Volume : 2 | Issue : 7 | July 2013 • ISSN No 2277 - 8179

Efficacy of FNAC in typing & grading of mammary carcinoma

Medical Science

KEYWORDS : Mammary carcinoma, diagnostic accuracy of FNAC, cytological type & grad

Dr. Alpa Shah	Associate Professor, Smt. NHL MMC, Ahmedabad, Gujarat, India
Dr. Rupal P. Mehta	Associate Professor, Smt. NHL MMC, Ahmedabad, Gujarat, India
Dr. Darshan J Gandhi	2nd year resident, Smt S.C.L. Hospital, Ahmedabad, Gujarat, India

ABSTRACT

In present study 40 cases of mammary carcinoma are studied during period of 2 years in Sheth L.G. General Hospital, AMC MET Medical college, Ahmedabad. Aim is to study cytological typing & grading of mammary carcinoma & to determine diagnostic accuracy of FNAC for mammary carcinoma. In present study we found 31 cases of IDC-NST, 1 case of tubular IDC, 2 cases of Medullary IDC, 1 case of Mucinous IDC, 3 cases of invasive lobular carcinoma & 2 cases of suspicious mammary carcinoma. From present study it is evident that Invasive ductal carcinoma-NST is most common type diagnosed on FNAC. Most of the carcinomas diagnosed are of grade I & grade II. Most of invasive ductal carcinoma-NST are from 41-60 years age group & are postmenopausal with most common site of upper outer quadrant.

Introduction

Fine needle cytology as practiced today is an interpretative art with histopathology as its scientific base.

FNAC is safe, simple, sensitive, specific, suitable for almost all cases, quick to apply, reproducible, save time, money, hospital stay & bed space. Unlike histology in cytology mainly the cell morphology is preserved.

FNAC is useful diagnostic tool for diagnosis of various mammary carcinoma & play important role in typing & grading of breast carcinoma.

Method of grading can easily be performed while scanning the slide with experience & correlates well with the Bloom Richardson grading scheme. It is also finding application in receptor & biological markers study, ploidy analysis, molecular biology & image analysis.

Because of changing option of treatment of breast carcinoma, preoperative typing & grading permits the surgeon to decide type of operation required, extent of surgical margins & level of axillary clearance & to decide even treatment by radiotherapy or chemotherapy.

Aims & Objectives

- To determine type of mammary carcinoma & grade them cytologically.
- To study & correlate clinical data with cytological typing & grading of mammary carcinoma
- To introduce FNAC as a routine diagnostic procedure.
- To determine diagnostic accuracy of FNAC with comparison to histopathology.
- To assist the surgeon in selection of operation & level of clearance.

Method & materials

The present study consists of 40 cases of breast carcinoma from our institute during period of 2 years. The details of clinical findings & relevant investigations were obtained in each & every case.

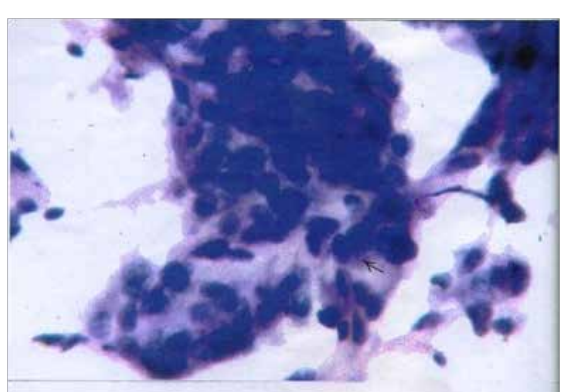
After explaining the procedure, consent is obtained from patient. With use of 10 ml disposable plastic syringe & 21 gauge disposable needle, FNAC procedure is performed with & without suction. Multiple passes in different directions, from different sites through lesion are performed.

Smears so prepared are immediately fixed in Ether-alcohol(50-50%) solution before air drying occurs, then stained by papanicolaou's staining method or air dry the smears for gimsa stain. Follow up biopsies are stained by Haematoxyline & eosin stain.

