

Original article

Role of Fine Needle Aspiration Cytology in Breast Lesions - a Study at a Rural Hospital

Dr. Smita Pathak, Dr. Pooja Banwaskar, Dr. Sneha Joshi

Department of Pathology

Name of the Institute/college: MIMER Medical College, Talegaon Dabhade Pune

Corresponding author: Dr. Smita Pathak

ABSTRACT

Introduction: With growing awareness a lady with breast lump is one of the most common presentations in out-patient department. Breast carcinoma is the leading cause of morbidity and mortality. FNAC, a quick, safe, easy to perform and virtually painless procedure has become a standard tool for diagnosis in breast lumps.

The present study analyses the utility of FNAC in the lesions of breast and its correlation with histopathology, thus verifying the accuracy of FNAC in detecting the lesions of the breast.

Aims and objectives:

1. Cytological evaluation of breast lesions.
2. To correlate cytological diagnosis with available histopathological diagnosis.
3. To evaluate the accuracy of fine needle aspiration cytology in the diagnosis of breast Lesions.

Materials and methods: This was a prospective study carried out in the Department of Pathology from January 2014 to August 2015. All patients attending Surgery out-patient department (OPD) at a rural tertiary care hospital with breast lesions irrespective of age and sex were included in the study.

Results: During the period of study, 163 patients were subjected to FNAC. Of these 126 patients underwent surgical excision. The cytological and histological diagnosis was compared in each these cases. The overall accuracy was 98.41%. The sensitivity was 88.89%, specificity of 100%, positive predictive value was 100%.

Conclusions: When performed & reported by an expert pathologist diagnostic accuracy of FNAC is very high in breast lesions

Key words: Breast lesions, FNAC

INTRODUCTION:

Breast lumps are frequent, easily palpated and almost invariably alarming for the patient.¹ With growing awareness breast lump is one of the commonest presentations in out-patient departments (OPD).² Spectrum of breast lesions is wide ranging from non-palpable lesions to high grade carcinoma in female as well as male patients.³ Breast cancer is now the most common cancer among Indian females (around 30%) and has speedily replaced cervical cancer.^{4,5} Breast lump is a matter of worry to the patient as well as

to clinician hence need for reliable, accurate and quick method for correct diagnosis. During the last century much progress has been made for diagnosis, treatment and prevention of breast cancer.⁶

The minimally invasive method includes fine needle aspiration cytology (FNAC). It is a simple technique readily tolerated by patients, does not require anesthesia.^{7,8} FNAC of the breast has two main goals. One is to confirm a radiological and clinical benign lesion and to avoid unnecessary

surgery. The other is to confirm a malignant diagnosis allowing definite treatment plan.^{9,10}

However, the diagnosis of FNAC may be presumptive in some cases. The final diagnosis in such cases is achieved by histopathological examination of tissue removed surgically.⁶

Recently core needle biopsy of the breast is gaining popularity and acceptability, although role of FNAC is still very important.¹¹

The present study had been taken up to study the utility of FNAC in breast lesions and in differentiating non-neoplastic from neoplastic lesions, and to aid in further management of the disease.

AIMS AND OBJECTIVES :

1. Cytological evaluation of breast lesions.
2. To correlate cytological diagnosis with available histopathological diagnosis
3. To evaluate the accuracy of fine needle aspiration cytology in the diagnosis of breast Lesions.

MATERIALS AND METHODS:

This was a prospective study carried out in the Department of Pathology from January 2014 to August 2015. All patients attending Surgery out-patient department (OPD) at a rural tertiary care hospital with breast lesions irrespective of age and sex were included in the study.

Detailed history and complete clinical examination of patient was carried out including general, systemic and local examination with reference to breast lesions such as nipple discharge, retraction. Breast examination was carried out with special reference to size, site, mobility, consistency, fixation of lump to the underlying chest wall. Relevant past, family and obstetrics history was also taken. Written informed consent was taken from every patient before performing FNAC.

Procedure and importance of FNAC was explained to the patient. Written informed consent was taken. FNAC was done under all aseptic conditions.

FNAC smears were carefully studied and categorized into breast lesions as benign or malignant. Patient who had undergone lumpectomy or mastectomy, specimens were received in the department of pathology and fixed in 10% formalin. Tissue sections were taken and stained with H&E. Cytological diagnosis was correlated with histological findings.

