Original Research Article

Cytomorphological study of breast lesions with histopathological co-relation

Shashikala Hiremani¹*, Shivananda Gundalli¹, Suma Mamadapur¹, Mamata Patil², Renuka Alagageri³

¹Dept. of Pathology, District Hospital, Vijayapura, Karnataka, India
²Dept. of Pathology, Gulbarga Institute of Medical Sciences, Gulbarga, Karnataka, India
³Dept. of Pathology, Haveri Diagnostic Centre, Haveri, Karnataka, India

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ABSTRACT

Introduction: Breast Lesions (BLs) are commonly encountered in routine practice and have increased importance due to awareness of breast carcinoma, potential cosmetic disfigurement following surgery, hence BLs are one of indication for fine needle aspiration cytomorphology (FNAC).

Objectives: 1) To study FNAC of various BLs. 2) To evaluate diagnostic accuracy of FNAC in comparison with Histopathology (HP) study.

Materials and Methods: A retrospective study of 4 years included all 103 BLs cases (palpable and non-palpable) presented to Department of Pathology, District Hospital Vijayapur for FNAC, from Jan-2015 to Dec-2018. FNAC study was carried out, diagnosis were categorized. Out of 103 FNAC performed cases, 76 cases were referred to HP examination and diagnosed at Department of Pathology Al-Ameen Medical College Vijayapur. The HP slides were retrieved and analyzed. Data was collected from cytology and HP case records. Cytological diagnosis were compared with HP diagnosis and FNAC diagnostic accuracy was assessed.

Observations: Total of 76 cases were included in the study, there were 74 females and 2 were males with age range of 18-65 years. Out of 76 cases 71 cases correlated with HP diagnosis, with diagnostic accuracy of 93.4% (71/76 cases), with highest number of benign BLs 92.1% (70/76 cases) and 100% correlation to malignant BLs (6/6 cases).

Conclusion: Study reveals that there is good correlation of FNAC diagnosis with HP diagnosis. Hence FNAC is a useful, valuable, quick and reliable primary screening technique for breast lesions with high diagnostic accuracy.

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1. Introduction

Breast lesions (BLs) are the most common illness in women contributing to a significant proportion of health care spending. Breast cancer is second most common malignant tumour & one of leading cause of death among females. More than 10 laks new cases occurring world wide every year,¹ and in India-75,000 new cases/year.² In USA 232,670 new cases and 40,000 deaths observed in 2014. Karyotype & molecular alterations in benign BLs parallel to those of breast carcinoma.³ If Pre-malignant BLs recognized in early stage, possible to abort development of invasive cancer.¹,⁴ In recent years there have been outstanding advances in breast cancer management leading to earlier detection of disease and the development of more effective treatment resulting in significant decline in deaths due to breast cancer and improved outcome for women living with disease.⁵,⁶ Hence it is very essential to screen of all BLs. FNAC observed best tool in screening the BLs.¹ FNAC widely accepted due to its high sensitivity, specificity & accuracy.⁵,⁷ FNAC is simple, quick, reliable, inexpensive, OPD procedure and done on both palpable and non-palpable BLs and avoids unnecessary surgery in specific benign
conditions\textsuperscript{5,6} gives rapid and accurate diagnosis.\textsuperscript{5} It also plays a major role in pre-operative analysis of BLs\textsuperscript{5,7} and provides diagnostic & therapeutic tool in cystic lesions,\textsuperscript{4} differentiate all BLs to nonneoplastic and neoplastic (benign, malignant & subtypes also). Combination with mammography, ultrasonography and clinical examination (Triple test)\textsuperscript{5,7} forms a good diagnostic triad. FNAC Permits a ancillary studies Hormone receptor analysis, Flow cytometry and Molecular diagnostics\textsuperscript{2,7}, gives cytological grade of malignant lesion which correlates with HP grading.

