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Original Article

Correlation of Fine Needle Aspiration of Breast Lesions (IAC categories) with histopathology and emphasis on code 3 and 4.

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Abstract

Context: Fine needle aspiration is one of the most important diagnostic modalities used in triaging of breast lesions. Recent recommendations by international academy of cytologists have suggested a comprehensive and standardised approach to breast cytology using 5 tier coding system (Code 1 – Code 5). **Objectives:** To reclassify the previous fine needle aspiration cytology of breast according to IAC recommendations and compare them with histological outcome and assess the diagnostic value of cytological diagnosis of Code 3 and Code 4 (C3 and C4) in predicting the benign and malignant cases confirmed on histopathology. **Materials and Methods**: Retrospective study done in the cytology section of department of pathology from January 2016 to April 2017. Institutional ethical clearance was taken before start of study. All cytology cases were rescreened and categorized into codes 1 to 5. Sixty seven cases were included in the study. Histopathological diagnosis was considered as gold standard. Corresponding histopathology details and slides whenever available were retrieved, analysed and documented. **Statistical Analysis:** Descriptive statistics and Chi square test was applied **Results:** Out of sixty seven cases included in our study, maximum number belonged to code 2. All cases diagnosed as code 2 were diagnosed as benign, while one case of code 5 was misdiagnosed as malignant, inspite of being hyperplastic lesion. Ability of code 3, code 4 in differentiating benign and malignant lesions was statistically significant. ($p<0.05$) **Conclusion:** IAC coding format of breast helps in triaging of benign and malignant cases, Code 3 and Code 4 have varying possibility of being malignant.

Key-words: Breast cytology, Coding, C3 and C4 categories.

Introduction

Fine Needle Aspiration Cytology (FNAC) is a basic investigative modality used in diagnosing breast lesions. In order to bring about uniformity in FNAC reporting IAC (International Academy of Cytologist) executive has commenced a process to produce comprehensive and standardised approach to breast FNA reporting.[1] NCI (National Cancer Institute) guidelines and Australian National Mammographic Screening Pathology Q group a 5-stage system the reporting of fine needle aspiration of breast has been categorized into code 1 for Insufficient material, Code 2 for benign cases, code 3 for atypical cases probably benign, Code 4 for suspicious cases probably in situ or invasive carcinoma, code 5 for malignant cases. [2,3]

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Objectives

1. Reclassify the previous fine needle aspiration cytology of breast according to IAC recommendations and compare them with histological outcome.
2. Assess the diagnostic value of cytological diagnosis of Code 3 and Code 4 in predicting the benign and malignant cases as confirmed on histopathology.

Material and Methods

Our study was retrospective study. Sixty Seven cases of breast swelling attending the cytology section for fine needle aspiration from January 2015 to April 2017 were included in our study. Institutional ethical clearance was taken before start of study. Cases with palpable breast lesions where Histopathological findings were available were included. Breast Lesions in men were excluded from the study. All cytological smears (Hematoxylin & Eosin stained, Giemsa stained, PAP stained) were rescreened by both the authors without knowledge of the histopathological outcome or previous FNA . They were classified into code 1, code 2, code 3, code 4, code 5 The findings were entered into the excel sheet, Master chart was prepared and results were tabulated

Statistical Analysis

Statistical Package for Social science statistics SPSS (version 20, IBM corporation, New York, USA), Sensitivity, Specificity, Positive predictive value, Negative predictive value, with 95% confidence interval, False positive rate and False negative rate was calculated for code 2 and code 5, Chi Square Test for code 3 and code 4. p Value <0.05 was considered significant

Results

Out of sixty seven cases included in our study, maximum number belonged to code 2. The distribution of cases is mentioned in the table 1.

