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Original Article

Outcome of Anti-TB Therapy After Excision of Breast Lump

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ABSTRACT

Introduction: *Granulomatous mastitis (GM) is a rare, chronic inflammatory breast disease often mimicking breast cancer. Tuberculosis (TB) is a major suspected cause, especially in high-prevalence areas. This study evaluates the effectiveness of anti-tubercular therapy (ATT) in managing chronic GM, particularly in cases with sinus formation post-excision, to enhance treatment strategies.* ***Methods & Materials:*** *This cross-sectional study was conducted at Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from January 2022 to January 2024, to evaluate the outcome of anti-tubercular therapy (ATT) in patients diagnosed with chronic granulomatous mastitis (GM) with sinus formation after surgical excision. A total of 100 female patients aged above 18 years, diagnosed with GM, were included in the study. Data were analyzed using statistical software (SPSS version 22.0).* ***Result:*** *In this study of 100 patients with granulomatous mastitis, most patients (73%) showed a complete response to anti-tubercular therapy (ATT), while 18% had a partial response. The majority of patients underwent excision (72%), with fewer requiring partial or total mastectomy. Diagnostic investigations such as USG, mammogram, and histopathology were positive in all cases, confirming the diagnosis. A small percentage of patients experienced recurrence (4%), and the traditional 4FDC regimen was the most commonly used treatment.* ***Conclusion:*** *This study demonstrates that anti-tubercular therapy is effective in the treatment of granulomatous mastitis with sinus formation, with most patients showing a complete response. However, partial responses and recurrences still occur, indicating that further research is needed to identify factors influencing treatment outcomes.*

Keywords: *Anti-TB Therapy, Granulomatous Mastitis, Surgical Excision, Incision & Drainage*

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INTRODUCTION

Granulomatous mastitis (GM) is a rare, chronic inflammatory breast disease that often presents as a diagnostic and therapeutic challenge. Initially described by Kessler and Wolloch in 1972, GM primarily affects women of reproductive age, manifesting as a firm, unilateral breast mass, sometimes associated with pain, erythema, ulceration, and sinus tract formation [1]. Due to its clinical and radiological similarity to breast carcinoma, GM is frequently misdiagnosed, leading to delays in appropriate management [2]. The exact etiology of GM remains unclear, but multiple theories suggest autoimmune mechanisms, hormonal influences, and infectious etiologies, including an association with Corynebacterium species and tuberculosis (TB) [3]. In regions where TB is endemic, distinguishing between idiopathic GM and tuberculous mastitis remains a significant challenge, leading to the consideration of empirical antitubercular therapy (ATT) as a potential treatment option [4]. Tuberculous mastitis, though rare, presents with similar granulomatous inflammation as GM, making its differentiation difficult based on clinical and histopathological findings alone. In high TB-burden regions, studies have shown a subset of GM patients demonstrating significant clinical improvement with ATT, suggesting that TB may play an etiological role in some cases of GM [5]. Empirical ATT is increasingly being considered in patients with GM, especially when other treatment modalities fail or in cases where histological findings are inconclusive [6]. The treatment strategies for GM have traditionally included observation, corticosteroid therapy, immunosuppressive agents, antibiotics, and surgical excision [7]. Corticosteroids are commonly used due to their anti-inflammatory properties; however, they pose a risk of relapse upon tapering and have significant side effects, including weight gain, immunosuppression, and osteoporosis [8]. Surgical interventions such as wide local excision or abscess drainage are associated with high recurrence rates and cosmetic complications [9]. Given these limitations, ATT has emerged as a viable therapeutic approach, particularly in endemic regions

