



Role of Diagnostics in Management of Breast Infection – A Retrospective Study from North Goa District Hospital

Authors

**Dr Shailendra Munj¹, Dr Patricia Fernandes¹, Dr Varsha Munj², Dr Krupa Jog³,
Dr Shruti Shetye³**

Department of Surgery, Department of Pathology and Department of Microbiology North District Hospital

*Corresponding Author

Dr Shailendra Munj

Senior Surgeon, Surgery Department, North District Hospital, Peddem, Mapusa, Goa, Pin 403507, India

Abstract

Objective: *To evaluate the utility of cytopathology and microbiological testing in diagnosis of breast infections.*

Materials & Methods: *This a retrospective study of cases presenting as mastitis and a review of 109 cases with regards to various laboratory tests in classification of mastitis and to identify their etiological agents.*

Observation: *Lactation was the risk factor for causing inflammatory breast abscess. Diabetes mellitus and tuberculosis also led to inflammatory breast abscess. 109 cases were included in this study. They were categorized into simple mastitis without abscess formation (24.7%), acute mastitis (52.2%), granulomatous mastitis (10%), fat necrosis (6.4%), hematoma (3.6%) and mastitis not otherwise specified (2.7%). Lactation was the risk factor in 44% cases of breast abscess. Diabetes mellitus and tuberculosis were responsible for non lactational inflammatory breast lesion. Granulomatous mastitis can be sub categorized by utilizing CNAAT, AFB staining & TB culture. Fungal stain and fungal culture sensitivity helps in making a diagnosis of Fungal mastitis.*

Conclusion: *Laboratory diagnostics in the form of FNAC, microbiological testing and biochemical parameters can be utilized in the diagnosis of various breast infections for specific management of patients.*

Keywords: *Breast abscess, FNAC, granulomatous mastitis, Tuberculous mastitis, Fungal mastitis, Diabetes.*

Introduction

Mastitis is a common complaint in clinical practice. Mastitis is defined as inflammation of breast with or without infection.¹ Although significant number of cases are seen in lactating women, it can affect at any time.^{1,2} Mastitis with infection may be lactational or non lactational³.

Breast abscess is localized collection of pus which can be a complication of mastitis causing

great agony to women.⁴ Non infectious Mastitis includes idiopathic granulomatous mastitis, duct ectasias, and other causes like fat necrosis, hematoma etc. Mastitis does not raise the risk of breast cancer. But, uncommon type of breast cancer known as inflammatory breast cancer presents clinically like mastitis which can be mistaken for infection and cause a problem for diagnosis.⁵ Histopathology remains gold standard

for establishing correct diagnosis, however Fine Needle Aspiration Cytology (FNAC) has gained significant credibility in initial diagnosis of breast diseases as it is simple, cost effective and quick OPD based test. When done by cytopathologist it can help in accurate and early diagnosis of these lesions.⁶ Breast aspirate should be handled systematically to get maximum information. Cytology combined with microbiological culture and other special studies can help in appropriate assessment of the lesion which will guide the clinician to administer appropriate therapy and decide on further course of treatment and also avoid unnecessary surgery.⁷

Aim & Objective

1. To evaluate utility of diagnostics like cytopathology and microbiological test in diagnosis and management of breast infection.
2. To study the spectrum of inflammatory breast lesions.
3. To study the spectrum of microbiological pathogens leading to mastitis.

Materials and Methods

This is a retrospective study carried out in the Department of Pathology and Microbiology in coordination with Surgery Department. Cases were retrieved from department of hospital records, cytopathology and microbiology laboratory.

Total of 109 cases of Mastitis were seen in our hospital from January 2017 to January 2019. Clinical details like gender, age, lactational history, past history of TB and radiological findings if available were recorded. Routine

Hematological findings and biochemistry parameters like blood sugar was correlated. In all cases of mastitis presenting with breast lump cytological parameters were evaluated including presence of inflammatory cells, granulomas, histiocytes, giant cells and necrosis. All cases of pus and pus like aspirate were subjected to culture sensitivity, CNAAT testing in addition to AFB, PAS/GMS staining in microbiology section. The cytomorphologic features for acute mastitis included presence of numerous neutrophils, macrophages and benign ductal cells. Whenever histopathology was available the diagnosis was confirmed by H and E stained section and special stains like ZN Stain, PAS and GMS stain was applied.