2. Objectives

1. To study the cytomorphology of various BLs.
2. To assesses accuracy of FNAC by correlating with HP diagnosis.

3. Materials and Methods

A retrospective study of 4 years from January 2015 to December 2018, included all 103 BLs cases (palpable and non palpable) presented to Department of Pathology, District Hospital Vijayapar for FNAC. Cytology study was carried out, diagnosis were categorized as C1 - C5. Out of 103 FNAC performed cases, 76 cases were referred to HP examination and diagnosed at Department of Pathology Al-Ameen Medical College Vijayapur. The HP slides were retrieved and analyzed. Data was collected from cytology and HP case records. Cytological diagnosis were compared with HP diagnosis and FNAC diagnostic accuracy was assessed. Statistical Analysis were made to find out ability of FNAC to detect presence of malignancy of breast in comparison to HP diagnosis, in terms of True positive, True negative, Diagnostic accuracy, Sensitivity and Specificity.

3.1. Inclusion criteria

1. Age: 18 – 65 years,
2. With palpable & non palpable BLs.

3.2. Exclusion criteria

1. Age: < 18 & > 65 years.
2. Diagnosed cases of BLs.
3. Recurrence of malignancy.
4. Pregnant patients.

3.3. FNAC Study

Patients with BLs were subjected to FNA procedure after detailed history, general physical examination. Procedure of FNA explained to patient and verbal consent was obtained. The patients were suitably seated for aspiration. The lesion was located, under aseptic precautions the aspirations of the BLs were performed with 23 or 20gauge needle attached to a 5 ml or10ml syringes. The materials collected were smeared directly onto slides, 5-7 slides were prepared, two slides were fixed in alcohol and stained by Pap anicolaou’s technique and two slides were stained with Leishman-Giemsa technique. Totally 103 FNA of BLs were done, studied and cytologically categorized in to C1 to C5.

3.4. HP Study

Out of 103 FNAC performed cases, only 76 FNA cases were included for HP study, those 76 FNA lesions of excised specimens were fixed in Formalin, were referred to Department of Pathology Al-Ameen Medical College Vijayapur. All specimens were processed & stained with Haematoxylin- Eosin stain and conditions giving rise to the chronic granulomatous inflammatory lesions Z-N stain was used, all specimens were studied for tumour type and grading. All 76 cytological diagnosis were compared with HP diagnosis. Statistical Analysis were made for benign and malignant lesions in terms of True positive, True negative, Sensitivity, Specificity and Diagnostic accuracy.

3.5. Observations

Out of 76 FNAC cases subjected HP, 74 females and 02 were males BLs patients. Right BLs 39(51.3%), Left35 (46.0 %) and Bilateral BLs were 02 (2.6%), and majority were over Right upper outer quadrant 28(71.7 %) as in Table 1. Clinical presentation of BLs was mobile painless lump in 52 (68.4%)cases, mobile with painful lump in 17(22.4%), mobile with painful lump with discharges 05 (6.6%) and nipple discharge lesions were in 02(2.6%) cases as in Table 2. Age wise spectrum of cytological diagnosis shows, benign cases more common in age groups of 18-40, and malignant more common in 50-65years as in Table 3. Cytological diagnosis categorized as C1-C5 as shown in Table 4.

| C1 Inadequate(0), C2 Benign 65(85.5%), C3 Atypical probably Benign 04 (5.3%). C4 Suspi cious favour Malignant 01(1.3%) and C5 Malignant 06(7.8 %) as in Table 5. Among Benign cases most common was Fibro adenoma 26(40.6%), followed by Fibrocystic changes14(21.9%), Benign proliferative breast lesion s 09 (12.5%), Breast abscess 05(7.8%), Benign Phyllodes tumour 04(6.2%), Granulomatous mastitis 03(4.7%), Duct papilloma 02(3.1%) and Gynaecomastia 02(3.1%) as in Table 6. Cytological non benign cases were 11(14.5%). Among these 11 cases, Atypical probably Benign BLs 04(5.3%) Suspicious favour malignant101(1.3%), Malignant BLs were06 (7.8%). Among 04(5.3%) Atypical probably Benign BLs, Fibroadenoma with atypical cystic changes were 02, Fibroadenosis with atypical fibrocystic changes 01 and Atypical lobular hyperplasia 01 case. Suspicious favour malignant anti01(1.3%)as malignant Phyllodes tumour. Malignant BLs were 06(7.8%) among them Infiltrating ductal carcinoma (IDC) 05 and malignant Phyllodes tumour 01 and most common malignant lesion was IDC 05(6.5%) |
All 76 FNA BLs cases histological diagnosis made as Table 8. Out of the total 76 (100%) BLs, 71 (93.4%) FNA BLs were well correlated with HP diagnosis and 05 (6.5%) were not correlated as shown in Table 9. Among 71 corelated cases, 65 were benign, 06 were malignant as Table 10. All various types of cytological benign (65) BLs well correlated with HPs in Table 11 and different malignant tumours (06) well correlated with HP as in Table 12. Cytological discordance (05), of 04 A typical probably benign cases, all were turned to benign and 01 suspicious favour of malignant Phyllodes tumour was turned to benign Phyllodes tumour on HP study as in Table 13. Total number of histocytological correlation done as in Table 14. Comparative analysis of FNAC diagnosis with HP diagnosis of BLs done as in Table 15. Fibro adenoma was commonest benign tumour (28).

