**Original article:   
Study of patterns of breast lesions on imprint cytology**

**Dr. Suchi Gadhiya , Dr Sunil V. Jagtap , Dr Pranita Warhate ,Dr. Sonal Gupta**

Department of Pathology, Krishna Institute of Medical Science (Deemed to be University) Karad.

Corresponding author: Dr Pranita Warhate

**Abstract   
Introduction:** The technique of imprint cytology is accurate , simple , rapid , cost effective and do not require any special instrument , in contrast to frozen section which is more time consuming , required specialized equipment , need well trained histopathologist , expensive and may not be always available.

**Methodology:** All surgically removed breast specimens which were sent to Histopathology department of KIMS University , Karad, from June 2016 to May 2018 were included in this study. Imprint cytology was done on freshly removed tissue. Excessive haemorrhagic fluid was washed away and gross examination of the lesions were recorded. Suspected areas were sliced into several pieces.

**Results:** In present study , findings on imprint cytology were categorized in cytological criteria of C1 – C5. Total 22 cases were categorized under C2 , fibroadenomas were the commonest finding. Total 6 cases were categorized under C3 and only one case was categorized as C4. 31 cases were categorized under C5 and they were of positive for malignancy , mucinous carcinoma and medullary carcinoma. There was no case noted under C1 category in this study.

**Conclusion:** In our study , we concluded that imprint cytology is simple, reliable , quick and inexpensive method.

**Keywords:** Imprint cytology, breast carcinoma

**Introduction:**

Breast lesion in female have gained a global attention as it leads to morbidity and mortality cause by breast cancer. 1In developing country like India , incidence of breast cancer is increasing now a days even in their younger age.2 It is important to aware the patients about self breast examination which will help surgeon in identifying lesion earlier. 3,4The technique of imprint cytology is accurate , simple , rapid , cost effective and do not require any special instrument , in contrast to frozen section which is more time consuming , required specialized equipment , need well trained histopathologist , expensive and may not be always available. 5,6,7 The procedure for imprint cytology can be done even in underdeveloped infrastructure and with minimally trained technician. Analysis of an individual cell is performed by imprint cytology. It provides an immediate result with minimal artifact , it is cheaper and so it is commonly used. A precise diagnosis is received through this technique.8

**Methodology:**

This prospective , observational study was done among 60 patients in tertiary care hospital over a period of 2 years with 60 as sample size.

**Inclusion criteria** - All surgically removed breast specimens which were sent to Histopathology department of KIMS University , Karad, from June 2016 to May 2018 were included in this study.

A relevant clinical data regarding age, history and examination was recorded in the proforma.

**Exclusion criteria** – Formalin fixed specimens were excluded in this study.

**Imprint procedure** - Imprint cytology was done on freshly removed tissue. Excessive haemorrhagic fluid was washed away and gross examination of the lesions were recorded. Suspected areas were sliced into several pieces.

For small mass , it was bisected , the freshly cut surface of tissue is then imprinted onto a clean glass slide. For larger mass, the portion of tissue used for imprinting was trimmed to approximately 1 cm in diameter and the same above procedure is repeated.

Imprints were obtained by gently pressing the clean glass slides against the cut surface of the lesion and allowed it to dry. Pressure applied for imprinting varied with the consistency of specimen. Care was taken to avoid any gliding movements. Average four slides from each case were prepared.

The slides were immediately fixed in 95% ethyl alcohol in order to avoid drying artifact. After that slides were stained with rapid H & E.

**Results:**

In present study total 60 cases of surgically removed breast specimens were evaluated by Imprint Cytology and Histopathology. The results of Cytodiagnosis were compared with Histopathological diagnosis.

Age of patient varied within 16 to 75 years. 24(40.0%) patients were in the age group of 21–40 years followed by 23 (38.3%) patients in 41-60 years, 09 (15%) patients in 61-80 years and 04 (6.7%) patients in 16-20 years of age with mean age of 42.3 years and standard deviation of 15.8 years.