RESULTS:

The present study included 163 patients who attended surgery out-patient department at a tertiary care hospital. All the patients included had palpable breast lumps. Out of these 163 patients, 126 underwent surgery and histopathological evaluation was done in these cases .(Table No 1) These 126 patients underwent lumpectomy or mastectomy depending on the cytological diagnosis. The FNAC and HPE results were compared so as to see accuracy of FNAC.

There were 9 (5.52%) male patients and 154 (94.48%) female patients with a male to female sex ratio of around 1:17. (Figure No 1) Out of total 163 breast aspirations, 26 (15.95%) were inflammatory and non neoplastic lesions, 105 (64.41%) were benign and 20 (12.26%) malignant lesions. There were 7 (4.29%) patients with inadequate smears and 5 (3.06%) patients with smears suspicious for malignancy. (Figure No 2) Majority of the patients with benign lesions (30.12%) were in age group of 21-30 years while malignant lesions were common in later age group i.e.31years and above. (Figure No 3)

Out of total 163 cases, 131 (80.36%) cases were labelled as benign which comprised inflammatory lesions in 14 (8.58%) cases, cystic lesions in 5 (3.06%) cases, miscellaneous in 7 (4.29%) cases and benign tumors in 105 (64.41%) cases.

Fibroadenoma was the most common lesion among benign tumours. There were 20 (12.26%) malignant cases in the present study. There were 07(4.29%) cases which had insufficient aspirated material and hence labelled as inadequate for cytology reporting. (Table No 2)

Out of 126 cases, the cytological diagnosis was consistent in 115 (91.26%) cases and it was inconsistent in 11 (8.73%) cases. Among these 11cases 9 were benign and 2 were malignant. Out of 9 benign diagnosis, 6 cases were of fibrocystic disease, out of which one was falsely diagnosed as granulomatous mastitis and five cases as fibroadenoma on cytology. Out of 2 malignant diagnosis which were inconsistent on cytology, one case was given inadequate for opinion where we

could only see mucinous background and no ductal cells on cytology and this case turned out to be colloid carcinoma on histopathology. The second case was infiltrating duct carcinoma, which was falsely given as benign phyllodes tumour on cytology where the smears showed only benign spindle shaped cells. On histopathology these spindle cells were seen as part of desmoplastic stromal component of infiltrating duct carcinoma (IDC) (Table No 3)

So, in the present study, the sensitivity was 88.89%, specificity was 100%, positive predictive value was 100%, negative predictive value was 98.18%, false positive rate was 0% and diagnostic accuracy was 98.41%. (Table No 4)

Table No 1: General information

Study period	Total no. of patients who underwent FNAC	FNAC with histopathological evaluation available in no. of cases
January 2014 to August 2015	163	126 (77.30%)

Table No 2 : Cytological classification of 163 breast lesions in present study

Cytological Diagnosis	No. of patients	Percentage
1) Inflammatory	14	8.58 %
a) Acute mastitis	6	3.68 %
b) Granulomatous mastitis	7	4.29 %
c) Plasma cell mastitis	1	0.61 %
2) Cyst	5	3.06 %
a) Galactocoele	3	1.84 %
b) Lactational changes	2	1.22 %
3) Miscellaneous	7	4.29 %
a) Fat necrosis	1	0.61 %
b) Gynaecomastia	6	3.68 %
4) Benign Tumors	105	64.41 %
a) Fibroadenoma	85	52.14 %
b) Fibrocystic disease	17	10.42 %
c) Benign phyllodes tumors	2	1.22 %

d)Hemangioma	1	0.61 %
5)Malignant tumors	20	12.26 %
6)Inadequate	7	4.29%
7)Suspicious for malignancy	5	3.06 %
Total	163	100 %

Table No 3 : Cyto-Histological correlation of 126 breast lesions in present study

Histological Diagnosis	No. of Patients	Cytological Diagnosis			
		Consistent		Inconsistent	
		No. of patients	Percentage (%)	No. of patients	Percentage (%)
1) Inflammatory	10	10	100	0	-
a)Acute(Breast abscess)	5	5	100	0	-
b)Granulomatous mastitis	4	4	100	0	-
c)Plasma cell mastitis	1	1	100	0	-
2) Miscellaneous	5	5	100	0	-
Gynecomastia	5	5	100	0	-
3) Benign Tumors	93	84	90.32	09	9.67
a)Fibroadenoma	70	69	98.57	01	2.86
b)Fibrocystic disease	17	11	64.70	06	35.30
c)Benign phyllodes tumor	02	01	50	01	50
d)Hemangioma	01	01	100	00	-
e)Lactating adenoma	02	02	100	00	-
f)Tubular adenoma	01	00	00	01	100
Malignant tumors	18	16	88.89	02	11.11
Total	126	115	91.26	11	8.73

