

Serum Prolactin as a Routine Biomarker in the Assessment of Mastalgia

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ABSTRACT

Introduction: Mastalgia is one of the most common breast-related complaints among females and is a frequent reason for seeking medical attention. Although hormonal factors, including prolactin, have been implicated in its pathogenesis, the clinical value of routine serum prolactin estimation remains uncertain. Therefore, this study was conducted to assess the role of serum prolactin as a routine biomarker in the assessment of mastalgia. **Methods & Materials:** This multi-setting, descriptive observational cross-sectional study was conducted from January 2025 to December 2025, in both hospital-based settings (including inpatient and outpatient departments) and selected private clinics/general practices to assess the prevalence of elevated serum prolactin among female patients presenting with mastalgia. The study included 123 participants. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. **Result:** A total of 123 females with mastalgia were included in the study, with a mean age of 33.8 ± 8.1 years. Cyclical mastalgia (64.2%), bilateral breast pain (50.4%), and moderate pain intensity (56.1%) were the most common clinical presentations (some were overlapped). The majority of patients (91.1%) had normal serum prolactin levels, while only 8.9% had elevated levels. No significant association was found between serum prolactin levels and the type or severity of mastalgia ($p > 0.05$). **Conclusion:** The findings of this study indicate that routine serum prolactin measurement is of limited clinical utility in the evaluation of mastalgia. The majority of patients with mastalgia had serum prolactin levels within the normal range, and no significant relationship was identified between prolactin levels and either the type or severity of breast pain. In addition, routine prolactin testing had minimal impact on clinical decision-making or patient management.

Keywords: Serum Prolactin, Biomarker, Mastalgia

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INTRODUCTION

Mastalgia, also known as breast pain or mastodynia, is one of the most frequent breast-related complaints encountered in surgical and breast clinics, affecting up to 70% of females at some point in their lifetime. Approximately 10–20% of affected females experience pain severe enough to interfere with daily activities and quality of life. Although mastalgia is rarely associated with breast malignancy, it remains a major source of anxiety among patients because of the widespread fear of breast cancer. Consequently, accurate clinical assessment is essential not only to exclude significant breast pathology but also to provide reassurance and appropriate management [1–4]. Mastalgia is broadly classified into cyclical, non-cyclical, and extramammary breast pain. Cyclical mastalgia, the most common form, is closely related to the menstrual cycle and is believed to result from hormonal fluctuations affecting breast tissue during the luteal phase. Non-cyclical mastalgia is unrelated to menstruation and may arise from benign breast diseases, trauma, infections, musculoskeletal disorders, medications, or, less commonly, malignancy. Proper classification of breast pain guides subsequent investigations and treatment strategies [1,3,5]. Earlier

physiological studies demonstrated that some females with cyclical mastalgia exhibit an exaggerated prolactin response to stimulation despite having normal basal serum prolactin concentrations. However, subsequent investigations have produced inconsistent findings regarding the association between serum prolactin levels and mastalgia. Several studies have reported higher prolactin concentrations in subsets of patients with breast pain, whereas others have found no significant difference compared with healthy controls. Consequently, hyperprolactinemia is considered an uncommon rather than universal cause of mastalgia, and the exact diagnostic value of serum prolactin measurement remains uncertain [2,6]. Routine measurement of serum prolactin has not been established as a reliable biomarker for the assessment of mastalgia. Although prolactin plays a physiological role in mammary gland development and lactation, evidence linking abnormal serum prolactin levels to breast pain remains inconsistent. Most females presenting with mastalgia have normal prolactin concentrations, and elevated levels are usually associated with endocrine disorders such as hyperprolactinemia or pituitary adenomas rather than isolated breast pain [2,7]. Furthermore, mastalgia is a

multifactorial condition influenced by hormonal fluctuations, breast tissue sensitivity, psychological factors, and musculoskeletal causes, making it unlikely that a single biochemical marker can adequately explain its occurrence [4]. Systematic reviews have concluded that there is insufficient evidence to support a consistent association between serum prolactin levels and mastalgia or to justify its routine measurement in all patients presenting with breast pain [1,4]. Current clinical guidelines therefore recommend that the assessment of mastalgia should primarily rely on a detailed clinical history, physical examination, and appropriate breast imaging based on patient age and clinical findings. Serum prolactin testing is advised only in selected patients with clinical features suggestive of hyperprolactinemia, such as galactorrhea, menstrual irregularities, infertility, or suspected pituitary disease, rather than as part of routine evaluation [7,8]. Consequently, indiscriminate prolactin testing may increase healthcare costs, generate unnecessary investigations, and provide limited additional diagnostic value in females with uncomplicated mastalgia [4]. The study aims to determine the diagnostic significance of serum prolactin levels in

females presenting with mastalgia in a clinical setting.

