Analysis Of Unsatisfactory Category Of 1601 Cases Of Breast Cytology – An Institutional Study

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Abstract: With ever increasing dependence on cytology reports for management of breast masses, audit of breast cytology and analysis of unsatisfactory cytology cases have become necessary. This study was undertaken to evaluate various diagnostic parameters for cytology diagnosis of breast lesions in our cytology set-up. Clinico-cytological findings in 1601 cases and details of unsatisfactory cytology category were studied. All patients coming with complaints related to breast and referred for cytology were included in the study. Material for cytology study was obtained by smears made from fine needle aspiration/non-aspiration biopsies of breast lump, lymph nodes or nipple discharge.

Breast cytology formed about 15% of total FNAC workload of our cytology section. Conclusive cytological diagnosis could be offered in 84.14% cases of breast cytology. None of the patients had any post-procedure complication. For analysis cytological smears from these cases were categorized into standard I to V categories. The largest category was that of benign lesions(category I) 66.02% followed by malignant lesions (category IV) 14.68%. Category II & III taken together included cases reported as atypical, indeterminate or suspicious and formed 3.44% of the total number. Unsatisfactory (category V) included inadequate and inconclusive reports and formed 15.86% cases. The study revealed sensitivity, specificity and diagnostic accuracy of 95.28%, 96.17% and 95.92% respectively.

Keyword: Breast cytology, audit, unsatisfactory category

I. INTRODUCTION

From being a rapid, reliable and cost-effective method of diagnosis cytological study of breast lesions has now become an established and indispensable pre-operative assessment tool along with clinical and imaging work up at many cytology centers.

FNAB is utilized as a first line diagnostic procedure for patients coming with complaints related to breast, in our setup. Important management decisions of operative Vs conservative treatment are based on the cytology reports for patients coming with palpable or non-palpable breast abnormalities. This necessitates the need for regular audit studies of breast cytology to be undertaken in order to evaluate diagnostic parameters and to know areas where errors commonly occur.

II. PATIENTS AND METHODS

1601 consecutive patients presenting to surgical outpatient department with complaints of lump in breast, increased or asymmetrical nodularity or nipple discharge were referred for cytological study from January 2006 to September 2010. Complete clinical details were obtained, thorough clinical examination was done and written consent was taken after explaining the procedure. Total 1595 patients were subjected to fine needle aspiration or non-aspiration (FNAB/FNC) biopsy of breast lump/lumps and palpable lymph nodes when present, using conventional procedure. FNABs were carried out by Pathology residents with rotational Cytology OPD posting under supervision of cytopathologist.

23 or 24 gauge needle and 10 ml plastic syringe attached to syringe holder were used. Grossly vascular lumps were subjected to fine needle capillary sampling without attaching syringe and holder. In cystic lumps, reaspiration from the cyst wall was done in same sitting. Ultrasound guided FNAB was done in deep seated lump not accessible by routine method.

Six patients presented with nipple discharge without breast lump and smears for cytology were made from the expressed nipple secretion. In each case on an average 3-4 smears were made from the aspirated material and were wet fixed in 95% alcohol and air dried. Wet fixed smears were stained with HE and PAP stain and air dried ones with MGG stain in all cases. Ziehl-Nelsen staining was carried out in cases that were diagnosed as abscess or granulomatous mastitis on initial cytological examination.

The analysis included prospective and retrospective cases over equally divided study period. Cytological diagnoses were categorized into five standard categories for purpose of analysis. Histological diagnoses were available in 501 cases and were based on either excision of lump or mastectomy specimens from the same breast subjected to routine paraffin sectioning and HE staining. Calculation of various diagnostic parameters of this study was based on these 501 cases.

III. RESULTS

A total number of 1601 cases of breast lesions referred for cytology were evaluated. Breast cytology formed 15% of total FNABs carried out during January 2006 to September 2010. Patients belonged to age range of 11 to 80 years. Maximum number 32.42% were between 21 to 30 years of age.98.38%
were females and 1.62% were males. Painless breast lump was the most common presenting symptom in 75.52% followed by lump with pain in 24.48%. Other symptoms were lump associated with either cyclical mastalgia, palpable lymph nodes, skin changes or nipple discharge. Only ten patients gave history of trauma and nipple discharge without lump was present in six patients.