Method accepted for cytological grading & typing of mammary carcinoma6,15,17,22 is as follows:

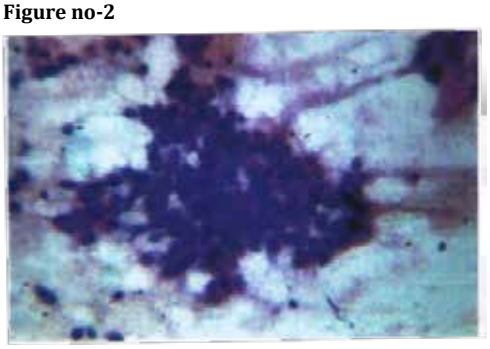
(1) Cell dissociation:
Score 1: 75% or more cells are in cluster.
Score 2: equal numbers of cells are in cluster & lying singly.
Score 3: 75% or more of the cells are lying singly.
(2) Nuclear size:
Score 1: equal to 1-2 erythrocytes.
Score 2: equal to 3-4 erythrocytes.
Score 3: equal to 5 or more erythrocytes.
(3) Cell uniformity:
Score 1: monomorphic population
Score 2: mild pleomorphism
Score 3: marked pleomorphism
(4) Nucleoli:
Score 1: not seen or just visible
Score 2: noticeable but single
Score 3: irregular or multiple
(5) Nuclear margin:
Score 1: not seen or just visible
Score 2: noticeable but regular
Score 3: irregular or multiple
(6) Chromatin pattern:
Score 1: vesicular as in benign ductal cells
Score 2: granular (salt & pepper appearance)
Score 3: clumping & clearing of chromatin
Score 6-11 : Grade 1
Score 12-14 : Grade 2
Score 15-18 : Grade 3

Figure no -1



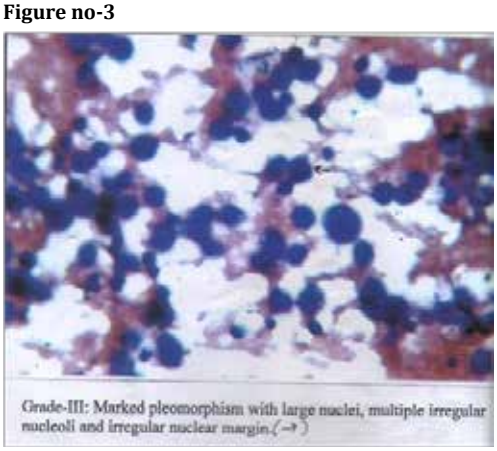
Grade-I: Cells showing mild pleomorphism, nuclear size equals to 1-2 erythrocytes, nucleoli is just visible, nuclear margin is regular & just visible and presence of vesicular chromatin pattern. (→)

Figure no-2



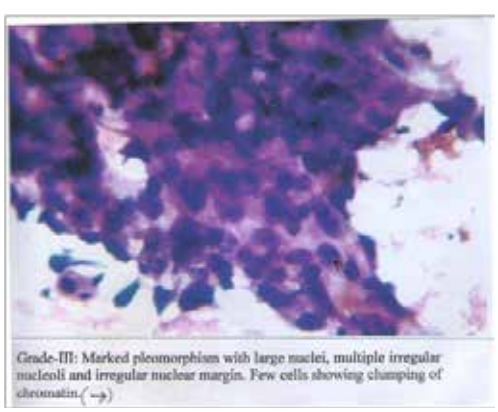
Cells are showing mild pleomorphism, with nuclear size equals to 1-2 erythrocytes, nucleoli not seen or just visible, just visible nuclear margin & granular chromatin, nuclear overlapping & nuclear hyperchromatism

Figure no-3



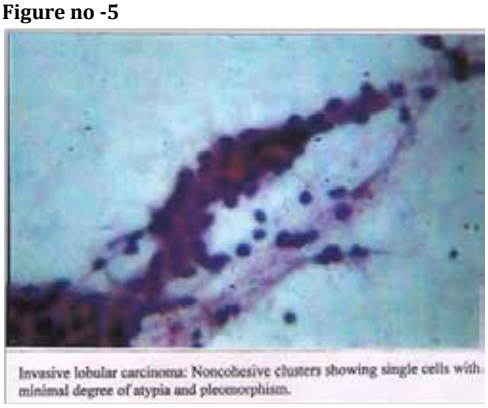
Grade-III: Marked pleomorphism with large nuclei, multiple irregular nucleoli and irregular nuclear margin.(→)

Figure no -4



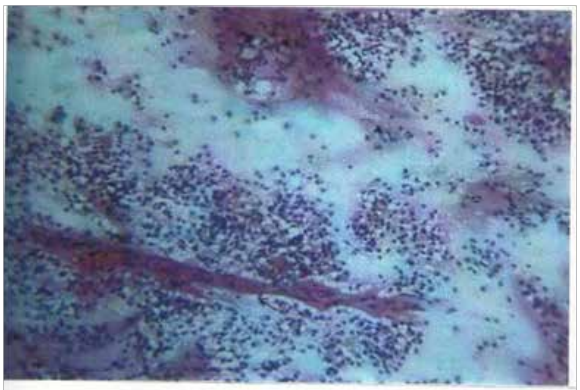
Grade-III: Marked pleomorphism with large nuclei, multiple irregular nucleoli and irregular nuclear margin. Few cells showing clumping of chromatin.(→)

Figure no -5



Invasive lobular carcinoma: Noncohesive clusters showing single cells with minimal degree of atypia and pleomorphism.

