DIAGNOSTIC VALUE OF FINE NEEDLE ASPIRATION CYTOLOGY (FNAC) BIOPSY AND LYMPH NODES IN BREAST TUMOURS

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Abstract

Introduction: Breast cancer is the most common solid cancer in women and one of the leading causes of cancer deaths in the western countries. In India it is a leading cause for mortality and morbidity. Prognosis of invasive ductal carcinoma (IDC) of breast is determined by anatomic extent of the disease and can be assessed by tumor size, lymph node status and metastasis, also biologic markers such as histological grade, hormone receptor expression, HER2 overexpression, and/or amplification and genomic panels can be used. The presence of metastatic in axillary lymph nodes confirms the capacity of a cancer to metastasize. It represents the single most prognostically potent element of clinical stage in potentially curable cases. Axillary lymph node dissection and histological evaluation has a continuing place in the staging and management of patients with breast cancer. It has been shown that cytological grade correlates well with the axillary lymph nodal metastasis and also prognosis. Axillary lymph node evaluation in breast cancer is usually performed preoperatively by clinical examination, sonography, lymph node resection and by ultrasound-guided fine-needle aspiration cytology.

Material and Methods: Patients with detected breast mass (palpable and non-palpable) and palpable axillary lymph node who were evaluated by FNAC. After sterile draping and sufficient disinfection, a 10-ml syringe was inserted into and withdrawn from the lymph node three times under aspiration while sonographically monitored. The procedure was performed by using 21-22 Gauge needle with 2-4 aspirations and it was repeated if the sample was inadequate. Ultrasound guided FNAC was performed for impalpable, and deeply located small lumps.

Results: A total of 156 patients were underwent for FNAC of the breast lump. Histological correlation of all the patients was done. The mean age of patients who underwent FNAC was 39.6 ± 9.42 years and all were female patients. The cytology reports were classified as benign, atypical, suspicious, malignancy, and unsatisfactory. In 59 (37.8%) cases benign lesions were observed of which the fibrocystic disease was the most common cytological diagnosis. 15 (9.6%) were atypical, 7(4.5%) were suspicious and in 72(46.2%) cases malignancy was diagnosed. In 3 (1.9%) cases sample was unsatisfactory. FNAC of the axillary lymph nodes was performed on 76 patients with palpable lymph nodes and histological correlation of axillary lymph node. In FNAC and histology correlation of axillary lymph node sensitivity was 81.94% (95% CI 71.11% to 90.02%) and specificity was 100% (95% CI 39.76% to 100.00%) with positive predictive value of 100%.

Conclusion: FNAC is a rapid, cost effective and safe procedure for management of breast lumps.

Introduction:

Breast cancer is the most common solid cancer in women and one of the leading causes of cancer deaths in the western countries¹. In India it is a leading cause for mortality and morbidity.

Prognosis of invasive ductal carcinoma (IDC) of breast is determined by anatomic extent of the disease and can be assessed by tumour size, lymph node status and metastasis, also biologic markers such as histological grade, hormone

receptor expression, HER2 overexpression, and/or amplification and genomic panels can be usedⁱⁱ.

Breast tissue is made up of various tissue components, also there is change in composition of breast tissue with hormonal changes. So, it has varied pathology, and there are various modalities for the diagnosis. It is important for the clinician to examine properly and take proper decision during evaluation of a patient with palpable breast massⁱⁱⁱ. The TNM staging of disease continues to provide quantitative classification categories for the primary tumour (T), regional lymph nodes (N), and distant metastases (M), which are combined to determine overall stage groups which are associated with overall survival and disease-free survival^{iv}. The presence of metastatic in axillary lymph nodes confirms the capacity of a cancer to metastasize. It represents the single most prognostically potent element of clinical stage in potentially curable cases. Axillary lymph node dissection and histological evaluation has a continuing place in the staging and management of patients with breast cancer^v.

The false negative rate has decreased to less than 1% by Triple assessment of breast mass. But FNAC can be done as an outpatient procedure and it helps in rapid diagnosis. But there are limitations of FNAC which include difficulty to differentiate ductal carcinoma in situ (DCIS), atypical ductal hyperplasia from low grade DCIS, and fibroadenoma from phyllodes tumor^{vi}. It has been shown that cytological grade correlates well with the axillary lymph nodal metastasis and also prognosis^{vii}. Regional lymph node recurrence is uncommon in patients and has been reported in 1 to 3 % of patients with early stage breast cancer and in 1.7 to 15.9 % of patients with any stage of breast cancer^{viii}. Loco-regional recurrence includes recurrent disease in the diseased breast and the ipsilateral lymph nodes in the axillary, the supra- and infraclavicular and the internal mammary region. Regular follow-up exams include physical examination, mammography and sonography and, in unclear

breast findings and magnetic resonance tomography^{ix}. Axillary lymph node evaluation in breast cancer is usually performed preoperatively by clinical examination, sonography, lymph node resection and by ultrasound-guided fine-needle aspiration cytology (FNAC)^x. FNAC can achieve high accuracy, sensitivity and specificity

