

## Research Article

# The Cytological Spectrum of Male Breast Lesions - A Peep into the Histopathological Correlation

Pragnashree Mukhopadhyay\* and Pritilata Rout

Department of Pathology, St. John's Medical College, Rajiv Gandhi University of Health Sciences, India

## \*Corresponding author

Pragnashree Mukhopadhyay, Department of Pathology, Rajiv Gandhi University of Health Sciences, St. John's Medical College, 2nd Floor, College Building, Bangalore-560034, Karnataka, India, Tel: 91- 804946-6241; Email: m.prag11@gmail.com

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## Keywords

- Male breast
- Cytopathology
- Histopathological correlation

## Abstract

**Background:** To study the cytological spectrum of male breast lesions in a tertiary care hospital in South India

**Materials and Methods:** It was a retrospective study of the palpable male breast lumps that were subjected to FNAC over eight years from January 2007 to December 2014. The reports from the archives were analyzed. The diagnoses were categorized as Inadequate, Benign, Indeterminate and Malignant. Histopathological correlation and follow up were studied, wherever available.

**Results:** Out of 3237 breast FNACs, 128 were in males (3.95%). 15/128 were inadequate (11.81%), 101/128 benign (78.90%), 7/128 indeterminate (5.47%) and 5/128 malignant (3.9%). Gynaecomastia was the most common lesion. The spectrum of the diagnosis ranged from inflammatory lesions, gynaecomastia, fibroadenomas, proliferative breast disease without atypia and lipomas in the benign category to infiltrative ductal carcinoma in the malignant category. The indeterminate category included diverse diagnosis. Histopathological correlation was available for 23/128 cases (17.97%). The histopathological diagnosis correlated with cytology in all the malignant cases and 8/9 benign cases. For patients in the benign category who were kept under a conservative management, the non-progression of the lesions on follow up served as a pointer of correct diagnosis. In the indeterminate category, histopathology gave the final diagnosis.

**Conclusions:** FNAC provides a reliable diagnosis in majority of the cases. However, in cases with high degree of clinical suspicion or insufficient material on aspirate, it is advisable to do biopsy for correlation. The most significant role of biopsy remains in cases where FNAC gives a diagnosis in the indeterminate category.

## ABBREVIATIONS

FNAC: Fine Needle Aspiration Cytology; DFSP: Dermatofibrosarcoma Protuberans

## INTRODUCTION

Male breast lesions form a minor portion of the male patients presenting to the hospital for evaluation. Developmentally, the male and female breasts are similar till puberty when due to the estrogen surge in women, the breast parenchyma starts developing while the lack of it in males ceases the same [1]. As a majority of the breast lesions are estrogen dependent, this explains the rarity of breast lesions in males. However infrequent it may be, male breast lesions are nevertheless encountered by clinicians, ranging in a spectrum from benign gynaecomastias to the much rarer carcinomas. Like in all palpable lumps, fine needle aspiration cytology (FNAC) is one of the first line investigations.

The role of FNAC in a definitive pre-operative diagnosis in these patients continues to be a subject of interest.

The aim of our study was to analyze the cytological spectrum of the male breast lesions in a large tertiary care center in South India and to evaluate the cytology - histology correlation wherever histopathology was available.

## MATERIALS AND METHODS

It was a retrospective analytical study over a period of eight years from January 2007 to December 2014. All the male breast lesions that were subjected to FNAC in the given time frame were included in the study. The diagnoses were classified into four categories: Inadequate, Benign/Negative for malignancy, Indeterminate for malignancy and Malignant. Cases were categorized as inadequate when both blind and ultrasound guided procedures failed to yield diagnostic material. The benign category included gynaecomastia, fibroadenomas, inflammatory

conditions, proliferative breast disease without atypia and others. The indeterminate category included cystic lesions, papillary lesions, proliferative breast disease with atypia, mesenchymal lesions among others. The malignant category included lesions that were clearly carcinomas on cytology. Wherever available, the reports of histopathology of the resected specimens were also analyzed for a histology-cytology correlation. The follow up was collected from the patient charts/outpatient folders wherever available.

