Original Article

Study to Evaluate Prediction of Invasion in Breast Carcinoma Diagnosed on FNAC

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ABSTRACT

Background: FNAC is minimally invasive, produces a speedy result and is inexpensive than biopsy. This remains one of the most important technique from a practical point of view for diagnosis in most of breast lesion.Tubular or angular epithelial structures, malignant cells adherent to fibrous stroma, presence of intracytoplasmic lumina in malignant cells, fibroblast proliferation and fragments of elastoid stroma were predictive of invasion if associated with breast carcinoma.

Objectives: To evaluate invasion criteria in fine needle aspiration cytology (FNAC) of histologically diagnosed invasive breast carcinoma.

Material and Methods: A prospective study of FNAC of breast lesions was carried out along with its histopathological correlation.All cases were diagnosed as invasive breast cancer in histopathological examination. All cytological breast cancer was evaluated for five features of invasive carcinoma.

Results: We found that out of five predictive features Malignant Cells Adherent to stroma and Fibroblast Proliferation are most frequently seen in invasive breast carcinoma and their predictive value 78.26% for the both. Intracytoplasmic lumina in malignant cells and Fragments of elastoid stroma are the least features seen in invasive breast carcinoma and their predictive value 39.13% and 52.17%.

Conclusion: In our study of prediction of invasion in breast carcinoma by FNAC, malignant cell adherent to stroma and Fibroblast proliferation are most consistent findings in invasive breast carcinoma. Intracytoplasmic lumina in malignant cells is least seen among breast carcinoma

Keywords: Breast Cancer, FNAC, Invasive Carcinoma

Introduction

Fine needle aspiration cytology (FNAC) is less time consuming than surgical biopsy, has a low risk of complications. Fine needle aspiration cytology offers advantages to patients and doctors. FNAC is minimally invasive, produces a speedy result and is inexpensive than biopsy. It has a low risk of complications and can be performed in outpatient departments and in radiology theatres, saving expensive days stay in hospital [1, 2]

Fine needle aspiration cytology confirms a clinical suspicious of malignancy or metastasis of known malignant lesion without further surgical intervention. This remains one of the most important techniques from a practical point of view for diagnosis in most of breast lesion. Nowadays the interest is focused on preliminary preoperative diagnosis like FNAC and radiological examination of all organ as a guide to rational treatment. [1, 2]

As per the recommendations of the Bethesda conference, FNA diagnosis given in five categories. They are benign, atypical/ indeterminate, suspicious, malignant and unsatisfactory smears. The National Cancer Institute, Bethesda has recommended that tumor grading on FNA material should be incorporated in FNA reports for prognostification. [1, 3]

There are few studies focusing on invasiveness of breast carcinoma in Fine Needle Aspiration cytology. Tubular or angular epithelial structures, malignant cells adherent to fibrous stroma, presence of intracytoplasmic lumina in malignant cells, fibroblast proliferation and fragments of elastoid stroma were predictive of invasion if associated with breast carcinoma.[1,4] When any two features were present the positive predictive value of invasion was 96%. Some workers have found the intimate adherence of malignant cells and fibrous stroma to be the single most useful feature predicting invasion. The presence of epithelial cells in fat tissue has not been confirmed to be a useful sign of invasive growth. Excluding focal invasion is obviously not possible due to the limited sampling. The presence of comedo-like necrosis is a useful sign of the presence of a DCIS component. Cell blocks were found to confirm invasion in 44% of breast FNBs in one study. [1, 4]

The cytological findings described may be of some value in combination with mammographic assessment in deciding management. Clinical presentation is obviously

also of significance. Chhieng et al. point out that 97.7% of palpable masses with unequivocally malignant cytology are invasive cancers.[1,5]

Material and Methods

A prospective study on FNAC of malignant breast lesion was carried out along with its histopathological correlation. This study was carried out at the Department of Pathology, Govt. Medical College, Bhavnagar, Gujarat. In this study, we have included those malignant breast cases whose cytological as well as histopathological examination done. All cases were evaluated for prediction of invasion by following features- (1) Tubular or angular epithelial structures, (2) Malignant cells adherent to fibrous stroma, (3) Presence of intracytoplasmic lumina in malignant cells, (4) Fibroblast proliferation and (5) Fragments of elastoid stroma. Results were confirmed by histopathological examination.

Results and Discussion

In our study total 26 cytology cases of malignant breast cancer were included for features of invasion by above mentioned parameters. Out of these 26 cytology cases, 23 were diagnosed as invasive breast cancer and 03 were diagnosed as ductal carcinoma in situ in histopathological examination.

We found that out of five predictive features Malignant Cells Adherent to stroma (Figure-1) and Fibroblast Proliferation (Figure-2) are most frequently seen in invasive breast carcinoma and their predictive value 78.26% for the both. Intracytoplasmic lumina (Figure-3) in malignant cells and Fragments of elastoid stroma are the least significant features seen in invasive breast carcinoma and their predictive value 39.13% and 52.17%.

 In cytopathological examination, 03 cases were reported as suspicious for breast malignancy and 02 cases as in situ ductal carcinoma. All 05 cases were reported as invasive breast carcinoma in subsequent histopathological examination.

During this study, another 03 cases were diagnosed as breast carcinoma with features of invasion in cytology but histopathological examination suggests ductal carcinoma in situ. Out of these 3 cases, two fine needle aspirates show Intracytoplasmic lumina, fibroblast proliferation and fragments of elastoid stroma and one case show fibroblast proliferation and fragments of elastoid stroma.

Study by Torill Sauer, M.D. suggest that above all 5 invasion criteria (except cytoplasmic vacuoles) correlated with invasive breast carcinoma, but none of them were found exclusively in invasive lesions. [6]

Table 1: Cytological features for prediction of invasion by FNAC in breast carcinoma (23 cases).