Symptom duration varied from 15 days to 90 days in 51.03% and more than 90 days to one year in 31.86% patients. 90.88% patients presented with single breast lump. Two or more lumps were present in 8.69% patients. Conclusive cytological diagnosis was possible in 84.14% cases. None of the patients complained of any post procedural complication.

Descriptive reports mentioning salient cytological features of the lesion and a definitive diagnosis were given when possible. For purpose of analysis cytological disease categorization of breast lesions was done in five categories as: I-Benign, II-Atypical/Indeterminate, III-Suspicious, IV-Malignant, V- Unsatisfactory. For sake of convenience category II and III were clubbed together.

Cytological disease categorization in our study was as under:

- Category I-Benign= 66.02%
- Category II+III- Atypical/Indeterminate/Suspicious= 3.44%
- Category IV-Malignant = 14.68%
- Category V - Unsatisfactory = 15.86%

Cases where aspirators yielded material but a definite diagnosis could not be given were considered inconclusive. These cases were included in unsatisfactory category V for statistical analysis in the present study.

Out of total 1601 cases, histopathological diagnoses were available in 531 cases giving an overall biopsy rate of 31.29% cases. Out of total satisfactory cytology samples, histopathology was available in 466 cases. Cytological and histological diagnoses correlated in 98.19% cases of benign and 97.37% of malignant category.

Out of total 254 unsatisfactory aspirates on cytology, histopathological diagnoses were available in 45 cases -37 turned out to be benign and 08 were malignant. Out of 37 benign histopathology diagnoses final definitive diagnoses were – fibroadenomas-20, inflammatory lesions (acute and chronic)-09, fibrocystic disease-06 and one case each of tubular adenoma and lactational adenoma.

Sensitivity, specificity and diagnostic accuracy were calculated by comparison of cytological data with histopathological findings. Thus this study had sensitivity of 95.28%, specificity of 96.17% and diagnostic accuracy of 95.92%.

**IV. DISCUSSION**

Diagnostic parameters namely sensitivity, specificity and diagnostic accuracy in the present study on breast cytology varied from 5.4% to 18.4% between these studies.

In our study, the rate of unsatisfactory samples varied between 9.44% to 28.86%, with an average of 15.86% over the study period of four years and nine months. This includes material that was either inconclusive or inadequate for interpretation on reaspiration. Out of total 1601 breast cytology samples, 254 were found to be unsatisfactory and included 210 inadequate and 44 inconclusive reports.

Fine needle aspiration biopsies (FNABs)/ fine needle capillary sampling (FNC) performed by multiple aspirators, inclusion of patients with palpable as well as non-palpable breast lesions in the study and categorization of inconclusive and inadequate aspirates into unsatisfactory category are important contributors for this number of unsatisfactory samples in our study.

On further analysis reasons and remedies for unsatisfactory category could be detailed out as –

A. **INADEQUACY RESULTING FROM IMPROPER TECHNIQUE**

Factors like delay in fixation resulting in partial drying of smears, crush artifacts due to firm pressure applied during smearing and lot of blood due to overzealous negative pressure are responsible for yield of fine needle aspiration cytology (FNAC) samples unsatisfactory for cytological assessment.

It has been shown that best results for FNAC are obtained in centers with a small selected group of well motivated aspirators. Unsatisfactory samples are less if the technique is carried out by one experienced person preferably a pathologist as compared to when many persons-clinicians were involved.

Initial inexperience of aspirators (registered pathology residents) due to rotational posting in cytology OPD where FNABs are carried out was responsible to some extent for obtaining unsatisfactory material for cytology study at our center. In a Teaching Institute new residents have to be trained every six months. However in order to minimize inadequacy resulting from improper aspiration technique, smear preparation and preservation, new aspirators are trained by senior residents and a reporting cytopathologist.