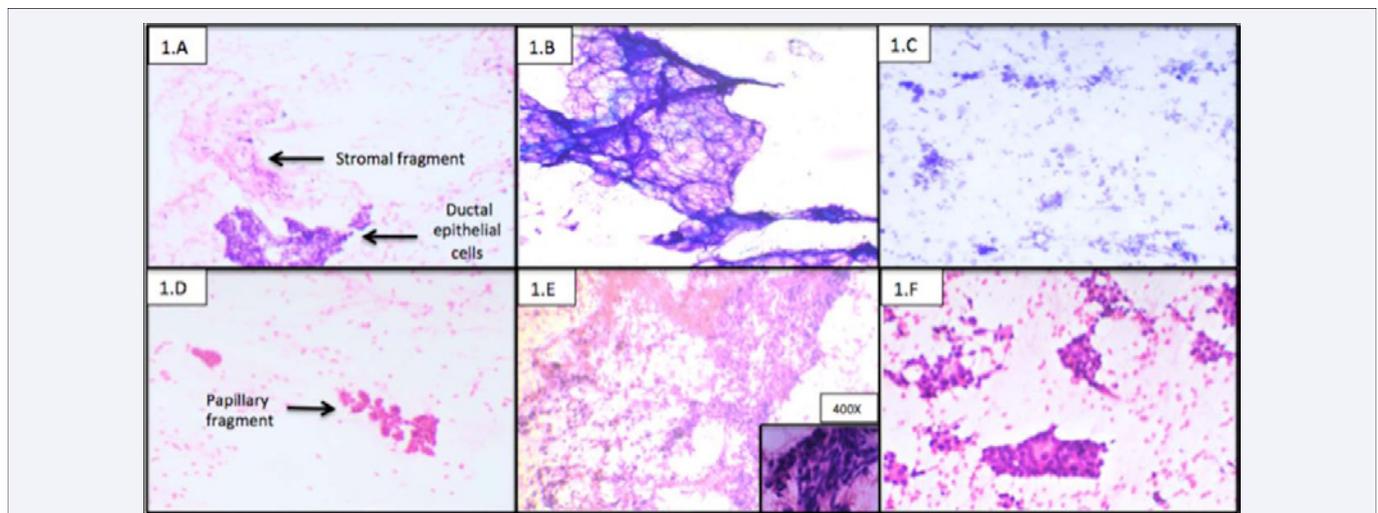
## RESULTS AND DISCUSSION

Out of the 3237 breast lumps that were subjected to FNAC in the time period of the study, 128 were in male patients (3.95%). The age of the patients ranged from 19-76 years with a median of 45 years. While the median age of patients diagnosed with gynaecomastia was 45 years, which of the patients diagnosed