The patients were classified into granulomatous mastitis based on presence of epithelioid granulomas, caseous necrosis and inflammatory cells. They were further classified into infectious and non infectious based on microbiology findings. 2 cases of duct carcinoma presenting with clinical features of mastitis were excluded from the study. 27 patients presented with simple mastitis without any lump. They were managed with hot fomentation and antibiotics and no FNAC was done in these cases.

Results

Total of **109 cases** were diagnosed with mastitis clinically. All the patients were females. **27 cases** were managed with analgesic and antibiotics based on clinical severity. **82 cases** who presented with breast lump/ in duration were subjected to FNAC and microbiological studies. Results are displayed in Table 1 and Table 2.

Table 1: Classification of Mastitis

Type of mastitis	Lactational	Non lactational	Inflammatory	Non inflammatory
Simple mastitis	17	10	-	-
Acute mastitis/abscess	30	27	35	22
Granulomatous mastitis	1	10	3	8
Fat necrosis	-	7	1	6
Hematoma	-	4	1	3
Mastitis not otherwise specified	-	3	-	3
Total	48	61	40	42

Table 2: Distribution of microbiological isolates

Organism	Number of cases
1.Negative culture and microscopy	42
2.Fungal: Candida Albicans	01
3.Tuberculosis TB Atypical mycobacterium	02 01
4.Bacterial: Staphylococcus aureus Streptococcus Enterobacteriaceae Corynebacterium Escherichia Coli Pseudomonas	26 02 02 03 02 01

Table 3: Case Distribution of Inflammatory Breast Disease based on Blood sugar levels

	Lactating	Non Lactating
Increased FBSL/PPBSL	2(1.8%)	8(7.3%)
Normal sugar levels	46	53

All the cases were seen in females. 59 cases were seen in left breast, 48 cases were in right breast and 2 cases in bilateral breasts. Mean age of presentation with mastitis was 32years, range (22-65years). Mean age of presentation for lactating women was 23years, range (22-34years). Mean age of presentation for non lactating women was 34years, range(26-65years).

Out of 12 cases of granulomatous mastitis diagnosed, 3 cases were diagnosed as Tuberculous based on cytology along with AFB, CNAAT and TB cultures. 2cases were CNAAT and AFB positive. 1case was AFB positive and CNAAT negative. Repeat FNAC was sent for TB culture which isolated atypical mycobacterium. Rest of the cases were diagnosed as idiopathic granulomatous mastitis after negative microbiology findings. 1 case of Candida was seen. Patient was a case of uncontrolled Diabetes Mellitus.

Data of blood sugar was available for all 109 cases from patient records. Refer table no. 3. Acute mastitis was managed with antibiotics and surgical drainage was done if they were not responsive to medical management. Subareolar abscess was treated by excision of abscess and lactiferous duct in addition to antibiotics. TB mastitis was started with anti tubercular drugs. In

case of Fungal mastitis diabetic control, antibiotics, antifungal and surgical drainage was administered.

Idiopathic granulomatous mastitis treatment was challenging. 8 cases were started on steroids. Variable response to treatment was seen. A combination of antibiotics and surgery was used in treatment of these cases.

Histopathological evaluation was done in all cases where surgical intervention was done. FNAC correlated with histopathology in most of the cases. However, 2 cases of acute mastitis (abscess) with acute inflammatory reaction on FNAC were diagnosed as idiopathic granulomatous mastitis on histopathological evaluation.

In case of Fungal mastitis diabetic control, antibiotics, antifungal and surgical drainage was administered.

Duct ectasia, foreign body granuloma were managed surgically. No surgical intervention was done in case of fat necrosis and hematoma. They were managed clinically

Discussion

Benign breast disease is the most common cause of breast problems. 30% of women require treatment at some time in their lives. The most

common symptoms are pain and lump in the breast.⁸

Bacterial mastitis is the commonest variety of mastitis and commences acutely. It is most commonly associated with lactation in majority of the cases but it may not necessarily be so.^{8,9} In our study we found that infective mastitis was common in lactating women and non infective mastitis was common in non lactating women. Some of the cases of mastitis are associated with infected hematoma and with periductal mastitis.