Out of 60 patients 59 (98.3%) patients were female and only 1 (1.7%) patient was male.

**Table 1: Distribution of cases of imprint cytology under cytological criteria -**

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | Finding | Frequency | Percent |
| C1 | Inadequate | 0 | 0 |
| C2 | Benign | 22 | 36.7 |
| C3 | Atypia probably benign | 06 | 10.0 |
| C4 | Suspicious for malignancy | 01 | 1.7 |
| C5 | Malignant | 31 | 51.7 |
|  | Total | 60 | 100 |

Majority of cases in this study were (51.7%) categorized under C5 followed by C2 (36.7%) and C3 (10.0%) whereas only one (1.7%) was categorized under C4 lesion. There was no lesion categorized under C1.

**Table 2: Distribution of findings of breast lesions on imprint cytology –**

|  |  |  |
| --- | --- | --- |
| Findings | Frequency | Percent |
| Benign breast lesion | 01 | 1.7 |
| Inflammatory lesion | 01 | 1.7 |
| Benign Phyllodes tumor | 01 | 1.7 |
| Fibrocystic change | 02 | 3.3 |
| Fibroadenoma | 17 | 28.3 |
| Fibroadenoma with atypia | 06 | 10.0 |
| Suspicious for malignancy | 01 | 1.7 |
| Medullary Carcinoma | 01 | 1.7 |
| Mucinous Carcinoma | 01 | 1.7 |
| Positive for malignancy | 29 | 48.3 |
| Total | 60 | 100.0 |

In this study , lesions diagnosed on imprint cytology were 1 case (1.7%) each of benign breast lesion, benign phyllodes tumor , inflammatory lesion, and suspicious for malignancy , mucinous carcinoma and medullary carcinoma. Total 17(28.3%) cases were diagnosed as fibroadenoma, 31 (51.6%) cases were diagnosed as Positive for malignancy , 6 (10.0%) cases were diagnosed as fibroadenoma with atypia and 2 (3.3%) cases as fibrocystic change.

**Table 3: Distribution of Imprint lesions under cytological criteria -**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Imprint cytology | cytological criteria (C1 - C5) | | | | | Total |
| C1 | C2 | C3 | C4 | C5 |
| Benign Phyllodes tumor |  | 1 |  |  |  | 1 |
| Benign breast lesion |  | 1 |  |  |  | 1 |
| Inflammatory lesion |  | 1 |  |  |  | 1 |
| Fibrocystic change |  | 2 |  |  |  | 2 |
| Fibroadenoma |  | 17 |  |  |  | 17 |
| Fibroadenoma with atypia |  |  | 6 |  |  | 6 |
| Positive for Malignancy |  |  |  |  | 29 | 29 |
| Mucinous Carcinoma |  |  |  |  | 1 | 1 |
| Medullary Carcinoma |  |  |  |  | 1 | 1 |
| Suspicious for malignancy |  |  |  | 1 |  | 1 |
| Total | 0 | 22 | 6 | 1 | 31 | 60 |

|  |  |  |  |
| --- | --- | --- | --- |
| Chi-Square Tests | Value | df | P value |
| Pearson Chi-Square | 180.00 | 27 | <0.001 |

In present study , findings on imprint cytology were categorized in cytological criteria of C1 – C5.

Total 22 cases were categorized under C2 , fibroadenomas were the commonest finding.

Total 6 cases were categorized under C3 and only one case was categorized as C4.

31 cases were categorized under C5 and they were of positive for malignancy , mucinous carcinoma and medullary carcinoma.

There was no case noted under C1 category in this study.