Material and Methods

Patients with detected breast mass (palpable and non-palpable) and palpable axillary lymph node who were evaluated by FNAC. Prior to ultrasound-guided FNAC, written informed consent was obtained from each patient. Histopathological correlation was done. After sterile draping and sufficient disinfection, a 10-ml syringe was inserted into and withdrawn from the lymph node three times under aspiration while sonographically monitored. The procedure was performed by using 21-22 Gauge needle with 2–4 aspirations and it was repeated if the sample was inadequate. Ultrasound guided FNAC was performed for impalpable, and deeply located small lumps. The FNAC cytology sample was concentrated by centrifugation. The supernatant was removed, and the pellet was resuspended. The slide was stained with Papanicolaou stain, covered with a coverslip, and evaluated. CytoBlock was cut in 3 µm slices and the slides were stained in Hematoxylin/Eosin

Statistical analysis was done using Statistical software SPSS 21.0 and MedCalc 9.0.1

Results

A total of 156 patients were underwent for FNAC of the breast lump. Histological correlation of all the patients was done. The mean age of patients who underwent FNAC was 39.6 ± 9.42 years and all were female patients. The cytology reports were classified as benign, atypical, suspicious, malignancy, and unsatisfactory.

Table 1: Cytology of the patients who underwent FNAC

Cytology	N=156
Benign	59 (37.8%)
Atypical	15 (9.6%)
Suspicious	7(4.5%)
Malignancy	72(46.2%)
Unsatisfactory	3 (1.9%)

In 59 (37.8%) cases benign lesions were observed of which the fibrocystic disease was the most common cytological diagnosis. 15 (9.6%) were atypical, 7(4.5%) were suspicious and in 72(46.2%) cases malignancy was diagnosed. In 3 (1.9%) cases sample was unsatisfactory.

FNAC of the axillary lymph nodes was performed on 76 patients with palpable lymph nodes and histological correlation of axillary lymph node.

Table 2: FNAC and histology correlation of axillary lymph node

	Axillary lymph node metastases present	Axillary lymph node metastases absent
FNAC Positive	59	0
FNAC Negative	13	4
Statistic	Value	95% CI
Sensitivity	81.94%	71.11% to 90.02%
Specificity	100.00%	39.76% to 100.00%
Positive Likelihood Ratio		
Negative Likelihood Ratio	0.18	0.11 to 0.30
Disease prevalence (*)	94.74%	87.07% to 98.55%
Positive Predictive Value (*)	100.00%	
Negative Predictive Value (*)	23.53%	15.83% to 33.48%
Accuracy (*)	82.89%	72.53% to 90.57%

Discussion:

FNAC is a simple rapid technique and can be performed as an outpatient procedure as compared to biopsy which has risk of bleeding

and occasionally rare complications like pneumothorax. It is cost effective and does not require any anaesthesia or hospitalization. Experience and expertise in sampling and interpretation of specimen decide the effectiveness of FNAC. The limitation of FNAC is it cannot differentiate few lesions like fibroadenoma from phyllodes, phyllodes from metaplastic carcinoma breast, papilloma from papillary carcinoma, and atypical ductal hyperplasia from ductal carcinoma in situ. Though a triple assessment is advocated for all palpable breast lumps, it is not feasible in developing countries like India, where affordability and availability are an issue at all centers and clinical decision takes a major role.

In a meta-analysis of FNAC of breast lesions showed a sensitivity and specificity of 0.920 (95% CI, 0.906 to 0.933) and 0.768 (95% CI, 0.751 to 0.784) respectively^{xi}. False positives results can be reduced by considering for biopsy in patients fulfilling DeMay's criteria in cases with poor cellular aspirate, absent single intact cells, presence of bare bipolar nuclei, and absent/less amount of atypia^{xii}. FNAC in palpable lymph nodes were evaluated in a study which showed diagnostic accuracy for metastatic lymph nodes as 97.9%, sensitivity of 97.9%, and specificity of 100%^{xiii}. Our study showed sensitivity as 81.94% (95% CI 71.11% to 90.02%) and specificity as 100% (95% CI 39.76% to 100.00%) with positive predictive value of 100%. FNAC is also cost effective and cost effectiveness of FNAC of breast was studied in a study by Silverman et al. They demonstrated less costs with FNAC of breast lesions^{xiv}. The most common reason for a false negative result may be the failure to localize the lesion exactly. Also, tumors with extensive fibrosis like scirrhous carcinoma can give a false negative result because of low cellularity which can be avoided by performing FNAC in the periphery of the tumor^{xv}.

Conclusion

To conclude FNAC is a rapid, cost effective and safe procedure for management of breast lumps.

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