In lactational mastitis most cases were caused by *Staphylococcus aureus*. The infants are usually the intermediary. After 2nd day of life 50% infants harbor staphylococcus in the nasopharynx. Cleaning the baby's mouth with swab is an etiological factor. The mucosa is excoriated and becomes infected. The organism in infants saliva is inoculated on mother's nipple. Women with sore or cracked nipple are prone for ascending infection. Lactiferous duct gets blocked by epithelial debris leading to stasis of staphylococcus aureus causing clotting of milk and within this clot the organism multiplies.^{10,11}

Diabetes mellitus has been associated with increased rates of infection.^{12,13,14} We found 9.1% of women having Diabetes, 1.8% were lactational and 7.3% were non lactational. However the data available is limited and this needs a larger study to evaluate the findings for correlating the effect of Diabetes in causing mastitis. Mastitis was common in left breast than right breast. However, there is no comparative data available to determine predisposing factor and it needs a large scale study to understand the same. However, in our study we found that improper practice of breast feeding on Left side caused the same.

FNAC is considered a useful tool in the diagnosis of breast mass and lesions. It is the least invasive technique of obtaining a cell diagnosis and is very accurate if done by experienced cytologist.^{15,16} It differentiates malignant from benign cases and can be used in directing the management and treatment. FNAC aspirate when combined with microbiological cultures and specialized tests like

ZN staining, CBNAAT testing, PAS and GMS can further help in specific diagnosis from a single aspirate and enhance the management of these patients in the era of evidence based medicine.¹⁶ However a report of negative culture does not exclude infection as most cases receive antibiotic treatment quite early at the start of mastitis.¹⁷ This study highlights the use of ZN staining, CBNAAT in differentiating tuberculous mastitis from idiopathic granulomatous mastitis. Utilizing TB culture further enhances identification of atypical mycobacterium induced tuberculous mastitis.¹⁸ Risk factors for mastitis are primarily sore and cracked nipples, increased maternal age, obesity and tobacco smoking.¹⁹ In our study Diabetes Mellitus, extremes of age, wrong breast feeding practices and tuberculosis were risk factors for mastitis. Breast abscess was seen in pregnant and lactating women. Hence they need to be trained and counselled about breast feeding and hygiene of breast and nipples.¹²

Breast tuberculosis is a rare entity in the West as breast is relatively resistant to tuberculosis. However in India it constitutes 3% of treatable breast lesions.²⁰ Infection usually occurs as an extension of infection through contiguous structures such as chest wall, Tubercular pleurisy or through skin abrasions.²¹ FNAC showed epithelioid granulomas with giant cells, caseous necrosis and neutrophils. One case presented like acute mastitis. In our study one patient was a known case of pulmonary TB. One of the cases had axillary and cervical lymphadenopathy. FNAC done thus proved it to be tuberculous lymphadenitis. One case had no history of TB or TB contact.

In our study idiopathic granulomatous mastitis was diagnosed by excluding infectious etiologies. These patients showed good response to steroid therapy. However some needed surgical intervention. They were difficult to treat as they came with recurrence and repeated surgical excisions were done in 2 cases. Idiopathic granulomatous mastitis showed non caseating granulomas with giant cells and few neutrophils.²⁰

Candida albicans was isolated in a non lactating female with uncontrolled hyperglycemia. FNAC revealed neutrophils with histiocytes and reactive ductal cells with budding yeasts seen on smear. The aspirate submitted for PAS, GMS and fungal culture confirmed the diagnosis.¹⁵

Fat necrosis may be acute or chronic and occurs in stout middle aged women following blow or indirect violence (contraction of the pectoralis major). It mimics a carcinoma with skin tethering and nipple retraction.²² Triple assessment of breast was done in these cases, 4 cases showed resolution of lump. Biopsy confirmed fat necrosis. FNAC had a good correlation in diagnosis of fat necrosis. But based on radiological, clinical findings and presentation, biopsy can be done to rule out malignancy as fat necrosis may be seen with carcinoma of breast.

Cytology shows numerous foamy macrophages, giant cells and neutrophils in acute stage. In later stages lymphocytes and myofibroblastic cells are seen. Epithelial cells may appear atypical. Cultures are negative.²³

Conclusion

It is evident from our study that breast infection (abscess) or infective mastitis is common in lactating women, however, it can occur at any age. Hence, stress has to be given on awareness of proper breast feeding and breast hygiene with special emphasis on infection control practices in nursery and maternity wards to prevent breast abscess formation. FNAC was found to be a useful tool in the diagnosis of infectious breast lesions and specific diagnosis can be done if pathologist submits the aspirate for microbiology studies. Tuberculosis should be considered a differential diagnosis for granulomatous mastitis in our area. Tuberculous mastitis should be differentiated from idiopathic granulomatous mastitis as treatment is completely different. Awareness of Breast care should be emphasized in women with diabetes for prevention of breast abscess.

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