Figure no -6



Mucinous carcinoma: Small aggregates of bland epithelial cells and presence of delicate vessel traversing in the mucinous background. (→)

Observation:

The present study includes 40 cases of mammary carcinoma with clinical history, typing & grading & histological confirmation of diagnosis in our institute during period of 2 years in which FNAC was performed. The results obtained are summarized below:

Distribution of cases according to cytological type of carcinoma

Table no-1

Type		Total no of cases	Percentage %
Non invasive		0	0
Invasive Ductal	NST	31	77.5
	Tubular	1	2.5
	Medullary	2	5
	Mucinous	1	2.5
Invasive lobular		3	7.5
Suspicious		2	5
Total		40	100

Table no-1 shows that most of cases (31) have been diagnosed as INVASIVE DUCTAL CARCINOMA-NST (Non Specific Type) (77.5%)

Non invasive carcinomas were not diagnosed in the present study.

Distribution of cases according to cytological grade of carcinoma

Table no-2

Grade	Total no of cases	Percentage %
I	19	47.5
II	17	42.5
III	4	10
Total	40	100

Table 2 shows that out of 40 cases nineteen cases (47.5%) were of grade 1, 17 cases (42.5%) were of grade II & 4 cases (10%) were of grade III. So, grade I & II were most commonly diagnosed grades.

Distribution of cytological type of carcinoma according to age

Table no-3

Type		0-20	21-40	41-60	>60	total	Percentage %
Non invasive		0	7	0	0	0	0
Invasive Ductal	NST	0	0	18	6	31	77.5
	Tubular	0	0	1	0	1	2.5
	Medullary	0	0	0	2	2	5
	Mucinous	0	0	0	1	1	2.5

Volume : 2 | Issue : 7 | July 2013 • ISSN No 2277 - 8179

Invasive lobular	0	0	2	1	3	7.5
Suspicious	0	0	2	0	2	5
Total	0	7	23	10	40	100

Table III shows that most of the cases (31) have been diagnosed as INVASIVE DUCTAL CARCINOMA-NST (No Specific Type) (77.5%)

Out of these 31 cases, most (19) were from age group of 41-60 years.

Distribution of cytological type of carcinoma according to quadrant
Table no-4

Type		UO	UI	LO	LI	Central	Total
Non invasive		0	0	0	0	0	0
Invasive Ductal	NST	21	5	1	0	4	31
	Tubular	0	0	0	1	0	1
	Medullary	2	0	0	0	0	2
	Mucinous	1	0	0	0	0	1
Invasive lobular		1	1	0	0	1	3
Suspicious		0	1	1	0	0	2
Total		25	7	2	1	5	40

Table no -4 shows that out of 31 cases diagnosed as invasive ductal carcinoma-NST (No Specific Type), 21 cases (67.74%) were from upper outer quadrant. Out of 25 cases 21 cases (84%) were of Invasive ductal carcinoma-NST.

Relation between cytological type & grade
Table no 5

Type		I	II	III	Total
Non invasive		0	0	0	0
Invasive Ductal	NST	14	15	2	31
	Tubular	0	0	1	1
	Medullary	0	1	1	2
	Mucinous	1	0	0	1
Invasive lobular		2	1	0	3
Suspicious		2	0	0	2
Total		19	17	4	40
Percentage (%)		47.5	42.5	10	100

Table 5 shows that out of 40 cases 19 cases (47.5 %) were of grade-1 , 17 cases (42.5%) were of grade-II & 4 cases (10%) were of grade-III.

Out of 19 cases of grade-1 , 14 cases (73.7%) were of Invasive ductal carcinoma- No Specific Type (NST).

Out of 17 cases of grade-II, 15 cases (88.2%) were of Invasive ductal carcinoma-NST.

Relation between age & cytological grade
Table 6

Age	I	II	III	Total
<20	0	0	0	0
21-40	6	1	0	7
41-60	9	11	3	23
>60	4	5	1	10
Total	19	17	4	40

Out of 23 cases of between age group 41 to 60 years, 11 cases (64.7%) were of grade-II & 9 cases (47.37%) were of grade-1.

Out of 10 cases of more than 60 years of age group, 5 cases (50%) were of grade –II.

7 cases of carcinoma between 21-40 years age group 6 cases (66.67%) were of grade-1.

