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Research Article

Role of fine needle aspiration cytology in male breast lesion: 4 year observational study

Pratik Mohanrao Chide[1]*, Suprita Nayak[2], Dinkar Kumbhalkar[2]

[1]Department of Pathology, Shri Vasantrao Naik Govt. Medical College, Yavatmal, Maharashtra, India
[2]Department of Pathology, Government Medical College, Nagpur, Maharashtra, India

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***Correspondence:**
Dr. Pratik Mohanrao Chide,
E-mail: pratikchide@gmail.com

ABSTRACT

Background: Fine needle aspiration (FNA) is a well-established and widely accepted procedure in the evaluation of breast masses. However breast masses in males is rarely aspirated and hence there is limited cytopathologic experience. The aim of our study was to determine the efficacy of FNAC in the diagnosis of male breast lesions and also we attempted to describe the cytomorphological features of some of these lesions. Its advantages over other more invasive diagnostic methods, in terms of speed, cost effectiveness and low complication rate have made it a first line investigation for both diagnosis and management of breast lesions.
Methods: Data on male breast FNAC done between June 2009 to June 2013 were retrieved from the records of the department of pathology. FNAC diagnoses were categorized as: C1 (Inadequate/ Insufficient) C2 (benign), C3 (Atypical /Indeterminate), C4 (Suspicious /probably malignant), C5 (malignant). Histopathological correlation done with subsequent surgical specimens wherever possible. Sensitivity, specificity and diagnostic accuracy were calculated using standard statistical methods.
Results: 53 out of 2144 patients undergoing breast FNAC were males. Histopathology was available in 7 (13.20%) out of 53 cases. FNAC had a sensitivity of 80%, specificity of 100% and diagnostic accuracy of 85.71 % for male breast lesions.
Conclusions: FNAC is a very accurate tool for the diagnosis of male breast lesions. It is less sensitive due to inadequate cellularity but when cellularity is adequate then it is 100% specific. To reduce the high rate of surgical biopsies of benign male breast masses, we conclude that FNAC should be performed as a standard procedure in the clinical evaluation of male breast lesions.

Keywords: FNA, Male breast, Gynaecomastia

INTRODUCTION

Fine needle aspiration cytology (FNAC) is well established and widely accepted procedure in the evaluation of breast masses. In spite of advent of sophisticated diagnostic methods, FNAC remains a critical diagnostic modality in the work up of breast masses in developing country.[1]

The approach to the work up of breast lump should be an early diagnosis that relieves the patients anxiety, saves times, and helps plan proper management. And FNAC has firmly established itself as an invaluable investigation tools in all these respects. Its numerous advantages over open biopsy in terms of speed, cost-effectiveness, low-complication rate and high diagnostic accuracy have made it the method of choice as a preliminary preoperative diagnostic modality of breast lesions.

The success of a breast FNAC service depends on the application of well- defined cytologic criteria for assessing adequate tissue sampling and for rendering

diagnosis. The current standard practice in most countries is to classify cytologic results into one of five categories, these being C1 (nondiagnostic), C2 (benign), C3 (atypical), C4 (suspicious) and C5 (malignant). This study is conducted to determine adequacy rate, sensitivity and specificity of FNA in the evaluation of male breast lumps.[2]

METHODS

The present study was carried out in the 'Department of pathology, Government Medical College, Nagpur' after obtaining permission from the Institute's Ethics committee. The medical records of all the patients who underwent FNAC of breast lumps at our centre between June 2009 to June 2014 were reviewed and data on the male breast aspirates were analysed. After explaining complete procedure, written informed consent was obtained from the patient. All aspirates were performed in the outpatient department using 23-gauge needle and 10 ml syringe by the cytopathologist. Air dried smears were prepared and stained by the May-Grunwald-Giemsa method. In addition, smears were wet-fixed in 95% ethyl alcohol and subsequently stained with Papanicolaou stain as well as Haematoxylin and Eosin (H & E) stain. The stained smears were classified into above mentioned five major diagnostic categories such as C1, C2, C3, C4 & C5. Histopathologic diagnosis was obtained wherever available and the cytologic diagnosis was retrospectively correlated with histologic findings. Finally statistical analysis was done by calculating the sensitivity, specificity and diagnostic accuracy of the aspirates.