B. **INHERENT PROBLEMS IN THE LESION ASPIRATED, RESPONSIBLE FOR UNSATISFACTORY SAMPLES**

- Predominantly cystic or small and deep seated or ill-defined lesion
- Fatty pendulous breast
- Lesion with prominent desmoplastic reaction
- Lesions with lot of necrosis and inflammation

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To keep sample inadequacy to minimum repeat FNABs were performed under radiological guidance in these cases.

After aspirating full contents from a breast cyst reaspiration was done from the cyst wall. Aspirated fluid was centrifuged and smears were made from the sediment.

It is known that well defined lumps yield best material by FNAB and it is more difficult to obtain adequate aspirates in benign lesions and certain histological types of malignancies. Studies on breast cytology in which patients with advanced tumors form majority of cases and patients who have non-palpable breast lesions are excluded show reduced inadequacy rate and significantly higher sensitivity.

In our study aspirators had no choice of patient selection as patients were referred for cytology by clinicians and patients with vague breast lumps were also included. In our experience patients having vague breast lumps often do not co-operate or turn up for repeat aspiration. Uncertainty on palpation and ultrasonography and lack of follow-up in these cases contribute further to increased percentage of cases in unsatisfactory category. Mammographic examination was not available for our patients.

C. ERRORS IN INTERPRETATION

Diagnostic accuracy of cytology report is highly dependent on the training and experience of the cytopathologist. Inexperience of cytopathologist who cannot confidently convey a meaningful report to the treating clinician is responsible for inconclusive reports that are finally included in unsatisfactory category. Periodic training and refresher courses for cytopathologists will surely help to reduce inconclusive reports.

Because of lack of architectural information, the interpretation of FNAC requires more training and experience than does the reading of a needle core biopsy. Definite criteria of cell groups seen in the smears as a measure of adequacy are established. However now-a-days adequacy of cytology sample is judged by whether it leads to resolution of the problem presented by the lesion in a particular patient’s breast.

FNAC aspirate is to be assessed in its clinical context. It is equally important to know limitations of needle aspiration biopsy and decide the future course of action in a particular patient on the basis of findings in smears. Good cytology reporting is a matter of experience. This is taken care of by posting an experienced cytopathologist with a less experienced one.

Choi et al have categorized causes of interpretive errors into three groups -

- Overlooking atypical cells in the background of benign changes
- mis-interpretation of atypical cells as degenerative histology and
- true interpretive errors where malignant cells are interpreted as benign

All these errors have occurred in aspirates labelled as unsatisfactory in this study. In our analysis when available histopathology reports were correlated with those reported as unsatisfactory on cytology, it was noted that 20 inconclusive and 17 inadequate on cytology were benign lesions on histopathology. For 8 malignant histopathology reports, 4 were reported as inconclusive and 4 were inadequate on cytology. Histopathology of unsatisfactory category has shown that either carcinoma or benign lesions may exist in this group and unsatisfactory category has no diagnostic or prognostic significance as was observed also by Rocha et al. It thus becomes necessary to evaluate reasons for unsatisfactory cytology material at a particular cytology centre in order to take pertinent corrective measures.

Methods of statistical analysis vary considerably. In some studies calculation of statistical test parameters is based only on those cases with definitive cytological diagnoses and cases that remain inadequate on re-aspiration are not reported as inadequate. We have included the inadequate on re-aspiration cases into unsatisfactory category. In our study, in few cases cytological and histological diagnoses could not be verified because of inadequate records or unavailability of original slides or tissue blocks. Some workers prefer to exclude such cases from analysis.

Collection of data for analysis becomes time consuming and tedious in absence of computerization. Computerization of patient data will be of help for regular statistical analysis studies and evaluation of clinical effectiveness of the procedure by long term follow-up. Availability of ancillary techniques will further increase efficacy of breast cytology reports.

In conclusion regular audits of breast cytology are needed in cytology centre with significant cytology workload and clinical setup that uses cytology reports as the basis for patient management. Yearly or half yearly audits will help to maximize diagnostic accuracy and reliability of breast cytodiagnosis and to reduce number of unsatisfactory samples. Audits should be submitted to Expert committee of cytopathologists. Feedback by the cytology laboratories should be made obligatory. Frequent interdepartmental multidisciplinary audits are equally essential.

REFERENCES