METHODS & MATERIALS

This multi-setting, descriptive observational cross-sectional study was conducted from January 2025 to December 2025, in both hospital-based settings (including inpatient and outpatient departments) and selected private clinics/general practices to assess the prevalence of elevated serum prolactin among female patients presenting with mastalgia. The study included 123 participants, with the sample size calculated using Cochran's formula assuming a prevalence of 8% in a large population. Female patients aged 18–50 years presenting with cyclical or non-cyclical mastalgia, who provided written informed consent and agreed to undergo serum prolactin testing, were included in the study. Pregnant or lactating females, those

receiving medications known to elevate prolactin (e.g., antipsychotics, antidepressants, antiemetics, or oral contraceptives), patients with known hyperprolactinemia, prolactinoma, thyroid dysfunction, pituitary or hypothalamic disorders, previous breast surgery or trauma, diagnosed breast malignancy or suspicious breast imaging findings, and those unwilling or unable to provide informed consent were excluded. Participants were recruited by consecutive purposive sampling until the required sample size was achieved. Following informed written consent, demographic, clinical, and laboratory data were collected using a structured questionnaire and recorded in a predesigned data collection sheet. Serum prolactin levels were measured according to standard laboratory protocols. The collected data were entered, processed, and analyzed using the Statistical Package

for the Social Sciences (SPSS) version 25. Quantitative variables were expressed as mean ± standard deviation (SD), whereas qualitative variables were presented as frequency, percentage, and ratio. A p-value <0.05 was considered statistically significant. Ethical clearance was obtained from the Institutional Review Board of the hospital, and confidentiality of all participants was strictly maintained throughout the study.

RESULTS

Table I shows that the mean age of the participants was 33.8±8.1 years. The majority (38.2%) were aged 30–39 years, followed by 18–29 years (33.3%). Most participants were married (68.3%), and 42.3% had completed secondary education.

Table I
Socio-demographic Characteristics of the Study Participants (n=123).

Characteristics	Frequency (n)	Percentage (%)
Age (years)		
18–29	41	33.3
30–39	47	38.2
40–50	35	28.5
Mean ± SD	33.8 ± 8.1 years	
Marital status		
Married	84	68.3
Unmarried	33	26.8
Widowed/Divorced	6	4.9
Educational status		
Primary or below	21	17.1
Secondary	52	42.3
Graduate and above	50	40.6

Table II demonstrates that 64.2% of patients had cyclical mastalgia, while 35.8% had non-cyclical mastalgia. Bilateral breast pain was the most frequent presentation (50.4%), and 56.1% of participants experienced moderate pain on the visual analogue scale.

Table II
Clinical Characteristics of Mastalgia (n=123).

Variables (some were overlapped)	Frequency (n)	Percentage (%)
Type of mastalgia		
Cyclical	79	64.2
Non-cyclical	44	35.8
Duration of pain		
<3 months	37	30.1
3–6 months	49	39.8
>6 months	37	30.1
Laterality		
Left	32	26.0
Right	29	23.6
Bilateral	62	50.4
Pain intensity (VAS)		
Mild (1–3)	26	21.1
Moderate (4–6)	69	56.1
Severe (7–10)	28	22.8

Table III shows that 91.1% of participants had normal serum prolactin levels, whereas only 8.9% demonstrated elevated prolactin concentrations. Ultrasonography was normal in 55.3% of patients, while fibrocystic breast changes were observed in 31.7%.

Table III
Serum Prolactin Levels and Imaging Findings (n=123).

Variables	Frequency (n)	Percentage (%)
Serum prolactin		
Normal	112	91.1
Elevated	11	8.9
Breast ultrasound		
Normal	68	55.3
Fibrocystic changes	39	31.7
Fibroadenoma	11	8.9
Other benign findings	5	4.1

Table IV reveals no statistically significant association between serum prolactin level and the type of mastalgia (p=0.961). Elevated prolactin occurred with similar frequency among patients with cyclical and non-cyclical mastalgia.

Table IV
Association Between Serum Prolactin Level and Type of Mastalgia.

Type of mastalgia	Normal prolactin n (%)	Elevated prolactin n (%)	Total	p-value*
Cyclical	72 (64.3)	7 (63.6)	79	0.961
Non-cyclical	40 (35.7)	4 (36.4)	44	
Total	112	11	123	

*Chi-square test was done.

Table V demonstrates that serum prolactin levels were not significantly associated with pain severity measured by the Visual Analogue Scale (p=0.874).

Table V
Association Between Serum Prolactin Level and Pain Severity.

Pain severity	Normal n (%)	Elevated n (%)	p-value*
Mild	24	2	0.874
Moderate	63	6	
Severe	25	3	

*Chi-square test was done.

Table VI indicates that routine serum prolactin estimation did not influence clinical diagnosis or management in 88.6% of patients. Only 6.5% required endocrinology referral, and confirmed hyperprolactinemia accounted for just 4.1% of final diagnoses.