RESULTS

This observational study included 2144 patients. There was a marked female predominance 97.52% (2091 cases) while male comprising only 2.43% (53 cases) of the total 2144 cases. The age ranged from 13 to 80 years with a mean age of 43.86 year. Diagnostic aspirates were obtained in 49 cases while in 4 cases cellularity were unsatisfactory. These aspirates were each categorized into the following groups as shown in Table 1. C1 (non-diagnostic) 4 cases, C2 (benign) 42 case, C3 (atypical) 3 cases, and C5 (malignant) 4 cases. No case was found in C4 (suspicious) category.

Table 1: Categorization of male breast sample.

Categories	No. of cases	Percentage
Inadequate/Insufficient (C1)	4	7.54
Benign (C2)	42	79.24
Atypical/Intermediate (C3)	3	5.66
Suspicious (C4)	0	0
Malignant (C5)	4	7.54
Total	53	100

As shown in Table 2, of the 53 male breast lesions majority cases were of Gynaecomastia (38 cases) followed by Ductal malignancy (4 cases). 3 cases of epidermal cyst, 2 cases of prolifrative breast lesion with atypia and 1 case of gynaecomastia with atypia were recognized. A rare case of lactiferous duct fistula in male breast was also identified.

Table 2: Diagnosis of breast lesions in males.

Diagnosis on cytology	No of cases
Unsatisfactory	4
Gynaecomastia	38
Ductal malignancy	4
Epidermal cyst	3
Proliferative breast lesion with atypia	2
Gynaecomastia with atypia	1
Lactiferous duct fistula/ Subareolar abscess	1
Total	53

Cytomorphologic features of the lesions in our series

The most common diagnostic entity encountered in our study was gynaecomastia. Smears showed variable amount of cellular material, ranging from moderately cellular smears to extreme hypercellularity with numerous crowded tissue fragments. However, more commonly a moderately cellular smear pattern was noted.

Smears showed large, tightly cohesive epithelial fragments often appearing as flat monolayered sheets. Mixed biphasic population of epithelial and stromal fragments were also seen (Figure 3). Scattered bipolar to oval myoepithelial nuclei were seen in the background of the smears. Only two cases were confirmed histologically.

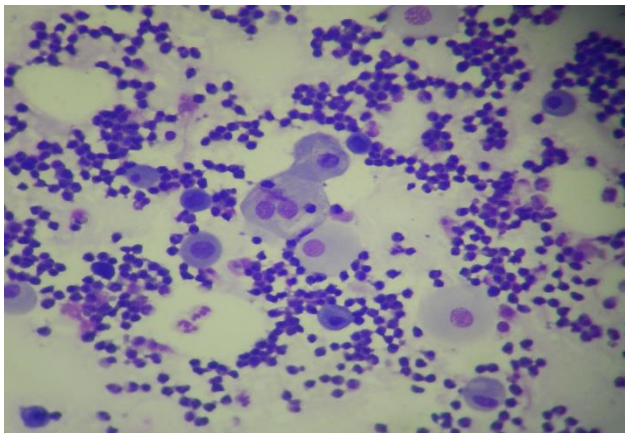

Figure 1: Lactiferous duct fistula. Smear show mature squamous cell with neutrophils.

We had 4 cases of ductal carcinoma. Smears were hypercellular with tumour cells in discohesive sheets and dispersed singly. The cells were relatively large, with pleomorphic, eccentrically placed, round to oval nuclei and had abundant eosinophilic cytoplasm (Figure 2).

Histologically all 4 cases were diagnosed as invasive ducal carcinoma.