Relation between quadrant & cytological grade
Table No -7

Quadrant	I	II	III	Total
UO	10	13	2	25
UI	4	2	1	7
LO	1	1	0	2
LI	0	0	1	1
Central	4	1	0	5
total	19	17	4	40

Out of 19 cases of grade-1 , 10 cases (52.6%) were from upper outer quadrant.

Out of 17 cases of grade-II, 13 cases (76.4%) were from upper outer quadrant.

Out of 4 cases of grade-III, 2 cases (50%) were from upper outer quadrant.

Age distribution
Table no-8

Age	Total no of cases	Percentage (%)
0-20	0	0
21-40	7	17.5
41-60	23	57.5
>60	10	25
Total	40	100

Table no 8 shows that practically most affected cases were after age of 40 years.

Out of 40 cases , 33 patients were having menopause. This shows that most of the affected cases were postmenopausal.

Distribution of cases according to chief complaints
Table no 9

Chief complaint	No of cases	Percentage (%)
Lump in breast	40	100
Nipple discharge	5	12.5
Pain in lump	12	30
Swelling in axilla	5	12.5
Bone pain	3	7.5
Fever	10	25
Weight loss	15	37.5
Loss of appetite	15	37.5

Table no 9 shows that all patients have complaint of lump in breast. 2nd most common complaints were weight loss & loss of appetite.

3 patients were having history of trauma. 2 patients were having history of oral contraceptive pills. 6 patients were having history of recurrence. One patient had history of mammary carcinoma to sister.

Distribution of cases according to menstrual history
Table no 10

Menstrual history	Total no of cases	Percentage (%)
Normal menses	4	10
Irregular menses	3	7.5
Post menopausal	33	82.5

Table no 10 shows that most of cases (82.5%) were having history of menopause.

Distribution according to site
Table no 11

Quadrant	Right breast	Left breast	Total no of cases	Percentage (%)
UO	14	11	25	62.5
UI	2	5	7	17.5
LO	1	1	2	5
LI	0	1	1	2.5

Central	1	4	5	12.5
Total	18	22	40	100
Percentage	45	55	100	

Table 11 shows that out of 40 cases, 22 cases were from left breast & 25 cases were from upper outer quadrant.

This shows that carcinoma is slightly more common in left side of breast & predominantly seen in upper outer quadrant of breast.

Comparison between FNAC & histological diagnosis
Table no -12

Type		FNAC	Histological diagnosis
Non invasive		0	0
Invasive ductal	NST	31	21
	Tubular	1	1
	Medullary	2	2
	Mucinous	1	0
Invasive lobular		3	2
Suspicious		2	2
Total		40	28

In 8 cases, follow up was not possible & were diagnosed on OPD bases. Diagnostic accuracy in present study is 87.5 %.

Discussion
In the present study, incidence of mammary carcinoma is more common in 41 to 60 years of age group (57.5%) (table 1) & most of cases (33) postmenopausal (82.5%).

6 patients (15%) were having history of recurrence & chest wall lesions, out of them all the patients have found positive for recurrence.

According to Tata Memorial Hospital study of 431 cases, 1991,59 cases (18.6%) were found to be positive for recurrence.

Table no-13

	Tata Memorial Hospital (TMH), 1991, (431 cases)	Present study 40 cases
Recurrence rate	18.6 %	15%

Out of 6 cases presented with chest wall lesion, all were positive for mammary carcinoma.

In present study, 1 patient was presented with positive family history with carcinoma of her sister.

Breast carcinoma have been found to be more common in upper outer quadrant with 25 cases (62.5%) & 10 % excess for left breast, which is comparable with Ackerman's surgical pathology 8th edition showing 13% excess.

Present study shows that 8 patients have palpable positive axillary lymph nodes (20%) comparable with 18.5 % cases with positive axillary & supraclavicular lymph nodes in Tata Memorial Hospital data of 431 cases.

Table -14

	Total no of cases	Pt with positive LNS	Percentage %
Tata Memorial Hospital	431	80	18.5%
Present study	40	8	20%

Comparison of cytological types of carcinoma between Tata Memorial Hospital data & present study is as follows.

Table no 15

Cytological type of mammary carcinoma		TMH,1991 431 cases %	Present study 40 cases %
Invasive ductal	NST	70.3	77.5
	Medullary	1.16	5
	Mucinous	1.39	2.5
	Tubular	0	2.5
Invasive lobular		3.71	7.5

Data from surveillance, epidemiology & end results (SEER) programme register of national cancer institute6 set the frequency of invasive ductal carcinoma at 68 % of all breast carcinoma which is comparable with present study data.