Table VI
Clinical Utility of Routine Serum Prolactin Estimation (n=123).

Variables	Frequency (n)	Percentage (%)
Serum prolactin influenced diagnosis/management.		
Yes	9	7.3
No	109	88.6
Uncertain	5	4.1
Endocrinology referral required		
Yes	8	6.5
No	115	93.5
Final diagnosis		
Cyclical mastalgia	67	54.5
Fibrocystic breast disease	33	26.8
Idiopathic breast pain	18	14.6
Hyperprolactinemia	5	4.1

DISCUSSION

The present study showed that the mean age of females presenting with mastalgia was 33.8±8.1 years, with the largest proportion in the 30–39-year age group. This pattern fits the reproductive-age predominance of mastalgia described in the literature. In a 45-patient quasi-experimental study, Mostary et al. reported a mean age of 30.24±6.93 years, with 33.3% of patients aged 31–35 years; 64.4% were married, and 57.78%

were multiparous [9]. Similarly, Yonis et al. studied 50 cases and 50 controls and reported mean ages of 28.5±6.9 and 29.7±5.2 years, respectively, again showing that cyclical mastalgia is mainly a disorder of premenopausal females [10]. Clinically, 64.2% of the present patients had cyclical mastalgia, 50.4% had bilateral pain, and 56.1% reported moderate pain. These findings are closely aligned with prior studies. Ali and Faraj reported cyclical

mastalgia in 60% and non-cyclical mastalgia in 40% of 150 females, and fibrocystic changes were identified in 23.3% [8]. Mostary et al. similarly found 57.78% cyclical mastalgia, 60% bilateral involvement, and 44.4% mastalgia with lumpiness [9]. The main biochemical finding of the present study was that 91.1% of patients had normal serum prolactin, while only 8.9% had elevated levels. This low prevalence of hyperprolactinemia is

important because it argues against serum prolactin as a good routine marker for mastalgia. Nazneen et al. evaluated 100 females with mastalgia and found elevated serum prolactin in 8% and hypothyroidism in 18%, which is strikingly close to the prolactin yield in the present series ^[11]. However, Yonis et al. reported that in a 50-case/50-control study, prolactin was higher in females with cyclical mastalgia than in controls, with a significant difference ($p=0.05$) ^[10]. Even earlier, Watt-Boolsen et al. studied 20 females with severe cyclical mastalgia and 10 controls and found basal prolactin to be significantly higher in patients, although still within the normal range ^[12]. In contrast, Mostary et al. reported high serum prolactin in 60% of 45 females with fibrocystic breast disease, showing that prolactin abnormalities may appear in selected symptomatic cohorts, but not consistently across general mastalgia populations ^[9]. In the present study, serum prolactin level showed no significant association with the type of mastalgia ($p=0.961$) or pain severity ($p=0.874$), and routine prolactin estimation influenced diagnosis or management in only 7.3% of patients. Kataria et al. concluded that measurements of estrogen, progesterone, and prolactin had not shown consistent abnormalities in mastalgia, and Li et al. emphasized that the initial work-up of breast pain should rely on thorough history, physical examination, and age-appropriate imaging, rather than indiscriminate laboratory testing ^[4,13]. Breast ultrasonography in the present study was normal in 55.3%, while 31.7% showed fibrocystic changes. Final diagnosis was most commonly cyclical mastalgia and fibrocystic breast disease, whereas confirmed hyperprolactinemia was found in only 4.1%. This pattern is consistent with Ali and Faraj, who found fibrocystic changes in 23.3% of mastalgia patients, reinforcing that benign structural breast findings are more common than endocrine abnormalities ^[8].

LIMITATIONS

The study was conducted in selected hospitals and private clinics with a relatively small sample size, which may limit the generalizability of the findings. Only a single serum prolactin measurement was obtained without repeat testing or assessment of other reproductive hormones, and long-term follow-up was not performed to evaluate changes in prolactin levels or clinical outcomes over time.

CONCLUSION

This study suggests that serum prolactin has limited value as a routine biomarker in the assessment of mastalgia. Most females with mastalgia had normal serum prolactin levels, and no significant association was observed between prolactin levels and the type or severity of breast pain. Furthermore, routine prolactin estimation rarely influenced clinical diagnosis or management. Therefore, serum prolactin testing should not be recommended as a routine investigation for all patients with mastalgia but should be reserved for selected cases with clinical features suggestive of hyperprolactinemia or other underlying endocrine disorders.

RECOMMENDATIONS

Routine serum prolactin estimation should not be included in the standard evaluation of all patients presenting with mastalgia. Instead, prolactin testing should be reserved for females with clinical features suggestive of hyperprolactinemia. Larger multicenter prospective studies with long-term follow-up are recommended to further clarify the role of serum prolactin and other hormonal markers in the assessment and management of mastalgia.

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CONFLICT OF INTEREST

None declared

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