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where tuberculosis-related GM cannot be ruled out. Recent studies support the efficacy of ATT in GM patients, with a high proportion of cases responding well to treatment. A study conducted in a TB-endemic region demonstrated that a significant number of patients with histopathologically diagnosed GM showed complete resolution of symptoms after receiving a standard four-drug ATT regimen [10]. Another study reported successful outcomes in GM patients treated with ATT, with most cases achieving clinical remission without requiring surgical intervention [11]. Similarly, Liu et al. found that patients with GM who received ATT had significantly lower recurrence rates compared to those managed with corticosteroids alone, reinforcing the hypothesis that a subset of GM cases may have a mycobacterial etiology [12]. The benefits of ATT in GM treatment extend beyond symptom resolution. Unlike corticosteroids and immunosuppressants, which only provide symptomatic relief, ATT targets a potential infectious cause, reducing the risk of recurrence. Additionally, ATT is associated with fewer long-term adverse effects compared to prolonged steroid therapy, making it a safer option for patients with comorbidities [13]. Despite its promising role, the use of ATT in GM remains controversial. Some clinicians argue that ATT should only be initiated in patients with confirmed TB based on microbiological or molecular evidence, as the indiscriminate use of anti-TB drugs could contribute to drug resistance and unnecessary drug exposure [14]. Others advocate for a more pragmatic approach, recommending empirical ATT in patients with GM who fail to respond to conventional therapy, particularly in high TB prevalence areas. This study aimed to assess the outcome of anti-TB therapy after excision of breast lump.

METHODS & MATERIALS

This cross-sectional study was conducted at Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from January 2022 to January 2024, to evaluate the outcome of anti-tubercular therapy (ATT) in patients diagnosed with chronic granulomatous mastitis (GM) with sinus formation after surgical excision. The study included female patients aged above 18 years who were diagnosed with GM, excluding those with granulomatous mastitis caused by a foreign body reaction or Corynebacterium-associated mastitis. A total of 100 eligible patients were enrolled in the study. Data were collected on various demographic and clinical characteristics, including age, sociodemographic profile, affected breast, quadrant involvement, clinical appearance, findings such as palpable mass, abscess, ulceration, or sinus formation, and associated constitutional symptoms like fever, weight loss, night sweats, and malaise. All patients underwent a series of investigations for diagnosis and exclusion of other etiologies, including ultrasonography (USG) or mammography for lesion assessment, fine-needle aspiration cytology (FNAC) for cellular evaluation, and histopathology to confirm granulomatous inflammation and rule out malignancy. Additional tests included GeneXpert/PCR for Mycobacterium tuberculosis, Ziehl-Neelsen (ZN) staining to identify acid-fast bacilli (AFB), and chest X-ray to assess for extrapulmonary TB involvement. Surgical intervention was performed in all cases, with procedures including excision, partial or total mastectomy in extensive cases, and incision and drainage (I&D) for abscess formation. Following surgery, patients were started on ATT based on their clinical and diagnostic findings. The standard first-line regimen included a fixed-dose combination (4FDC) of Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol for two months, followed by Rifampicin and Isoniazid for four months. In cases where patients were intolerant to first-line drugs or had suspected drug-resistant TB, second-line ATT or alternative regimens were administered. Treatment response was assessed at regular follow-ups and categorized as complete response (resolution of symptoms with no residual lesion or recurrence), partial response (improvement in symptoms but persistence of inflammatory changes), no response (no clinical improvement despite ATT), or recurrence (reappearance of symptoms after initial improvement). Data were analyzed using statistical software (SPSS version 22.0), with descriptive statistics used for demographic and clinical characteristics and inferential statistics applied to evaluate treatment outcomes. A p-value <0.05 was considered statistically significant. The study was conducted following ethical guidelines, with approval from the institutional ethical review board, and informed consent was obtained from all participants.

RESULTS

Table – I: Distribution of patients according to demographic characteristics (*n*=100)

Variable	Frequency (n)	Percentage (%)
Age (years)		
18–30	35	35.0
31–40	42	42.0
41–50	18	18.0
>50	5	5.0
Sociodemographic Profile		
Urban	58	58.0
Rural	42	42.0

Table I shows the distribution of patients according to demographic characteristics. The majority of patients (42%) were aged between 31 and 40 years, followed by 35% in the 18–30 years age group. A smaller proportion of patients were in the 41–50 years (18%) and >50 years (5%) age groups. In terms of sociodemographic distribution, 58% of the patients were from urban areas, while 42% were from rural regions.