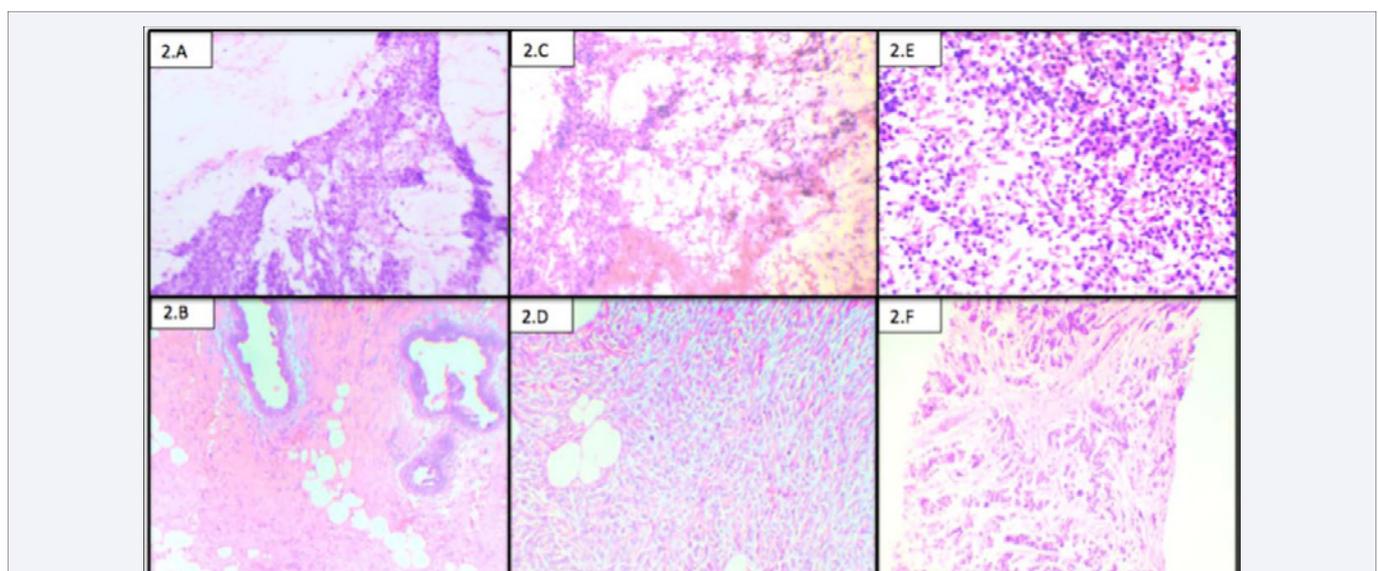
with malignancy was 61 years.

101/128 cases (78.90%) were classified as benign, 7/128 (5.47%) as indeterminate, 5/128 (3.90%) as malignant and 15/128 (11.81%) as inadequate. The distribution of the cases in the various categories with the diagnosis is provided in Table 1, Figure 1 Shows some of the histopathological diagnosis.

The most common lesion in the breast was gynaecomastia in the benign category which included 54.69% cases. The inflammatory category (11/128) included lesions with acute suppurative inflammation (8/11), fat necrosis (1/11), idiopathic granulomatous mastitis (1/11) and tuberculous mastitis with demonstrable acid fast bacilli (1/11). Cases that were reported as mature adipose tissue/lipoma (8/128) were called so when both the blind and ultrasound guided aspiration yielded no other material. Clinical and radiological correlation was advised for



**Figure 1** Photomicrographs depicting some of the diagnosis. 1. A – Gynaecomastia (H&E, 100X), 1. B – Lipoma (MGG, 100X), 1. C – Suppurative inflammation (MGG, 100X), 1. D – Papillary lesion (H&E, 100X), 1. E – Mesenchymal lesion (H&E, 100X), 1. F – Ductal carcinoma (H&E, 200X).



**Figure 2** Photomicrographs depicting histological correlation. 2. A,B – Gynaecomastia (H&E, H&E, 100X, 40X), 2. C,D – DFSP (MGG, H&E, 100X, 100X), 2. E,F – Invasive ductal carcinoma (H&E, H&E, 100X, 40X).

these patients.

There were seven cases in the indeterminate category (5.47%). There were two cystic lesions which yielded only cyst macrophages in a fluid background without any epithelial cell component. The others included one mesenchymal lesion, one papillary lesion, one case of proliferative breast disease with atypia, one case with myoepithelial cell morphology and one case in which a few atypical cells were seen and a frozen section was advised.

5/128 cases (3.90%) cases were in the malignant category and all were ductal carcinomas.

15/128 (11.81%) cases were reported as inadequate in our series.

A histopathological correlation was available in 23 cases (17.97%), 9/101 benign, 4/7 indeterminate, 5/5 malignant and 5/15 inadequate cases. Figure 2 depicts the histopathological correlation of some of the cases.