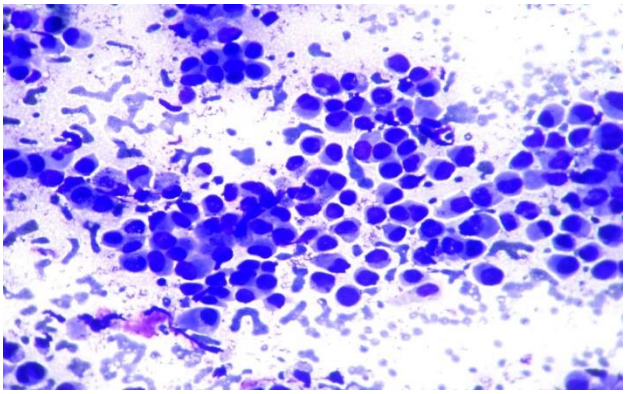

Figure 2: Male breast ductal malignancy. Smear show discrete population of malignant cell, having high N/C ratio with centrally to eccentrically placed pleomorphic nuclei.

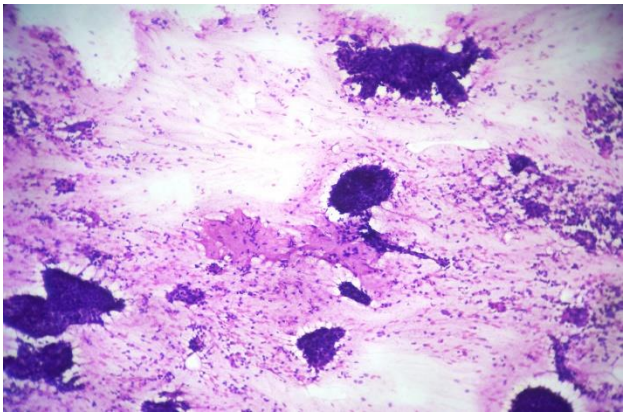

Figure 3: Gynaecomastia; smear show cohesive groups of benign ductal cells with stromal fragments and bare bipolar nuclei.

In present study 2 were cases diagnosed as Proliferative breast disease with atypia. Histopathology was available in only one case and it was diagnosed as invasive ductal malignancy. In this case smears were celluar with many epithelial cells presents in groups which showed significant crowding and overlapping with cellular atypia.

In this study 3 cases were identified as epidermal cyst. Smears examined showed many anucleate squames and few benign nucleated squamous cells in a background containing inflammatory infiltrate along with few clusters of ductal epithelial cells with preserved myoepithelial component.

We had one rare case of lactiferous duct fistula on FNA. Smear shows keratinous debris and mature squamous cells with chronic granulomatous reaction in stroma (Figure 1).

Statistical analysis

As shown in Table 3 the adequacy rate was 92.45%, while the inadequacy rate was found to be 7.43%.

Table 3: The adequate and inadequate samples.

Categories	No. of samples	Percentage
Adequate	49	92.45
Inadequate	4	7.43
Total	53	100

Cytohistological correlations were available in 5 cases. Out of this C1 category were not considered in this table. Remaining categories (C2 to C5) were broadly divided into positive for malignancy and negative for malignancy. Negative for malignancy included all benign and atypical lesions while positive for malignancy included only malignant lesions.

From this Table 4, interpretation drawn as in present study sensitivity was 80%, specificity was 100% and diagnostic accuracy was 85.71%. The sensitivity low in our study probably due to unavailability of histopathology report in all cases as well as unsatisfactory/ inadequacy of sample in few cases.

Table 4: Statistical analysis.

Cytology	Histopathology		
	Positive	**Negative**	**Total**
Positive	4	0	4
Negative	1	2	3
Total	5	2	7

DISCUSSION

Table 5A and 5B represents clinical details of all 53 patients which are included in this study.

This observational study found 53 male breast lesions out of total 2144 cases. In our series, the total number of patients who underwent FNAC for the assessment of a breast lump was 2144 over a four year period with males constituting 2.43% (53 out of 2144 case). This was approximate similar to a study by MacIntosh et al, (3.2%).[1] However, Westend et al and Wauters et al, had very few cases such as 1.5% and 1.7% respectively.[2,3]

The maximum cases were in the age group of the third and sixth decade. Russin et al, observed bimodal peak in the third and seventh decades.[3] The youngest patient in this study was 13 year male while oldest was 80 year old man.