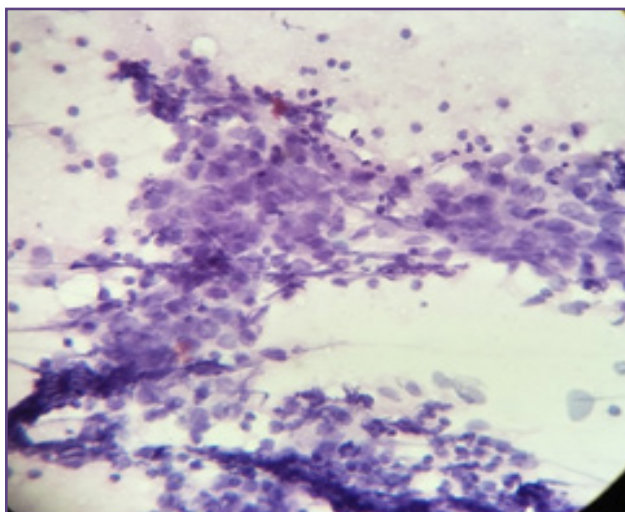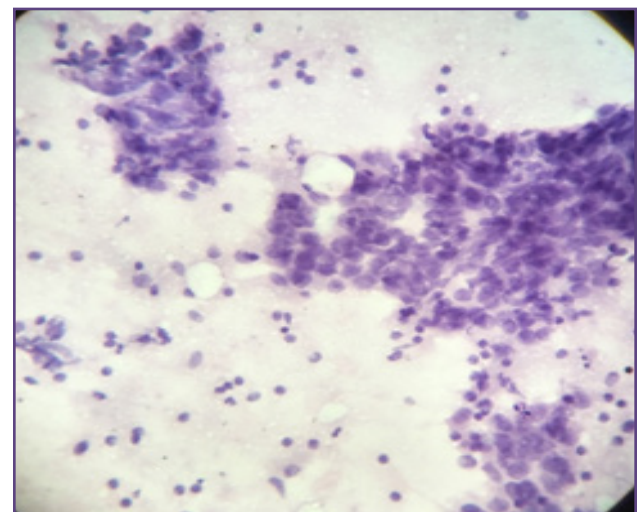| Features	Number of cases	Predictive value
Tubular or Angular Epithelium	17	73.91%
Malignant Cells Adherent to Stroma	18	78.26%
Intracytoplasmic Lumina In Malignant Cells	9	39.13%
Fibroblast Proliferation	18	78.26%
Fragments of Elastoid Stroma	12	52.17%

Fig. 1: Malignant cells adherent to stroma in Invasive breast Carcinoma (H&E stain, 40x).

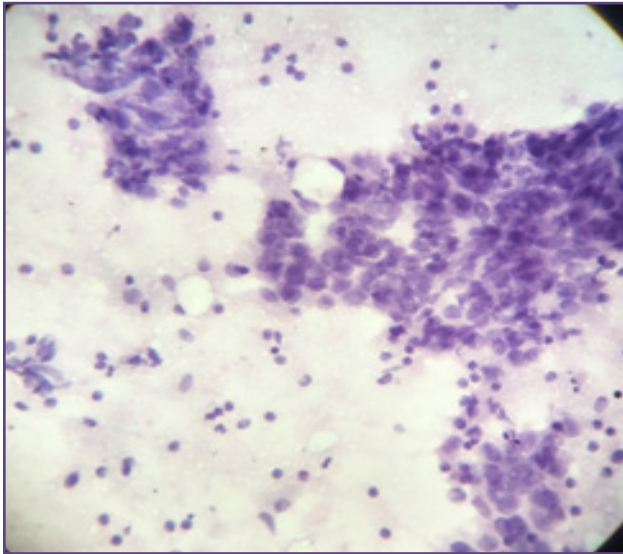**Fig. 2: Fibroblast proliferation in Invasive breast Carcinoma (H&E stain, 40x).**

Fig. 3: Intracytoplasmic luminain Invasive breast Carcinoma (H&E stain, 40x).

Conclusion

For prediction of invasion in breast carcinoma by FNAC, we observed malignant cell adherent to stroma and Fibroblast proliferation are most consistent findings in invasive breast carcinoma. Intracytoplasmic lumina in malignant cells is least observed features. Grading using above five features will help treating surgeon to make appropriate treatment policy for breast carcinoma patient.

References

1. Orell SR, Sterrett GF. Fine Needle Aspiration Cytology. 5th ed. New York: Churchill Livingstone; 2012

2. Koss LG. Diagnostic cytology and its histopathologic basis. 5th ed. Philadelphia: J. B. Lippincott Williams and Wilkins; 2006. p. 1081-84.

3. Das AK, Kapila K, Dinda AK, Verma K. Comparative evaluation of grading of breast carcinomas in fine needle aspirates by two methods. Indian J Med Res 2003;118:247-50.

4. Istvanic S, Fischer AH, Banner BF, et al. Cell blocks of breast FNAs frequently allow diagnosis of invasion or histological classification of proliferative changes. Diagn Cytopath 2007;35:263–9.

5. Chhieng D, Fernandez G, Cangiarella JF, et al. Invasive carcinoma in clinically suspicious breast masses diagnosed as adenocarcinoma by fine-needle aspiration. Cancer 2000;90:96–101

6. Torill Sauer, M.D., Øystein Garred, M.D et al. Assessing Invasion Criteria in Fine Needle Aspirates from Breast Carcinoma Diagnosed as DCIS or Invasive Carcinoma Can We Identify an Invasive Component in Addition to DCIS?. The International Academy of Cytology; June 2006: 50-3.

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