All cases of code two were diagnosed as benign on histopathology with sensitivity of 50% (95% CI - 34.19% to 65.81%), Specificity of 100% (95% CI - 86.28% to 100%), PPV of 94.12% (95% CI – 100%), NPV of 54.35% (95% CI - 46.80% to 61.70%)

One case of Code five was diagnosed as benign while all other sixteen cases were diagnosed as malignant with sensitivity of 64% (95% CI - 42.52% to 82.03%), Specificity of 97.62% (95% CI - 87.43% to 99.94%), PPV of 94.12% (95% CI - 69.3% to 99.13%), NPV of 82% (95% CI - 72.94% to 88.5%)

The various cases that were labelled as code 1 are Fibroadenoma, Benign Phyllodes, Granulomatous Mastitis, Infiltrating Ductal Carcinoma, Hyperplasia without atypia, Acute Suppurative Lesion, Granulomatous Mastitis, Invasive Papillary carcinoma, Mature Adipocytes, Fibrocollagenous Tissue, Epidermal Cyst Code 3 cases were diagnosed as granulomatous inflammation, epithelial hyperplasia, fibroadenosis with ductal hyperplasia, fibroadenoma, infiltrating lobular carcinoma, fibroadenoma, fibrocystic disease.

The distribution of cases in code 4 category were six cases of Infiltrating Ductal Carcinoma, one case of benign phyllodes with fibroadenosis, one case of usual hyperplasia. In one case only adipocytes were present on biopsy. The distribution of cases in code 3 and code 4 and their ability to distinguish benign and malignant cases are described below.

Table 1. Distribution of cases among various codes

Codes	Total	Percentage	Benign	Malignant
1	12	18	10	2
2	21	31.2	21	0
3	08	12.0	07	1
4	09	13.4	03	6
5	17	25.4	01	16
Total	67	100	42	25

Table 2. Showing distribution of benign and malignant cases in code 3 and code 4

	Benign	Malignant	Total
Code 3	7	1	8
Code 4	3	6	9
Total	10	7	17

The p-value for comparison of ability of code 3 and code 4 for diagnosing malignancy was significant at p<.05

Discussion

Though various diagnostic modalities are available for triaging of breast lesions are available, FNAC has established itself as a part of triple approach in triaging the patients.[4,5] Though use of core needle biopsy (CNB) supersedes over FNAC, CNB is used as an adjunct to FNAC in some institutes.[6,7] IAC executive committee in view of establishing a comprehensive and standardised approach to FNA has included best practice guidelines covering[1] Indications for breast FNAB cytology, FNAB technique, smear making and material handling procedure, a practical, standardised and reproducible reporting system including report requirements, terminology, definition, descriptive terms and categories, structured reports, checklists and formats, appropriate ancillary diagnostic and prognostic tests, and correlation with clinical management algorithms.

The number of inadequate samples in other studies ranges from 0.7% t0 25.3%. [9,10,11] Though ideal rate of < 10% is recommended the adequacy of sample depends on nature of lesion, available technology, skill, experience of aspirator , Ten benign cases was diagnosed as Code 1, Lack of ductal epithelial cells, Difficulty in aspiration because of sclerosis, sampling from wrong areas, aspiration of inflammatory cells were responsible for the same. Use of guided fine aspiration may help in better sample yield.

Table 3. Comparison of distribution of cases in our study with other studies

	Code 1	Code 2	Code 3	Code 4	Code 5
Singh[7] et al (100)	5 (5%)	51 (51%)	2 (2%)	3 (3%)	39 (39%)
Arul[8] et al (523)	14(2.7%)	352 (67.3%)	27 (5.2%)	41 (7.8%)	89 (17%)
Tikku G[6] et al (100)	3 (2.8%)	30 (28.03%)	35 (32.71%)	6 (5.6%)	33 (30.84%)
Our Study (67)	12 (18%)	21 (31.2%)	8 (12%)	9 (13.4%)	17 (25.4%)

Benign Cases: Out of forty cases of benign tumours (diagnosed on histopathology), ten cases were diagnosed as Code 1, while another ten cases were diagnosed as Code 3 and Code 4. One case wrongly interpreted as malignancy – cellular discohesiveness may be a reason for misinterpreting as malignant, similar finding of false positivity was also reported in literature. [8]

Malignant cases: Out of twenty five cases of malignant cases (diagnosed on histopathology), two were categorised as inadequate. In one case of infiltrating ductal carcinoma no material was aspirated because of dense sclerosis while only cystic fluid was aspirated in a case of invasive papillary carcinoma. None of the cases of malignant tumour was diagnosed as benign. While one case was diagnosed as code 3 and six cases were diagnosed code 4.