Statistical Analysis were calculated for all 76 cases and FNAC diagnosis were compared with HP diagnosis. For Benign lesions as all 65 cases FNAC diagnoses are confirmed as Benign, hence True positive 100%, True negative 100%, discordancy was for 05 cases, hence Sensitivity was 100% and Specificity was 92.8%. For Malignant lesions as all 06 cases FNAC diagnosed malignant were confirmed as malignant, hence True positive 100%. True negative 100%, hence Sensitivity was 100% and Specificity was 100%. Diagnostic accuracy of FNAC was 93.4% in our study as shown in Table 18.

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### 3.6. HP examination specimens

1. Lumpectomy specimen 54 (71.0 %)
2. Biopsy 18 (23.7 %)
3. Radical mastectomy 04 (5.3 %)
### Table 1: Observations

| Age Range            | 18 - 65 years |
|----------------------|---------------|
| Sex:                 | Female 74 (97.4%), Male 2 (2.6%) |
| SITE                 | Right Breast 39 (51.3%), Left Breast 35 (40.0%), Bilateral Breast 2 (2.6%) |
| Common:              | Upper outer quadrant of Right Breast 28 (71.9%) |

### Table 2: Observations clinical presentation of breast lesions (n-76)

| Clinical Presentation | Number of Cases | Percentage |
|-----------------------|-----------------|------------|
| Mobile Painless lump. | 52              | 68.4%      |
| Mobile with Painful lump. | 17           | 22.4%      |
| Mobile with Pain & Discharge lump. | 05         | 6.5%       |
| Nipple Discharge.     | 02              | 2.6%       |
| **Total**             | **76**          | **100%**   |

### Table 3: Observations age wise cytological spectrum of breast lesions (n-76)

| Year   | Benign | Atypical | Suspicious | Malignant | Inadequate | Total |
|--------|--------|----------|------------|-----------|------------|-------|
| 18-20  | 19     | 01       | 00         | 09        | 00         | 19    |
| 21-30  | 28     | 01       | 00         | 15        | 00         | 29    |
| 31-40  | 13     | 02       | 01         | 01        | 00         | 15    |
| 41-50  | 03     | 02       | 01         | 03        | 00         | 07    |
| 51-60  | 02     | 00       | 01         | 03        | 00         | 05    |
| 61-65  | 00     | 00       | 01         | 02        | 00         | 02    |
| **Total** | **65** | **05**  | **01**    | **06**    | **06**     | **76** |

### Table 4: Categorisation of FNAC Breast Lesions

| Cytology categories | Types                      |
|---------------------|----------------------------|
| C1                  | Inadequate                 |
| C2                  | Benign                     |
| C3                  | Atypical, probably benign  |
| C4                  | Suspicious favour malignancy |
| C5                  | Malignant                  |

### Table 5: Observations: cytological spectrum of breast lesions (n-76)

| Cytological types               | N  | Percentage (%) |
|---------------------------------|----|----------------|
| C1 Inadequate                   | 00 | 00             |
| C2 Benign                       | 65 | 85.5           |
| C3 Atypical probably benign     | 04 | 5.3            |
| C4 Suspicious with malignancy   | 01 | 1.3            |
| C5 Malignant                    | 06 | 7.9            |
| **TOTAL**                       | 76 | 100            |