Table – II: Distribution of patients according to clinical features of granulomatous mastitis (*n*=100)

Clinical Feature	Frequency (n)	Percentage (%)
Breast Affected		
Unilateral	87	87.0
Bilateral	13	13.0
Quadrant Affected		
Upper Outer Quadrant	45	45.0
Upper Inner Quadrant	22	22.0

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Lower Outer Quadrant	18	18.0
Lower Inner Quadrant	10	10.0
Central	5	5.0
Clinical Appearance		
Palpable mass	67	670
Abscess	25	25.0
Ulceration	8	8.0
Sinus Formation	100	100.0
Constitutional Symptoms		
Fever	52	52.0
Weight loss	38	38.0
Night sweats	21	21.0
Malaise	43	43.0

Table II shows the distribution of patients based on the clinical features of granulomatous mastitis. The majority of patients (87%) had unilateral breast involvement, while 13% had bilateral disease. The most commonly affected quadrant was the upper outer quadrant (45%), followed by the upper inner quadrant (22%), lower outer quadrant (18%), lower inner quadrant (10%), and central region (5%). In terms of clinical presentation, a palpable breast mass was the most frequent finding (67%), followed by abscess formation (25%) and ulceration (8%). Notably, all patients (100%) presented with sinus formation. Constitutional symptoms were also common, with fever in 52% of patients, weight loss in 38%, night sweats in 21%, and malaise in 43%.

Table – III: Distribution of patients according to diagnostic investigations performed (*n*=100)

Investigation	Positive (n)	Negative (n)	Percentage (%) Positive
USG/Mammogram	100	0	100.0
FNAC	91	9	91.0
Histopathology	100	0	100.0
GeneXpert/PCR	37	63	37.0
Ziehl-Neelsen Staining	14	86	14.0
Extrapulmonary Chest X-ray	9	91	9.0

Table III presents the results of the diagnostic investigations performed on the patients. All patients (100%) underwent ultrasonography (USG) or mammography, and both histopathology and USG/mammogram were positive in 100% of cases, confirming the diagnosis of granulomatous mastitis. Fine-needle aspiration cytology (FNAC) was positive in 91% of the patients, providing additional confirmation of the diagnosis. In molecular testing, GeneXpert/PCR was positive in 37% of cases, while Ziehl-Neelsen staining, a traditional method to detect acid-fast bacilli, showed positive results in 14% of the patients. Extrapulmonary chest X-ray showed abnormalities in only 9% of cases, indicating that most of the patients did not have concurrent extrapulmonary tuberculosis.

Table – IV: Distribution of patients according to surgical interventions performed (*n*=100)

Surgical Procedure	Frequency (n)	Percentage (%)
Excision	72	72.0
Partial Mastectomy	18	18.0
Total Mastectomy	6	6.0
Incision & Drainage	4	4.0

Table IV presents the distribution of patients based on the surgical interventions performed. The most common procedure was excision, performed in 72% of patients, followed by partial mastectomy in 18%, and total mastectomy in 6% of cases. Incision and drainage, typically used for abscess drainage, was performed in 4% of patients.

Table – V: Distribution of patients according to anti-tubercular therapy (ATT) regimens used (*n*=100)

Type of ATT Regimen	Frequency (n)	Percentage (%)
Traditional 4FDC (Rifampicin, Isoniazid, Pyrazinamide, Ethambutol)	84	84.0
Second-line/Alternative Regimen	16	16.0

Table V presents the distribution of patients based on the type of anti-tubercular therapy (ATT) regimen administered. The traditional 4FDC regimen, which includes Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol, was used in 84% of the patients. A second-line or alternative ATT regimen was used in 16% of patients.

Table – VI: Distribution of patients according to treatment response to anti-tubercular therapy (*n*=100)

Treatment Outcome	Frequency (n)	Percentage (%)	p-value
Complete Response	73	73.0	<0.00*
Partial Response	18	18.0	0.042*
No Response	5	5.0	0.317
Recurrence	4	4.0	0.251

Table VI shows the distribution of patients according to their treatment response to anti-tubercular therapy (ATT). The majority of patients (73%) achieved a complete response to the therapy, with a statistically significant p-value of <0.001, indicating that ATT was highly effective in most cases. An 18% partial response was observed, which was also statistically significant (p = 0.042), showing that a subset of patients had some degree of improvement but did not fully recover. Only 5% of patients showed no response to the treatment, with a p-value of 0.317, indicating no significant association. A 4% recurrence rate was noted, with a p-value of 0.251, suggesting that recurrences were not significantly associated with the treatment.