Table 4. Shows comparison code 3 and code 4 of cases among various studies

Kanhoush et al [12]	Code 3 (n=225)	Benign	107 (48%)
		Malignant	118 (52%)
	Code 4 (n=162)	Benign	27 (17%)
		Malignant	107 (66%)
Goyal et al [13]	Code 3 (n=24)	Benign	15 (62.5%)
		Malignant	9 (37.5%)
	Code 4 (n=16)	Benign	2 (12.5%)
		Malignant	14 (87.5%)
Our Study	Code 3 (n=8)	Benign	07 (87.5%)
		Malignant	01 (12.5 %)
	Code 4 (n=9)	Benign	03 (33.33%)
		Malignant	06 (66.66%)

Cases diagnosed as Code 3: Granulomatous Inflammation, Epithelial Hyperplasia, Fibroadenosis with Ductal Hyperplasia, Fibroadenoma (Three), Infiltrating Lobular Carcinoma, Fibroadenoma, Fibrocystic Disease, and Fibroadenoma

Cases diagnosed as Code 4: Adipocytes (Trucut), Benign Phyllodes with Fibroadenosis, Infiltrating Ductal Carcinoma (Six), Usual Hyperplasia Infiltrating Lobular carcinoma was diagnosed as C3 which may be because of the tumor cells appearing monomorphic on cytology. Phyllodes tumor was misdiagnosed as Code 4 because of loss of cell cohesiveness; Hyperplasia was misdiagnosed because of less myoepithelial cells and presence of few naked nuclei. In one case only adipocytes was obtained on trucut biopsy.

Controversy regarding requirement of two categories, some authors opine that single category is suffice, some other authors opine maintaining two different categories. [12, 13] We found statistical significance in ability of Code 3 and Code 4 in diagnosing malignancy with code 4 being better in diagnosing malignancy on code 3 Hence two categories are required; Trucut biopsy can be adopted as a second line of investigation

Figure 1. Case diagnosed as Code 1 on Cytology. Biopsy revealed features of Granulomatous Mastitis. H&E X 100 . Inset shows giant cells and epitheliod cells H&E X100 .

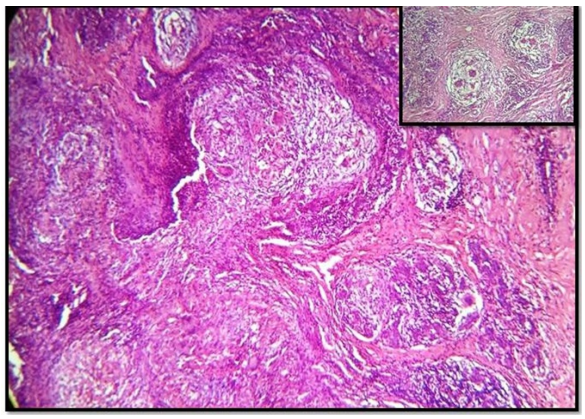
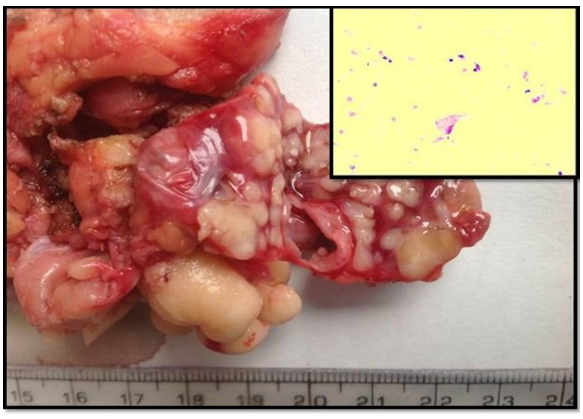


Figure 2. Case of papillary carcinoma that yielded no cells on fna. Gross appearance of tumor with cystic areas. Inset shows cyst macrophages and occasional inflammatory cells. H&E X 100.



Conclusion

IAC coding format of breast helps in triaging of benign and malignant cases, Code 3 and Code 4 have varying possibility of being malignant, and hence they need to be worked up further with caution by employing other investigative modalities.

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