Martin Bates and Russin et al, found a near-total unilateral involvement in Gynaecomastia while in our study in 4 cases have bilateral involvement in Gynaecomastia.[4,5] In our study, 38 out of 53 cases

(71.69%) were Gynaecomastia and 34 out of 38 cases (89.47%) of them presented as unilateral breast lump. Gynaecomastia was more frequent in the left than right side (27 cases were left sided, 22 were in right sided and 4 cases have bilateral lumps). This was similar to the studies conducted by Das et al, and Martin-Bates et al, who observed it more in the left breast.[5,6]

Table 5A: Represents details of 25 male breast lesions.

Serial no.	Age	Sex	FNA diagnosis	Categories	Side	Qudrant	Size	Histo. diagnosis
1	21	M	GY	B	R	UIQ	3X3	Not done
2	56	M	GY	B	L	C	2X2	Not done
3	40	M	GY	B	L	UIQ	3X2	Not done
4	21	M	GY	B	BL	UIQ	2X1	Not done
5	40	M	EC	B	R	C	2X2	Not done
6	20	M	GY	B	L	C	2X2	Not done
7	40	M	GY	B	R	UOQ	2X2	Not done
8	23	M	GY	B	R	C	3X1	Not done
9	40	M	GY	B	L	UIQ	4X3	Not done
10	25	M	GY	B	R	C	3X3	Not done
11	57	M	GY	B	L	UIQ	3X3	Not done
12	47	M	GY	B	R	C	2X2	Not done
13	72	M	PBDA	B	L	UIQ	1X1	IDC
14	72	M	GY	B	R	UIQ	2X2	Not done
15	55	M	GY	B	R	UOQ	3X3	Not done
16	60	M	PBDA	B	L	UOQ	2X2	Not done
17	60	M	GY	B	L	UIQ	3X3	Not done
18	62	M	Lactiferous duct fistula	B	L	C	2X2	Not done
19	49	M	GY	B	R	UIQ	3X2	Not done
20	30	M	GY	B	L	UIQ	2X2	Not done
21	28	M	EC	B	L	C	1X1	Not done
22	40	M	GY	B	L	UIQ	3X3	Not done
23	13	M	GY	B	L	UIQ	1X1	Not done
24	60	M	DC	M	R	UOQ	3X3	IDC
25	16	M	GY	B	BL	UIQ	1X1	Not done

Table 5B: Represents details of another 23 male breast lesions.

Serial no.	Age	Sex	FNA diagnosis	Categories	Side	Qudrant	Size	Histo. Diagnosis
1	48	M	GY	B	L	LOQ	1X1	Not done
2	70	M	GY	B	L	C	2X2	Not done
3	21	M	EC	B	L	C	1X1	Not done
4	14	M	GY	B	L	UOQ	2X2	Not done
5	70	M	U	Inadequate	R	UIQ	2X3	Not done
6	43	M	GY	B	R	UOQ	2X2	Not done
7	62	M	DC	M	L	UOQ	3X4	IDC
8	75	M	GY	S	L	C	2X1	Not done
9	35	M	U	Inadequate	L	C	2X3	Not done
10	44	M	GY	B	R	C	2X2	Not done
11	50	M	DC	M	R	C	4X3	IDC
12	80	M	GY	B	R	LIQ	2X2	Not done
13	42	M	GY	B	R	UOQ	2X2	Not done
14	25	M	U	Inadequate	R	UOQ	2X3	Not done
15	68	M	DC	M	L	UOQ	4X2	IDC
16	65	M	GY	BL	R	LOQ	2X2	Not done

17	37	M	GY	B	L	UOQ	2X2	Not done
18	14	M	GY	B	BL	UOQ	2X2	Not done
19	65	M	GY	B	R	C	2X2	Not done
20	61	M	GY	B	L	UOQ	2X2	Not done
21	36	M	GY	B	R	UOQ	2X2	Not done
22	45	M	GY A	S	L	C	2X3	Not done
23	45	M	U	Inadequate	L	UOQ	2X2	Not done
24	20	M	GY	B	L	UOQ	2X3	GY
25	14	M	GY	B	BL	UOQ	3X2	Not done
26	40	M	GY	B	R	UIQ	3X2	GY
27	67	M	GY	B	R	C	3X1	Not done
28	22	M	GY	B	L	UOQ	1X1	Not done

