

# Varied etiology in patients presenting with non-puerperal mastitis: an observational study

N Himabindu<sup>1\*</sup>, V Rama Mohan Rao<sup>2</sup>, U Rajesh<sup>3</sup>, Y Sasitha<sup>3</sup>

<sup>1</sup>Associate Professor, Department of General Surgery, Mallareddy Institute of Medical Sciences, Suraram, Hyderabad

<sup>2</sup>Professor, Department of General Surgery, Mallareddy Institute of Medical Sciences, Suraram, Hyderabad

<sup>3</sup>Junior Resident, Department of General Surgery, Mallareddy Institute of Medical Sciences, Suraram, Hyderabad

\*Corresponding Author:

N Himabindu, Associate Professor, Department of General Surgery, Mallareddy Institute of Medical Sciences, Suraram, Hyderabad

E-MAIL: [drhimanbindu@gmail.com](mailto:drhimanbindu@gmail.com)



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## ABSTRACT

**Introduction:** The etiology of nonpuerperal mastitis is more diverse varying from infections to autoimmune disorders. Most of them are misdiagnosed as pyogenic mastitis and are treated with routine antibiotics. In this study the various causes of nonpuerperal mastitis which required surgical intervention were evaluated. It was observed that some of the pre-malignant and malignant conditions were also presented as nonpuerperal mastitis. **Materials and methods:** All non-lactating women who presented with symptoms and signs of mastitis and did not respond to single course of antibiotics (active against staphylococcus) treated in tertiary care Hospital and in private practice of primary author between June 2021 to December 2022 and in those in whom the ultrasound of breast was also suggestive of inflammatory breast disease were included in the study and rest were excluded from study. The final etiological diagnosis of these patients is given by the histopathological examination of tissue taken from the wall of abscess cavity or of breast mass. **Results:** Total 21 patients were included in the study of which 7 patients had nonspecific infection, 3 patients were diagnosed to have tuberculous mastitis, 3 patients with idiopathic granulomatous mastitis, 2 patients with periductal mastitis, 1 patient with fat necrosis, 3 patients with atypical ductal hyperplasia and 2 patients were diagnosed to have invasive duct cell carcinoma. **Conclusion:** The etiology of nonpuerperal mastitis is diverse. Not only the benign conditions but premalignant conditions like ADH, DCIS and even invasive carcinoma can present with clinical symptoms and signs of inflammatory breast disease.

**KEYWORDS:** Nonpuerperal mastitis, non-lactational mastitis, invasive duct cell carcinoma.

## INTRODUCTION

Mastitis is the term used to denote the inflammation of the breast. It can be either puerperal (lactational) or nonpuerperal (non-lactational). Lactational mastitis constitutes acute inflammation of the breast in relation to pregnancy or breastfeeding, which occurs in 2-10% of breastfeeding women.<sup>[1]</sup> Majority of lactational mastitis are infectious in etiology, which can be explained by ascending infection through a cracked or abrasion of nipple. The commonest organism implicated in lactational mastitis is staphylococcus aureus.<sup>[2, 3]</sup>

Non-lactational mastitis is the inflammation of the breast that occurs in non-breastfeeding women. The etiology of non-lactational mastitis is more diverse, varying from infections to autoimmune disorders of which the two major entities are periductal mastitis and idiopathic granulomatous mastitis and both of them primarily affect the young women.<sup>[4-6]</sup> Among the infectious mastitis in non-lactating women, staphylococcus is the main causative organism and up to 30% are polymicrobial.<sup>[7] [8]</sup> This study aims to identify various etiologies of patients who present with signs and symptoms of mastitis in non-lactating women.

## MATERIALS AND METHODS

All non-lactating women who presented with symptoms and signs of mastitis and did not respond to a single course of antibiotic (active against staphylococcus) treated in tertiary care Hospital and in private practice of primary author between June 2021 to December 2022 were taken up for the study. In all these patients, ultrasound of breast was done and those patients in whom ultrasound of breast was also suggestive of inflammatory breast disease were included in the study. Patients with age less than 15 years,

all lactating women, patients with non-lactational mastitis who responded to a single course of antibiotic and patients in whom the ultrasound of breast was suggestive of other than mastitis were excluded from the study. This study was approved by the institutional ethics committee.