- All malignancies and benign cases diagnosed on FNAC were confirmed on histopathology except one case that had been reported as mature adipose tissue and was diagnosed as invasive ductal carcinoma on histopathology.
- The sensitivity and specificity, when the diagnoses of benign and malignant categories were considered were 83.33% and 100% respectively (Table 2).
- All the inadequate cases were diagnosed as gynaecomastia.
- The histopathological correlation of the 4 cases in the indeterminate category is as given in Table 3.

2/4 cases in the indeterminate category were diagnosed as invasive ductal carcinoma on histopathology. These included the one case with myoepithelial cell morphology and the other that had been reported as proliferative breast disease with atypia. The mesenchymal lesion on cytology was found to be a dermatofibrosarcoma protuberans and was confirmed with CD34 positivity on immunohistochemistry. The one case in which cytology had been reported as a few atypical cells showed marked epithelial hyperplasia on histopathology.

Follow-up was available for 113/128 (88.3%) cases, with a follow-up period ranging from 3 years – 10 years. This group included all the cases, which had subsequent surgery and histological correlation. 15/128 (11.7%) cases were lost to follow up. This group included 13 cases in the benign category, one case in the indeterminate category (reported as a papillary lesion) and one case in the inadequate category.

All the patients diagnosed with malignancies (five from the malignant category and two from the indeterminate category) had event free post-operative recovery and were treated with chemotherapy and radiation as per staging. Two of these patients opted to go back to their hometown for further management and were discharged with advice for further management.

The patient finally diagnosed as dermatofibrosarcoma protuberans had clear post-operative margins and no recurrence. Of the patients with a benign diagnosis on cytology who underwent a subsequent biopsy/surgery, all had a smooth

post-operative recovery except one patient who developed an infection at the incision site and was managed with an extended cover of antibiotics.

Of the 90 remaining patients with no subsequent histology for correlation, 79 belonged to the benign category, two in the indeterminate category and nine in the inadequate category. All the patients in the benign category chose a conservative management with no progression/reduction of the lesions on follow up. The inflammatory lesions were treated with antibiotics and incision and drainage where required. The one case that was diagnosed as Tuberculosis was started on ATT and the lesion completely disappeared post completion of treatment.

Nine patients in the inadequate category and two in the indeterminate category also followed a conservative management without a repeat cytology/biopsy as the clinical and radiological index of suspicion was very low. These patients also had no progression of the breast lumps on follow up. For both the cystic lesions, the lump disappeared completely after aspiration and did not recur.

The percentage prevalence of male breast lesions amongst all breast lesions that were aspirated was found to be 3.95% in our study which compared to that reported by Pailoor et al. [2], at 3.6% and Macintosh et al. [3], at 3.2%. Table 4 compares the percentage of our study with other studies.

Gynaecomastia was seen in patients with a median age of 45 years and carcinoma was common in a much older age group with a median age of 61 years. This correlates with other studies [4].

All studies in the literature report a higher prevalence of benign lesions in male breasts with gynaecomastia being the most common diagnosis [1-6]. In our study, gynaecomastia had a prevalence of 78.9% which compared to 63.63% by Jain et al [4], 79.3% by Gill et al. [1], and 72.27% by Ranbeer et al [6]. Table 5 compares the number of cases in our study in the 4 different categories with those reported by two other studies.

Fibroadenomas were found to be 3.12% (4/128 cases) in our study. Fibroadenomas in male breasts have been reported as case reports [7]. Fibroadenomas are extremely common in women but are not so in males. This is because of the anatomical difference in the male and female breast. In male breasts, lobules are very few and hence, fibroadenomas which arise from the ductulo-lobular units are rare [8].