### Table 6: Observations c 2 :cytological spectrum of benign breast lesions: (n-65) (85.5%)

| Fibroadenoma                     | 26 (40.6%) |
|----------------------------------|------------|
| Fibrocystic diseases             | 14 (21.9%) |
| Benign proliferative breast diseases | 09 (12.5%) |
| Breast abscess                   | 05 (7.8%)  |
| Benign Phyllodes tumours         | 04 (6.2%)  |
| Granulomatous mastitis           | 03 (4.7%)  |
| Duct papilloma                   | 02 (3.1%)  |
| Gynaecomastia                    | 02 (3.1%)  |
Table 7: Observations cytological spectrum of non benign breast lesions: (n-11)(14.5%)

| C3 | Atypical probably benign (04) | Fibro adenoma with atypical cystic change. (02) |
|----|--------------------------------|---------------------------------------------|
|    | Fibro adenosis with atypical fibrocystic change (01) | Lobular atypical hyperplasia (01) |
| C4 | Suspicious of malignant (01) | Phyllodes tumour (01) |
| C5 | Malignant (06) | IDC (5) |
|    | Malignant phyllodes (01). |

Table 8: Histopathologic spectrum of BLs (n-76)

| Histopathologic diagnosis | Number of cases | Percentage(%) |
|---------------------------|-----------------|---------------|
| Inadequate                | 00              | 00            |
| Fibroadenoma              | 28              | 36.8          |
| Fibrocystic changes       | 15              | 19.7          |
| Benign Proliferative diseases | 10          | 13.1          |
| Breast abscess            | 05              | 6.5           |
| Benign Phyllodes           | 05              | 6.5           |
| Granulomatous mastitis    | 03              | 03            |
| Duct papilloma            | 02              | 02            |
| Gynaecomastia             | 02              | 02            |
| Atypical probably benign  | –               | –             |
| Suspicious of malignant   | –               | –             |
| Infiltrating ductal carcinoma | 05          | 6.5           |
| Malignant Phyllodes       | 01              | 1.3           |

Table 9: Comparision of fna diagnosis with hp diagnosis (n-76)

| Cordancy with HP | 71(93.4%).(65 benign + 06 malignant) |
| Discordancy with HP | 05 (6.5%). |

Table 10: Cyto-histopathological correlation of breast lesions (n-71)

| Types of BLS    | Cytological Diagnosis | Histopathological Diagnosis |
|-----------------|-----------------------|-----------------------------|
| Benign          | 65                    | 65                          |
| Malignant       | 06                    | 06                          |

Table 11: Cytological various benign cases confirmed on histopathology diagnosis (n-65).

| Cytological diagnosis of bls. | Number of cytological diagnosis (n-65). | Number of hp diagnosis (n-65). |
|-------------------------------|----------------------------------------|-------------------------------|
| Inadequate                    | 00                                     | 00                            |
| Fibroadenoma                  | 26                                     | 26                            |
| Fibrocystic changes           | 14                                     | 14                            |
| Benign Proliferative diseases | 09                                     | 09                            |
| Breast abscess                | 05                                     | 05                            |
| Benign Phyllodes              | 04                                     | 04                            |
| Granulomatous mastitis        | 03                                     | 03                            |
| Duct papilloma                | 02                                     | 02                            |
| Gynaecomastia                 | 02                                     | 02                            |
| Total                         | 65                                     | 65                            |

Table 12: Fna malignant lesions confirmed on histopathology (n-06).

| S.No. | Malignant diagnosis | No. Of fnac diagnosis(06) | No. of HP diagnosis(06) |
|-------|---------------------|---------------------------|-------------------------|
| 01    | IDC                 | 05                        | 05                      |
| 02    | Malignant Phyllodes | 01                        | 01                      |
Table 13: Cytohistopathological discordance of cases - 05(6.6%)

| Cytological category                  | Number of cases | Cytological diagnosed discordance cases (05)                                                                 | In hp study all discordance bls diagnosed as benign.(05) |
|---------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| C3 Atypical probably benign.          | 04              | Fibroadenoma with atypical cystic changes (02). Fibroadenosis with atypical fibrocystic changes (01).       | Fibroadenoma (02). Fibrocystic changes (01). Lobular hyperplasia (01) |
| C4 Suspicious of malignant.           | 01              | Suspicious of malignant Phyllodes tumour (01).                                                           | Benign Phyllodes tumour (01)                             |
| Total                                 | 05              | 05                                                                                                         | 05                                                       |