Among these patients, those patients who presented with clearcut abscess, incision and drainage of abscess was done and pus was sent for culture and sensitivity. Tissue was taken from the wall of the abscess cavity and sent for histopathological examination.

Those patients who presented with an inflammatory mass, FNAC and/or Tru-cut biopsy was done for pathological diagnosis and if inconclusive, wide local excision of the lump was done and sent for regular biopsy to get the final diagnosis. In patients with associated nipple discharge, cytological examination of nipple discharge was done.

The final histopathological diagnosis was taken as the etiological diagnosis of patients with non-lactational mastitis.

## RESULTS

Total number of patients included in the study were 21. The age of the patients ranged from 17 years to 55 years. The age distribution of the patients with non-puerperal mastitis is given in Table 1.

Age group (in years)	No. of patients
15 to 25	3
26 to 35	10
36 to 45	3
46 to 55	5
> 55	0

**Table 1: Age distribution of patients with non-puerperal mastitis**

Majority of patients diagnosed with non-lactating inflammatory breast disease were in the age group of 26–35 years and next peak incidence was noted between 46–55 years. So, a bi modal distribution of cases was observed.

All patients presented with symptoms of pain in the breast. Clear cut abscess was noted in 7 patients which required incision and drainage. Pain associated with lump in the breast was noted in 12 patients and the remaining 2 patients had only localized tenderness. Nipple discharge was noted in 3 patients.

Pus drained from 7 patients was sent for culture and sensitivity. All were negative except for one patient, which was positive for klebsiella. Cytological examination of nipple discharge of all the three patients showed cystic macrophages. There was no evidence of any abnormal cells.

The histopathological diagnosis of patients presenting as non-lactational mastitis is given in Table 2.

Histopathological diagnosis	Patients No. (%)
Nonspecific infection/ inflammation	7 ( 33.3)
Tubercular mastitis	3 ( 14.3)
Idiopathic granulomatous mastitis	3 ( 14.3)
Periductal mastitis	2 ( 9.5)
Fat necrosis	1 ( 4.8)
Atypical ductal hyperplasia	3 ( 14.3)
Invasive duct cell carcinoma	2 ( 9.5)

**Table 2: Histopathological diagnosis of patients with non-lactational mastitis**

## DISCUSSION

Inflammatory disorders of the breast are more common in lactating women and majority of them are infectious in etiology. Staphylococcus is the commonest organism isolated in patients with lactational breast abscess.<sup>[2,3]</sup> Mastitis in non-lactating women have diverse etiology ranging from infectious to autoimmune disorders. Even in non-lactational mastitis of infective etiology the commonest organism isolated is staphylococcus.<sup>[7,9]</sup> In this study, seven patients presented with clear cut abscess who underwent incision and drainage and pus was sent for culture and sensitivity. Except for one patient in whom the cultures were positive for klebsiella, rest all cultures were negative. Among these seven patients two patients were diagnosed to have idiopathic granulomatous mastitis and other two were diagnosed to have tuberculous mastitis. The reason for the negative culture in the other two patients could be because of the initial course of antibiotic treatment.

Tuberculous mastitis was first described in the 19th century (1829), by Sir Astley Cooper, who called it the 'scrofulous swelling of the bosom.'<sup>[10]</sup> In India tuberculous mastitis was reported to account for up to 3% of surgically treated breast diseases.<sup>[11]</sup> Diagnosis of tuberculosis of the breast is mainly based on the histopathological demonstration of bacilli, tubercles, caseation and granuloma formation.<sup>[12]</sup> In this study, three patients (14.28%) were diagnosed to have tuberculous mastitis. In all the 3 patients the diagnosis was confirmed by histopathological examination. This high percentage might be due to selection criteria where only patients with non-lactational mastitis were taken for study.