**Fig. 1 – Imprint cytology diagnosis and cytological criteria.**

|  |
| --- |
| **IMG_20181030_082719__01__01.jpg** |
| **Fig.2 . –** Imprint smears showing ductal epithelial cells arranged in monolayered sheets and seen forming honey coombing pattern. Bare bipolar nuclei noted. Epithelial proliferating lesion without atypia s/o Fibroadenoma.(H & E stain , 100x & 400x) |

**Discussion:**

Imprint cytology is widely accepted in evaluating lumpectomy margins in patient operated for breast conservative therapy and it will help surgeon to re excise during the initial surgery only. In current study, we have not taken lumpectomy margins into consideration. These intraoperative techniques have also gained popularity in assessing the sentinel lymphnode status.9

It is advised to use imprint method and scrape cytology method together to achieve better cellular features. It was observed that out of total 60 cases , only one case was non neoplastic and rest of 59 cases were neoplastic. Out of total 59 noeplastic lesions, 22 lesions were benign , 6 lesions were benign with atypia, 1 case of suspicious for malignancy and remaining 31 lesions were of malignant.Out of 22 benign lesions , fibroadenoma was the commonest finding followed by fibrocystic change , benign phyllodes tumor and benign breast lesion. Similar findings were noted by Hiregoudar AD et al10 and shashidhar MR et al11 as shown in the table. Out of total 31 malignant lesions, cases of medullary carcinoma , positive for malignancy and mucinous carcinoma were noted. Hiregoudar AD et al10and shashidhar MR et al11 also observed the same.

**Table 4 : Comparision of lesions diagnosed on imprint with different studies.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sr.no. | Lesions | Hiregoudar AD et al10 | Shashidhar MR et al11 | Present study |
|  | **Benign lesions** |  |  |  |
| 1. | Fibroadenoma | 12(30%) | 26(26%) | 17(28.3%) |
| 2. | Fibrocystic disease | 4(10%) | 5(5%) | 2(3.3%) |
| 3. | Benign phyllodes tumor | - | 4(4%) | 1(1.7%) |
| 4. | Inflammatory lesion | - | 1(1) | 1(1.7%) |
| 5. | Benign breast lesion | 1(2.5%) | 2(2%) | 1(1.7%) |
| 6. | Fibroadenoma with atypia | - | - | 6(10.0%) |
| 7. | Lobular hyperplasia | 2(2.5%) | - | - |
|  | **Malignant lesions** |  |  |  |
| 8 | Invasive breast carcinoma  (Positive for malignancy) | 20(50%) | 38(38%) | 29(48.3%) |
| 9. | Mucinous carcinoma | - | 5(5%) | 1(1.7%) |
| 10. | Medullary carcinoma | - | 1(1%) | 1(1.7%) |
| 11. | suspicious for malignancy | - | - | 1(1.7%) |
| 12. | Papillary carcinoma | - | 1(1%) | - |

In this table , study done by Shashidhar MR et al and Hiregoudar AD et al have used the term Invasive breast carcinoma but positive for malignancy term has been used here.

Remaining lesions found by Shahidhar MR et al were 1% cases of invasive lobular carcinoma , Papillary carcinoma , tubular carcinoma malignant phyllodes tumor , 6% cases of fat necrosis , 4% case of no residual tumor and 2% cases of foreign body granuloma.

**Categorization of lesions diagnosed by imprint method under cytological criteria–**

Majority of lesions in our study were (51.7%) categorized under C5 followed by C2(36.7%) and C3 (10.0%) whereas only one (1.7%) was categorized under C4 lesion.

**Categorization of lesions diagnosed by imprint method under cytological criteria–**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sr.no | Studies done | Total case | Inadequate  [C1] | Benign  [C2]) | Atypia probably benign [C3] | Suspicious for malignancy  [C4] | Malignant  [C5] |
| 1. | Karre S et al12 | 50 | - | 31(6%) | 4(8%) | - | 15(30%) |
| 2. | Khudier HH et al13 | 110 | 9(8.2%) | 71(64.5%) | - | 4(3.6%) | 26(23.6%) |
| 3. | Ramraje SN et al14 | 90 | 9(10%) | 41(45.5%) | 1(1.1%) | - | 39(43.3%) |
| 4. | Present study | 60 | - | 22(36.7%) | 6(10.0%) | 1(1.7%) | 31(51.7%) |

Majority of lesions in our study were (51.7%) categorized under C5 followed by C2(36.7%) and C3 (10.0%) whereas only one (1.7%) was categorized under C4 lesion.