M-Male, GY-Gynacomastia, GYA- Gynacomastia with atypia, DC-Ductal carcinoma, EC-Epidermal cyst, PBDA-Proliferative breast disease with atypia, B-benign, S-Suspicious, M-Malignant, R-Right, L-left, BL-Bilateral, UIQ-Upper inner quadrant, C-Central quadrant, UOQ-Upper outer quadrant, LOQ- Lower outer quadrant.

Gynaecomastia is the most common cause of masses in the male breast and is defined as the enlargement of the male breast due to proliferation of both glandular and stromal elements. The FNAC features of gynecomastia include three components such as poor to moderately cellular, cohesive sheets or groups of bland cells, bipolar bare nuclei and single, stroma. Mild to moderate cellularity was observed in 86% of cases by Russin et al in 96.2% of cases by Das et al, and 92.45% in the present study.[4,6] In present study 1 case diagnosed as gynaecomastia with atypia.

There was only one rare case of lactiferous duct fistula on FNA. The developments of lactiferous duct fistula in the male breast are generally caused by keratinizing metaplasia of lactiferous duct. The breast duct then become obstructed by the keratinous debris and may tear. Mature or anucleate squamous cells with a background of pus aspirated from the abscess deep to areola enable this diagnosis to be made.

In present study 3 cases diagnosed as epidermal cyst. Epidermal cyst is a benign lesion, which occurs due to proliferation and implantation of epidermal elements within a circumscribed space in dermis. They usually occur in the head and neck region, trunk and extremities. Epidermal cyst occurring in the breast is very rare.

In present study 2 cases diagnosed as proliferative breast disease with atypia.

Carcinoma in male breast is rare as compared to the female breast. In present study 7.54% (4 out of 53 cases) of breast lesion diagnosed as ductal malignancy. Macintosh et al observed similar finding (7.9% cases of ductal malignancy).[1]

Table 6: Results of the present study in comparisons with other studies.

Result	Westend et al[2]	Siddiqui et al[7]	MacIntosh et al[1]	Wauters et al[3]	Present study
No. of male FNA	153 (1.5%)	614 (4.3%)	138 (3.2%)	147 (1.7%)	53 (2.47%)
No. of cases with histologic follow up	72 (47%)	170 (28%)	23 (17%)	85 (58%)	5 (9.43%)
No. of malignant cases	15 (9.8%)	26 (4.23%)	11 (7.9%)	15 (10.2%)	4 (7.54%)
No.of unsatisfactory cases of all FNAs	13 (8.49%)	94 (15.4%)	46 (33.3%)	45 (30.6%)	4 (7.54%)
Sensitivity	87%	95.3%	95.5%	100%	75%
Specificity	78%	100%	100%	90.2%	100%

In the present study, we had 13.20% (7 out of 53) cases with histologic follow-up which is in contrast to that of a study by MacIntosh et al, (20%), Westend et al, (47%) and Wauters et al (58%).[1-3]

The number of unsatisfactory cases ranged from 11.7% to 33.3% in various studies. However, in present study unsatisfactory cases were 7.45% (4 cases out of 53 cases).

In present study specificity was 100%. Similar finding noted by Siddiqui et al, and MacIntosh et al.[1,7] We noticed 80% sensitivity while other likes Westend et al & Wauters et al show 100%, Siddiqui et al show 95.3% and MacIntosh et al show 95.5%.[1-3,7]

CONCLUSION

FNAC is a good sensitive and specific diagnostic tool for the assessment of breast masses in male patients. The routine use of FNAC greatly reduces the number of unnecessary biopsies and frozen sections for histopathologic evaluation, especially in case of Gynecomastia. Hence, we strongly recommend the use of FNAC as the first-line investigation in the clinical evaluation of male breast lumps.

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