Inflammatory lesions are well documented in female breasts but are also seen in the male breasts. In our study, inflammatory lesions formed 8.6% of the cases which compared to 9.09% by Jain et al. [4], and 5.4% by Gill et al [1]. In our study, we reported one case of necrotizing inflammation in the male breast with a positive staining for acid fast bacilli, hence diagnosed as tuberculosis. Tuberculosis of the male breast is rare and many of the case series on male breast cytology did not report any cases [2,4,9]. There have been case reports of the same in the past [10].

On the other end of the spectrum were cases of ductal carcinomas of the male breast. Male breast cancers are rare and account <1% of all breast cancers [11]. Table 5 gives the prevalence in our study as compared to two other studies.

Our study found a good histo-pathological correlation when

**Table 1:** The spectrum of diagnosis in the study.

Category	Diagnosis	No. of cases (n=128)	Percentage of total cases	Percentage within category
<b>Benign</b>				
101/128 (78.90%)	Gynaecomastia	70	54.69%	69.3%
	Inflammatory	11	8.6%	10.89%
	Fibroadenoma	4	3.12%	3.96%
	Proliferative breast disease without atypia	8	6.25%	7.9%
	Others (Lipoma, Mature adipose tissue)	8	6.25%	7.9%
<b>Indeterminate</b>				
7/128 (5.47%)	Papillary lesion	1	0.78%	14.28%
	Mesenchymal lesion	1	0.78%	14.28%
	Cystic lesions	2	1.56%	28.57%
	Proliferative breast disease with atypia	1	0.78%	14.28%
	Neoplasm with plasmacytoid morphology, myoepithelial origin suggested	1	0.78%	14.28%
	A few atypical cells, advised frozen section	1	0.78%	14.28%
<b>Malignant</b>				
5/128 (3.9%)	Ductal carcinoma	5	3.9%	100%
<b>Inadequate</b>				
15/128 (11.81%)	----	15	11.81%	----

**Table 2:** Histopathological correlation in the clearly benign and malignant categories.

	Histopathology benign	Histopathology malignant
FNAC benign	8	1
FNAC Malignant	0	5

**Table 3:** Histopathological diagnosis of the four cases in the indeterminate category.

S.No	FNAC Diagnosis	Histopathological diagnosis
1)	A few clusters with Nuclear atypia and high N/C ratio, Advice frozen	Epithelial hyperplasia in a background of gynaecomastia
2)	Mesenchymal lesion	Dermatofibrosarcoma Protuberans (DFSP)
3)	Neoplasm of plasmacytoid morphology, myoepithelial origin is suggested	Invasive Ductal Carcinoma
4)	Proliferative breast disease with atypia	Invasive ductal carcinoma

**Abbreviations:** FNAC: Fine Needle Aspiration Cytology; DFSP: Dermatofibrosarcoma Protuberans

**Table 4:** Percentage prevalence of male breast lesions.

Study	Percentage of male breast lesions
2014, Present study	3.95%
2014, Pailoor et al [2]	3.6%
2008, Macintosh et al [3]	3.2%
2014, Jain et al [4]	6.34%
2009, Wauters et al [5]	1.7%

**Table 5:** The incidence of cases in the four categories in this study compared to other studies.

Study	No. of male breast lesions	Benign	Indeterminate	Malignant	Inadequate	No. of cases with histological correlation
Pailoor et al [2]	40	36 (90%)	3 (7.5%)	1 (4.16%)	0 (0%)	8 (20%)
Wauters et al [5]	147	78 (53.06%)	9 (6.12%)	15 (10.2%)	45 (30.6%)	85 (58%)
Present study	128	101 (78.9%)	7 (5.47%)	5 (3.9%)	15 (11.81%)	23 (17.97%)

the diagnosis on cytology was classified in either of the two definite categories of benign or malignant. This is in concordance with other studies in the literature [5,6,12]. Except for one case which had been reported as mature adipose tissue on cytology that was found to be a carcinoma on histopathology, all other diagnosis correlated. This one discordance could be attributed to a sampling error rather than an interpretive error. For the cases where subsequent histology was not available, the follow up of the patients with no progression of the lesions reinforced the benign diagnosis on cytology to be correct. Hence, FNAC is a good initial diagnostic tool for a majority of the male breast lumps that present to the hospital.