Table 14: Total cyto-histopathological diagnosis of breast lesions (n-76)

| Types of BLS | Cytological diagnosis | Histopathological diagnosis |
|--------------|-----------------------|-----------------------------|
| Benign       | 65                    | (65+05) 70                  |
| Malignant    | 06                    | 06                          |

Table 15: Comparative analysis of FNAC diagnosis with HP diagnosis BLs (n-76)

| Cytological diagnosis of bls(76). | Fnnac cordancy with hp diagnosis bls(71) | Fnnac c3 &c4 bls discordinance were turned to benign non hp study | Total hp diagnosis bls(76) |
|-----------------------------------|-----------------------------------------|-----------------------------------------------------------------|---------------------------|
| C1.Inadequate (00).               | 00                                      | 00                                                             | 00                        |
| C2.Fibroadenoma(26).              | 26                                      | 02(C3)                                                         | 28                        |
| Fibrocystic changes(14).          | 14                                      | 01(C3)                                                         | 15                        |
| Benign Proli ferative diseases(09).| 09                                     | 01(C3)                                                         | 10                        |
| Breast abscess(05).               | 05                                      | –                                                              | 05                        |
| Benign Phyllodes(04).             | 04                                      | 01(C4)                                                         | 05                        |
| Granulomatous mastitis(03).       | 03                                      | 03                                                             | 03                        |
| Duct papilloma(02).               | 02                                      | –                                                              | 02                        |
| Gynaecomastia(02).                | 02                                      | –                                                              | 02                        |
| C3.Atypical probably benign(04).  | –                                       | –                                                              | –                         |
| C4.Suspicious of malignant(01).   | –                                       | –                                                              | –                         |
| C5.Infiltrating ductal carcinoma(05).| 05                                    | –                                                              | 05                        |
| Malignant                         | 01                                      | –                                                              | 01                        |
| Phyllodes tumour(01).             |                                         |                                                                |                            |
| Total                              | 71                                      | 05                                                             | 76                        |

Table 16: Statistics of cytohistopathology study of BLs (n-76)

| Test result of BLs | True diagnosis | Total | Percentage (%) |
|--------------------|----------------|-------|----------------|
| Malignant          | 06             | 06    | 7.89           |
| Benign             | 65             | 65    | 85.5           |
| Total              | 71             | 71    | 93.4           |
4. Discussion

BLs are one of the commonest illnesses presented by patients to the surgery. Early diagnosis of BL is important. FNAC has been widely used in detecting the presence or absence of cancer pre-operatively and as a guide to starting the specific treatment. FNA today occupies an extremely important role in preoperative evaluation of BLs and in most centres patient management is decided on the basis of the cytological report. Although prior cytological typing of breast carcinoma may have little influence on the surgical management of a case, awareness of certain types of carcinoma is necessary to correctly identify these lesions. Further more reconfirmation of prognostically favourable histological types is necessary to select patient for pre-operative chemotherapy, cytology plays an important role in benign lesions of breast, in the distinction of proliferative, inflammatory and granulomatous lesions.

All the patient in the present study were subject to FNAC using syringes with a 23 and 20 number needles, with no discomfort or unto ward side effects, so because of good needling technique all samples yielded adequate material, hence inadequate sampling rate is 0% in our study, but it was 2% reported in similar study done by Hebbar AK et al. Patel J reported that FNAC results were influenced by the number needle maneuvers jabbing, more the number of to and fro of the needle more chances of getting an adequate material.

In our study age range of patients from 18-65 years, maximum numbers of patients were found in 21-30, followed by 18-20 and 31-40 years respectively. But in Rathi Met al reported in the study maximum incidence of BLs were in 30-39 years. Benign lesions were observed in all age groups but were most common in 18-30 years patients. Commonest age group for malignant lesions in 51-60 and 61-65 years in our study as Table 3.