**Conclusion:**

In our study , we concluded that imprint cytology is simple, reliable , quick and inexpensive method.

**References:**

1. Vemuganti GK, Naik MN, Honavar SG, Sekhar GC. Rapid intraoperative diagnosis of tumors of the eye and orbit by squash and imprint cytology. Ophthalmology 2004;111:1009-15.
2. Helpap B, Tschubel K. The significance of the imprint cytology in breast biopsy diagnosis. Acta Cytol 1978;22;133-7.
3. Khanna AK, Singh MR, Khanna S, Khanna NN. Fine needle aspiration cytology, imprints cytology and tru-cut needle biopsy in breast lumps: A comparative evaluation. J Indian Med Assoc 1991;89:192- 5.
4. Dudgeon LC, Patrick CV. A new method for the rapid microscopical diagnosis of tumours: With an account of 200 cases so examined. Br J Surg 1927; 25:250.
5. Anstasiadis P, Koutlaki N, Liberis V. Cytomorphologic features of non specific granulomatous mastitis diagnosed by imprint cytology.Acta Cytol, 2001; 45:887-889.
6. Creager AJ, Geisinger KR, Shiver SA,Perrier ND, Shen P, Shaw JA, Young PR , et al. Intraoperative evaluation of sentinel lymph node for metastatic breast carcinoma by imprint cytology. Modren Pathol, 2002(a); 126:838-839.
7. Creager AJ, Shaw JA, and Young PR, Geisinger KR: Intraoperative evaluation of lumpectomy margins by imprint cytology with histologic correlation .A community hospital experience .Archives of Pathology and Laboratory Medicine, 2002(b); 126 (7):846- 848.
8. Ranjan A, Chandoke RK, Chauhan N, Kumari R. Oncology, study of tumors by imprint cytology. Indian J Clin Pract. 2013;24:472–7.
9. Layfield DM, Agrawal A, Roche H, Cutress RI. Intraoperative assessment of sentinel lymph nodes in breast cancer. Br J Surg 2011; 98: 4-17.
10. Hiregoudar AD, Godhi AS, Malur PR, Gogeri BV, Metgud SC. Accuracy of intraoperative imprint smears in breast tumours: A study of 40 cases with review of literature. Indian Journal of Surgery 2006; 68: 302-305.
11. M. R. Shashidhar, Zulfikar Ahmed, Umaru N. The diagnostic accuracy of imprint cytology in breast lesions. Journal of Evolution of Medical and Dental Sciences 2015; 4(25): 4299-4307.
12. Saritha Karre, Satyanarayana Veeragandham, Raghu Kalahasti. Evaluation of the relevance of touch Imprint Cytology in the Diagnosis of Neoplastic Lesions of Breast. International Journal of Biomedical research 2014;05(11)
13. Khudier HH, Hawramy TA, Abdul QGA. Role of imprint cytology in breast lesions. Iraqi J Med sci.2009; 7(4):61-6.
14. Sushma N Ramraje, Bhavana M Bharambe and Vijay D Tote. Imprint smear cytology and histopathology of breast lesions – a comparative evaluation with review of literature.Cibetch Journal of Bio-Protocol ISSN 2012;1(2):22-27.

Date of Submission: 08 November 2020

Date of Publishing: 15 December 2020

Author Declaration: Source of support: Nil, Conflict of interest: Nil

Ethics Committee Approval obtained for this study? YES

Was informed consent obtained from the subjects involved in the study?  YES

For any images presented appropriate consent has been obtained from the subjects: YES

Plagiarism Checked: Urkund Software

Author work published under a Creative Commons Attribution 4.0 International License



DOI: 10.36848/IJBAMR/2020/16215.55640