Periductal mastitis and duct ectasia are considered as part of the spectrum of inflammatory processes presenting as chronic non-lactational mastitis.<sup>[13]</sup> The etiology of periductal mastitis is not yet clear. Some studies have shown

that periductal mastitis was associated with smoking. [14, 15] In this study, two patients (9.52%) were diagnosed to have peri ductal mastitis. Duct ectasia as an associated factor noted in another 3 patients. None of these patients had any history of smoking.

Idiopathic granulomatous mastitis is a rare benign inflammatory breast disease that affects mostly women of child bearing age with a history of breast feeding in the past. The disease usually occurs around 2 years after breastfeeding at a median age of 30 years. [16] The exact etiology of idiopathic granulomatous mastitis is still unknown, however inflammation as a result of reaction to trauma, metabolic, hormonal imbalances, auto immunity and infection with *Corynebacterium kroppenstedtii* have been implicated. [16, 17] Most of these patients present with symptoms of erythema and swelling and 37% present with signs of abscess. [18] In this study 3 (14.28%) patients were diagnosed to have idiopathic granulomatous mastitis. All of them presented with pain; two with abscess and one with inflammatory mass. Clinical presentation of these patients mimicked pyogenic mastitis but final confirmation of diagnosis was made by histopathological examination which showed non-necrotising granulomas with infiltrates of giant cells, epithelioid cells and plasma cells.

In this study around 3 (14.28%) patients were diagnosed to have atypical ductal hyperplasia (ADH) who presented clinically with signs of inflammatory mass. The occurrence of ADH in general population after the biopsies varies widely from 3% (sample size n=30953) [19] to 8-10% (n=3532) [20] and 23% (n=2833). [21] these differences may be because of the sample size. ADH is not only a risk factor for invasive ductal cell carcinoma (IDC) but also considered to be a direct and non obligate precursor to invasive carcinoma. [22]

Duct cell carcinoma usually presents as a painless lump in the breast. In this study we had 2 (9.52%) patients who were diagnosed to have invasive duct cell carcinoma presenting with the symptoms of an inflammatory mass. Both of these patients had extensive ductal carcinoma in situ (DCIS) component in association with ADH. These patients belonged to different age groups one at 29 years and other at 53 years. The presentation of non-inflammatory breast cancer or DCIS as non-puerperal mastitis is rare. The true incidence of these cases is unknown, though it was demonstrated that up to 1.81% of women with non-puerperal mastitis could eventually develop non-inflammatory breast cancer, 1 year following their mastitis. [23] Peters F. et al., therefore suggested that non-puerperal mastitis may be a risk factor for breast cancer. [23] The pathophysiology of DCIS manifesting as mastitis is unclear. One possible explanation suggested by Damiani S. et al. [24] is that high grade DCIS has been associated with damage of the myoepithelial cell layer and basement membrane surrounding the ductal lumen. This resultant nidus of dead ductal tissue then acted as a source for chronic infection, hence resulting in the atypical manifestation of DCIS as mastitis. Both the patients in this study, diagnosed to have invasive carcinoma had an extensive DCIS in association

with atypical ductal hyperplasia, suggesting the progression of disease from chronic mastitis to ADH to DCIS to invasive carcinoma. Further studies with large sample size and long follow up period are required to establish the progression of disease from non-lactational mastitis to invasive duct cell carcinoma.

From the observations noted, some of the premalignant and non-inflammatory carcinomas of breast can present as inflammatory breast disease particularly in non-lactating women. So, a thorough investigation of such patients is required to rule out an underlying malignancy.

## CONCLUSION

The etiology of nonpuerperal mastitis is diverse. Not only the benign conditions but premalignant conditions like ADH, DCIS and even invasive carcinoma can present with clinical symptoms and signs of inflammatory breast disease. Radiological evaluation may be inconclusive and only histopathological examination clinches the diagnosis. So, a cautious approach is required in treating patients presenting as nonpuerperal mastitis, otherwise there may be a delay in the diagnosis which can affect the prognosis.

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