In minority of the cases, when FNAC fails to yield a definite diagnosis or is categorized an indeterminate lesion, a biopsy is necessary, especially so, if the index of clinical and radiological suspicion is high. In our study, the biopsy of two of the cases in this category was found to be malignant and one case only had marked epithelial hyperplasia. One interesting diagnosis was that of a dermatofibrosarcoma protuberans (DFSP) on histopathology which had been called a mesenchymal lesion on cytology. DFSP is also a very rare entity in the male breast with case reports documented in the literature [13,14]. One of the indeterminate cases was lost to follow up where as two patients were kept on a conservative wait and watch approach due to a low index of suspicion.

## CONCLUSION

Hence, while FNAC is a reliable diagnostic tool in majority of the cases, biopsy becomes mandatory in certain cases where cytology gives a diagnosis in the suspicious or indeterminate category.

## REFERENCES

1. Gill MS, Kayani N, Khan MN, Hasan SH. Breast diseases in males--a morphological review of 150 cases. *J Pak Med Assoc.* 2000; 50: 177-179.
2. Pailoor K, Fernandes H, Cs J, Marla NJ, Keshava S M. Fine needle aspiration cytology of male breast lesions - a retrospective study over a six year period. *J Clin Diagn Res.* 2014; 8: FC13-15.
3. MacIntosh RF, Merrimen JL, Barnes PJ. Application of the probabilistic approach to reporting breast fine needle aspiration in males. *Acta Cytol.* 2008; 52: 530-534.
4. Jain R, Shah SA, Kadam TB, Gonsai RN, Vala K. Male breast lesion profile in a tertiary care hospital in western India on fine needle aspiration. *IJCRR.* 2014; 6: 90-95.
5. Wauters CA, Kooistra BW, de Kievit-van der Heijden IM, Strobbe LJ. Is cytology useful in the diagnostic workup of male breast lesions? A retrospective study over a 16-year period and review of the recent literature. *Acta Cytol.* 2010; 54: 259-264.
6. Singh R, Anshu, Sharma SM, Gangane N. Spectrum of Male Breast lesions Diagnosed by Fine Needle aspiration Cytology: A 5- Year Experience at a Tertiary Care Rural Hospital in central India. *Diagn Cytopathol.* 2012; 40: 113-117.
7. Sunder G, Snigdha G, Trikha A. Fibroadenoma in male breast: Case report and review. *Clin Cancer Investig J.* 2015; 4: 220-222.
8. Gupta P, Foshee S, Garcia-Morales F, Gray T. Fibroadenoma in male breast: case report and literature review. *Breast Dis.* 2011; 33: 45-48.
9. Das DK, Junaid TA, Mathews SB, Ajrawi TG, Ahmed MS, Madda JP, et al. Fine needle aspiration cytology diagnosis of male breast lesions. A study of 185 cases. *Acta Cytol.* 1995; 39: 870-876.
10. Jaideep C, Kumar M, Khanna AK. Male breast tuberculosis. *Postgrad Med J.* 1997; 73: 428-429.
11. Fentiman IS, Fourquet A, Hortobagyi GN. Male breast cancer. *Lancet.* 2006; 367: 595-604.
12. Rosen DG, Laucirica R, Verstovsek G. Fine needle aspiration of male breast lesions. *Acta Cytol.* 2009; 53: 369-374.
13. Al Tarakji M, Toro A, Di Carlo I, Junejo K. Unusual presentation of dermatofibrosarcoma protuberans in a male patient's breast: a case report and review of the literature. *World J Surg Oncol.* 2015; 13:158.
14. Akhtar K, Sherwani RK, Ray PS. Dermatofibrosarcomaprotuberans of male breast: an unusual presentation. *Oman Medical Specialty Board.* 2012; 1-3.

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