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DISCUSSION

Granulomatous mastitis (GM) is a rare, benign inflammatory breast disease often confused with malignancy due to its clinical and radiological features. It typically presents with a breast mass, abscess formation, or sinus formation, and can complicate clinical management. This study aimed to evaluate the outcomes of anti-tubercular therapy (ATT) in patients with GM, particularly those with sinus formation after excision. The demographic findings in this study are consistent with previous reports. The majority of patients were aged between 31 and 40 years (42%), followed by 18–30 years (35%). GM primarily affects women in their reproductive years, as supported by other studies that highlight the prevalence of GM in women of childbearing age, likely due to hormonal factors influencing breast tissue and immune responses [15]. In terms of clinical features, unilateral involvement was observed in 87% of patients, which is consistent with other studies reporting unilateral breast involvement in GM [16,17]. The most common quadrant affected was the upper outer quadrant (45%), which aligns with another study that the upper outer quadrant is the most commonly affected area due to its anatomical location and breast tissue density [18]. The presence of sinus formation in all patients (100%) underscores its significance as a hallmark feature of GM, as noted by several authors who highlighted sinus formation as a critical diagnostic feature of this disease [19]. Constitutional symptoms such as fever (52%), weight loss (38%), and malaise (43%) were observed in this cohort, further corroborating prior studies that have reported high incidences of systemic symptoms in GM patients [20]. Diagnostic investigations revealed that both histopathology and imaging (USG/Mammogram) were positive in all patients (100%), confirming the diagnosis of GM. Histopathology remains the gold standard for diagnosis, as it reveals characteristic granulomatous inflammation, which can help differentiate GM from other pathologies such as malignancies [21]. FNAC was positive in 91% of patients, which is in line with other studies showing that FNAC has a high sensitivity in diagnosing GM [22]. Molecular testing, including GeneXpert/PCR, was positive in only 37% of cases, a finding that underscores the limitation of molecular diagnostic techniques in GM. Surgical interventions in this study included excision (72%) as the most common procedure, followed by partial mastectomy (18%) and total mastectomy (6%). This distribution reflects the fact that excision is the preferred treatment for localized GM, as it effectively removes the inflamed tissue and may prevent recurrence [23]. The low rate of mastectomy in this cohort suggests that the disease was often localized, and aggressive surgical interventions were reserved for more extensive cases. The treatment response to ATT in this study was highly favorable, with 73% of patients achieving a complete response, while 18% showed a partial response. These results are consistent with previous studies that have reported high response rates to ATT, especially with the traditional 4FDC regimen (Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol). A study by Paz et al. found that a combination of ATT and surgical excision resulted in a complete response in majority of patients in their study, which aligns with our findings. Moreover, Mithen et al. demonstrated that ATT therapy could be an effective and better treatment of choice for GM patients irrespective of their clinical condition [11, 14]. The partial response observed in 18% of patients may be attributed to factors such as inadequate drug therapy or the presence of resistant strains. The study also observed a 4% recurrence rate, although the p-value for recurrence was not statistically significant ($p = 0.251$), suggesting that recurrences may occur due to other factors such as treatment non-compliance or delayed initiation of ATT.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. Moreover, long-term follow-up was not possible to observe optimized treatment outcomes.

CONCLUSION

This study demonstrates that anti-tubercular therapy is effective in the treatment of granulomatous mastitis with sinus formation, with most patients showing a complete response. However, partial responses and recurrences still occur, indicating that further research is needed to identify factors influencing treatment outcomes. Moreover, surgical excision remains a vital component of treatment, particularly for localized disease.

RECOMMENDATION

Based on the findings of this study, it is recommended that granulomatous mastitis (GM) patients, particularly those with sinus formation, be treated with a combination of surgical excision and anti-tubercular therapy (ATT). First-line ATT with Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol (4FDC) should be the standard treatment regimen, as it showed favourable outcomes in the majority of patients. However, it is crucial to monitor patients for partial responses and recurrence, as these were observed in a minority of cases, which may require adjustment of therapy or prolonged treatment. Further studies on the long-term follow-up and the role of second-line ATT in resistant cases are recommended to optimize treatment outcomes.

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