There was notable female predominance (F -74, M- 02) of the lesions in our study as similar in Vasudev et al study. In the present study right breast (39) was most commonly affected than left breast (35) and bilateral(02) involvement seen as similar to study done by A. C Shrivatsav Majority symptoms was painless mobile lump(52), [3.8]. Majority of the BLs situated in right breast upper outer quadrant in both benign (24) cases as well as malignant (04) cases. In present study Benign BLs (70) were highest and malignant (06) were lowest as in Table 14 and similar to other studies. This highest number of benign than malignant lesions cases may be due to good follow up or more awareness among the patients. Most common lesion noted in our study was Fibroadenoma(28) as a benign tumour, this was followed by fibrocystic diseases and all male (02) patients diagnosed as Gynaecostasia, which commonest benign lesion among male BLs. as similar findings noticed by Deshapande K. In our study all FNAC benign (65) & ma lignant (6) cases confirmed with HP. Present study showed that among the malignant lesion, IDC was the commonest lesion as similar finding was observed in other studies. In present study cytologically observed atypical probably benign (04) cases were diagnosed as benign lesions as Fibroadenoma, Fibrocystic change and proliferative lobular hyperplasia. In these atypical probably benign (04) lesions, few cells were showing nuclear atypia with scanty bipolar cellswich was due to proliferation process, in some cases exact cause of atypia cannot be determined.

In our study, cytologically suspicious of malignant Phyllodes (1) case was diagnosed as benign Phyllodes tumour in HP study, the cause might be hitting the area which was showing hyperplasia of stromal cells with nuclear atypia.

In our study, 76 FNAC diagnosis were compared with HP diagnosis. With respect to malignant lesions, FNAC malignant lesions diagnosis compared with HP diagnosis, as all FNAC malignant 06 cases were confirmed as malignant only, so True positive were 100%, we found Sensitivity as 100%. As there was no lesion which was found negative on FNAC and turned to positive as malignant in HP study, so True negative cases 100 %, hence Specificity of FNAC was 100%. Diagnostic accuracy was 93.4%, as there was cordancy with HP for 71 cases (71; 65 benign + 06 malignant cases) as Tables 9 and 10.

In present study more number of benign and less number of malignant lesions found cytohistopatho logically as similar studies done by various authors in Table 17. In our study for malignant lesions, Sensitivity was 100%, and Specificity was 100% and Diagnostic accuracy was 93.4%, which were highest when compared to statistics of other similar studies done by various authors. 22-26 our study statistics were relatively yielded good results as shown in Table 18.

5. Conclusion

1. FNAC is very good simple tool to differentiate BLs.
2. FNAC is a easy, safe, repeatable simple OPD procedure.
Table 17: Comparison of histopathological diagnosis with other studies

| Study                  | Benign (%) | Malignant (%) | Total |
|-----------------------|------------|---------------|-------|
| Present study         | 70 (92.1%) | 06 (7.9%)     | 76    |
| Jayawant et al        | 177 (83.8%)| 34 (16.1%)    | 211   |
| Kim et al             | 153 (62.2%)| 93 (37.8%)    | 246   |
| Park and Ham          | 107 (54.0%)| 91 (45.9%)    | 198   |
| Mohammed al           | 61 (65.6%) | 32 (34.4%)    | 93    |

Table 18: Comparison of our statistics with similar studies

| Study                  | Sensitivity | Specificity | Diagnostic Accuracy |
|-----------------------|-------------|-------------|---------------------|
| Present study         | 100%        | 100%        | 93.4%               |
| Mohammed at al        | 78.1%       | 94.4%       | 91.1%               |
| Rubin at al           | 87.0%       | 100%        | 100%                |
| Choi et al            | 90.0%       | 100%        | 100%                |
| Zuk JA et al          | 70.6%       | 87.5%       | 95.2%               |
| Bhavya P. et al       | 98.8%       | 96.3%       | 97.4%               |

3. It yields a definite diagnosis when compared to histopathology reports.

4. It is very good tool when compared with histopathological study. It yielded a high diagnostic accuracy (93.4%) with high sensitivity and specificity.

5. Hence it can be considered as very good diagnostic tool in diagnosis of breast lesions.

6. Source of Funding

None.

7. Conflict of Interest

None.

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