction

Over the past decade, numerous studies have emphasized the significant association between benign breast tumors and gynecological pathologies, particularly those influenced by hormonal imbalances. Benign breast lesions such as fibroadenomas, intraductal papillomas, and lipomas frequently coexist with conditions like uterine fibroids, endometrial hyperplasia, and adenomyosis, which share similar hormonal etiologies [1,5,10,14,15].

Recent advances in imaging techniques, including high-resolution ultrasound and mammography, combined with BI-RADS classification, have improved early diagnosis of benign breast tumors in women with gynecological disorders [2,9,16]. Particularly, proliferative benign breast diseases with atypia have been identified as premalignant lesions that increase breast cancer risk [4,6,17].

Multiple epidemiological studies report a strong link

between hormonal dysregulation in gynecological pathologies and breast tissue changes, highlighting the need for integrated diagnostic approaches [7,12,18]. Additionally, patient histories including menstrual irregularities, sexual dysfunction, and gynecological surgeries are important factors influencing breast disease progression [3,8,19].

Recently, machine learning and Bayesian risk assessment models have been applied to predict breast lesion development based on gynecological and hormonal data, enabling personalized screening and prevention strategies [11,13,20]. These multidisciplinary approaches are critical for improving prognosis and management in patients with benign breast tumors and concurrent gynecological disorders.

Research Objective

The objective of this study is to optimize the early diagnosis of benign breast pathologies in women with concomitant gynecological diseases by identifying clinical, hormonal, and gynecological risk factors. Additionally, the study aims to develop a prognostic risk matrix to quantitatively assess the likelihood of breast pathology progression, thereby improving preventive strategies and personalized patient management.

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2. Materials and Methods

This study included 115 women diagnosed with benign breast tumors and gynecological pathologies, all classified under the BI-RADS-2 category. These women were divided into three clinical groups based on their diagnosis.

- **Group 1** consisted of 58 women with benign breast tumors resulting from abnormal cell growth characterized by slow progression without invasion or metastasis. The group included 25 (43.1%) patients with fibroadenoma, 18 (31.0%) with intraductal papilloma, and 15 (25.9%) with lipoma.
- **Group 2** included 57 women diagnosed with proliferative nodular mastopathy (PNM), a benign condition with a high risk of malignancy. This form of mastopathy is considered precancerous and is characterized by increased proliferative activity within the breast tissue, often related to elevated estrogen levels.

Clinical data including menstrual function, sexual activity, gynecological history, and hormonal status were collected. The prevalence of gynecological diseases such as uterine fibroids, adenomyosis, endometrial hyperplasia, and ovarian cysts was evaluated.

Ultrasound examinations of the breast were performed to identify fibrous, cystic, and fibro-cystic changes. A prognostic risk matrix was developed using normalized intensity indicators (NII) based on Bayesian probability methods to assess the risk of breast pathology progression. Statistical analysis was conducted to evaluate correlations between breast and gynecological pathologies, hormonal factors, and sexual function parameters.

3. Results and Discussion

The study included 115 women divided into two main groups based on breast pathology. Group 1 consisted of 58 women with benign breast tumors, including fibroadenoma (43.1%), intraductal papilloma (31.0%), and lipoma (25.9%). Group 2 included 57 women diagnosed with proliferative nodular mastopathy (PNM), a condition with a higher risk of malignant transformation.

Menstrual function analysis showed that prolonged menstruation (7 or more days) was observed in 26 (45.6%) women in Group 2, which was statistically significant ($p < 0.001$). Late menarche and prolonged menstruation were more frequent among women with proliferative mastopathy (28.1%) ($p < 0.001$) (Table 1).

Sexual function assessment revealed significant differences between groups. In Group 1, 8.6% of women began sexual activity before age 16, while in Group 2, 78.9% started at age 18 or later. Orgasmic disorders were reported in 39.7% of Group 1 and 78.9% of Group 2 women ($p < 0.001$). Lack of libido was noted in 25.9% of Group 1 and 59.6% of Group 2 ($p < 0.001$). Dissatisfaction with sexual life was significantly higher in Group 2 (68.4%) compared to Group 1 (32.8%) ($p < 0.001$) (Table 2).

Gynecological diseases were highly prevalent in both groups. Uterine fibroids were diagnosed in 77.6% of Group 1 and 100% of Group 2 ($p < 0.001$). Endometrial hyperplasia was present in 17.2% of Group 1 and all patients in Group 2 ($p < 0.001$). Other conditions such as adenomyosis, ovarian cysts, and inflammatory pelvic diseases were also common (Table 3).

Ultrasound examinations revealed fibrous and cystic breast changes associated with uterine fibroids, endometriosis, and endometrial hyperplasia in Group 1, while proliferative mastopathy was confirmed in all Group 2 patients.

Table 1

Parameter	Group 1	Group 2	p-value	Interpretation
Prolonged menstruation (≥ 7 days)	–	45.6%	<0.001	Significantly more frequent in PNM group
Late menarche & prolonged menses	–	28.1%	<0.001	More frequent in PNM group

Table 2

Parameter	Group 1	Group 2	p-value	Notes
Sexual activity before 16 years	8.6%	–	–	Earlier debut in Group 1
Sexual activity started ≥ 18 years	–	78.9%	–	Delayed debut in PNM group
Orgasmic disorders	39.7%	78.9%	<0.001	Significantly higher in PNM group
Lack of libido	25.9%	59.6%	<0.001	Significantly higher in PNM group
Dissatisfaction with sexual life	32.8%	68.4%	<0.001	Significantly higher in PNM group

Table 3

Condition	Group 1	Group 2	p-value	Interpretation
Uterine fibroids	77.6%	100%	<0.001	Strong association in PNM
Endometrial hyperplasia	17.2%	100%	<0.001	Strong association in PNM
Adenomyosis, ovarian cysts, inflammatory diseases	Common in both	–	–	High prevalence overall

A prognostic matrix based on normalized intensity indicators was developed to evaluate the risk of breast tumor development. The matrix stratified patients into three risk groups: low risk (NII < 3), moderate risk (4–8), and high risk (> 9). The findings indicate a strong correlation between gynecological pathology and the risk of benign breast tumor progression.

4. Conclusions

The study demonstrates a significant association between benign breast tumors and gynecological pathologies such as uterine fibroids and endometrial hyperplasia. Women with proliferative nodular mastopathy showed higher risks of hormonal imbalance, menstrual irregularities, and sexual dysfunction. The developed prognostic matrix effectively stratifies patients by risk level, aiding early diagnosis and management. Identifying these risk factors is crucial for preventing malignant transformation and improving patient outcomes.

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