Present study have shown that grade I & grade II are more common, (table 7) with 47.5 % & 42.5 % respectively of total cases.

Thus FNAC is useful diagnostic tool in early detection of mammary carcinoma. In present study out of 31 cases of invasive ductal carcinoma-NST, grade I is 43.1 %, grade II is 48 % & grade III is 8.9 %.

Comparison of cytological grading in present study performed & described by Diagnostic cytopathology of breast, Hani Zakhour in 1991-1995.

Table no-16

Cytologic-al grades	Hani Zakhour721 cases	Percentage %	Present study 40 cases	Percentage %
Grade I	281	38.97	19	47.5
Grade II	279	38.69	17	42.5
Grade III	162	22.34	4	10
Total	721	100	40	100

According to above comparison, most commonly diagnosed grades are grade I & grade II in both studies.

Comparison of diagnostic accuracy with Tata Memorial Hospital (TMH) data :

Table no 17

	TMH data	Present study data
Diagnostic accuracy	97 %	87.5 %

The diagnostic accuracy in present study is found to be comparable with Tata Memorial Hospital study, 1991 data. Lesser degree of diagnostic accuracy is due to small size of study.

Summary & Conclusion
The present study showed that:

- Invasive ductal carcinoma-NST is most common type diagnosed on FNAC, non invasive carcinoma are not diagnosed in the present study.
- Most of the carcinomas diagnosed are of grade I & grade II. So FNAC is useful diagnostic technique in early detection of mammary carcinoma.
- Most of invasive ductal carcinoma-NST are from 41-60 years age group & are postmenopausal.
- Upper outer quadrant is most common site involved with invasive ductal carcinoma-Non specific type (NST).
- Most of invasive carcinoma diagnosed are of grade I & grade II is most commonly involved with invasive ductal carcinoma-NST.
- In all age group grade I & grade II are most commonly diagnosed grades & in all age groups 41- 60 years is most common age group.
- Cytological grade II & upper outer quadrant is most commonly seen in association with each other.
- 41-60 years & postmenopausal women are most commonly affected in case of mammary carcinoma.

To conclude, it may be observed that FNAC is rapid, cheap, safe, accurate & effective method to determine type & grade of mammary carcinoma.

REFERENCE

1. Arthur S. Schneider, Board review series, 1st , 1998, P-291-293 | 2. Christopher D. MecKinney, American Journal of pathology,16(1),33-36,1992. | 3. Christopher D.M. Fletcher, Diagnostic histopathology of tumors, 1st edition, vol. 1, 1995, P-654-678 | 4. Danish breast cancer cooperative group, American journal of pathology, 17(1), 14-21,1993. | 5. G. Bussolati, American journalof pathology, 80,117-128,1975. | 6. Hani Zakhour, diagnostic cytopathology of breast, P.205-214,1999 | 7. Indian academy of cytologists: FNAC of head & neck lesions, manual of handouts, 1995. | 8. Issam A. Al-bozom, Jacky Abrams, arch pathology laboratory medicine, 1996, 120: 1086-1068. | 9. Jersy lasota, Klaus Weber, American journal of pathology,1990,136:219- 227 | 10. Jose Russo & Tait, American Journal of pathology, 1983,113:50-66 | 11. Jose Russo & Tait, American Journal of pathology, 1980,100:497-512 | 12. Juan Rosai, Ackerman's Surgical pathology, 8th edition, vol. 2, 1565-1660 | 13. Kitai Kim, practical guide to surgical pathology with cytologic correlation 1st edition, 1992, P.300-310 | 14. Kurt Meissner, American journal of pathology, 1990, 137:1305-1309. | 15. Mckee G, Nicholson A et al: A new system of cytological grading of breast carcinoma, annual scientific meeting of British Society of clinical cytology,1991. | 16. Mrudula Sampat, Aspiration cytology of breast, 3, aspiration cytology for clinicians & pathologists, 1991, 16-49. | 17. Orell, svante R., manual & atlas of fine neddle aspiration cytology, 2ndedition, 1995, P.129-169 | 18. Ramzi S. cotran, Kumar, Collins, Robbins pathologic basis of disease, 6th edition P-1104-1119 | 19. Robert W. Astarita, Practical cytopathologist 1st edition, 1990, P.163-179 | 20. Sabiston, text book of surgery, the biological basis of modern surgical practice, 16th edition, P-561-573. | 21. Sarah bacus, American Journal of pathology, 1990, 137:103-111. | 22. Steven G. Silverberg, Principles & practice of surgical pathology & cytopathology, 3rd edition vol. 1, 1997, P-575-673. |