Table No 4: Dignostic accuracy of FNAC in breast lesions in available (126) histopathology cases

Histological Diagnosis	No. Patients	Cytological Diagnosis	
		positive	Negative
Malignant	18	16	02
Non-Malignant	108	00	108
Total	126	16	110

Figure No 1: Gender Distribution

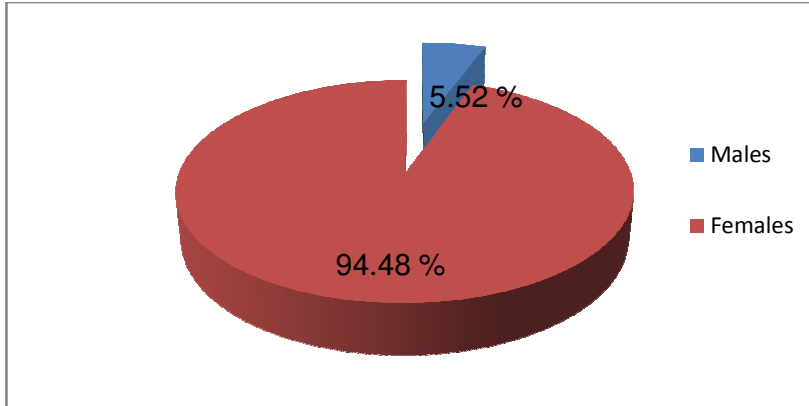


Figure No 2 : The basic distribution of lesions of breast on cytology

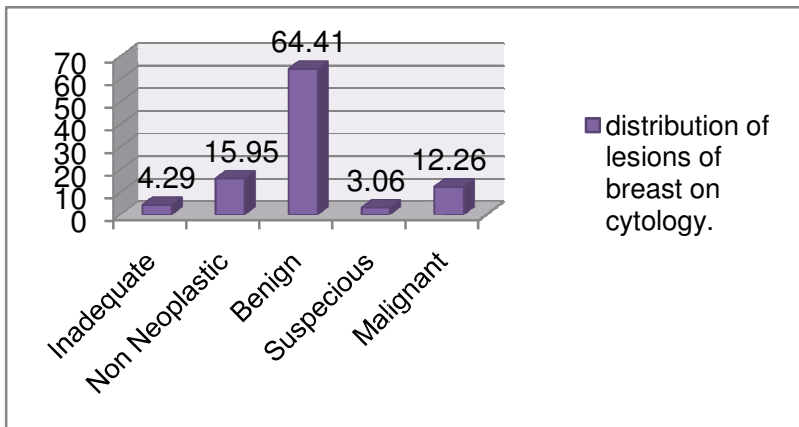


Figure No 3 :Age wise distribution of breast lesions

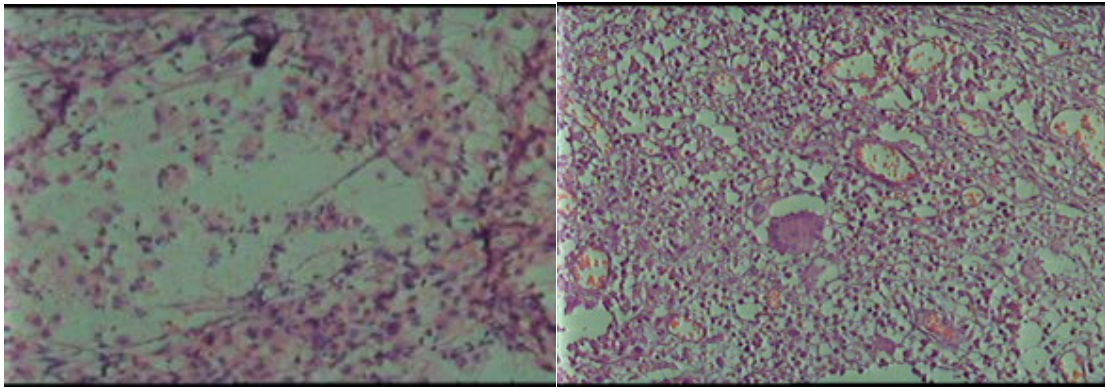
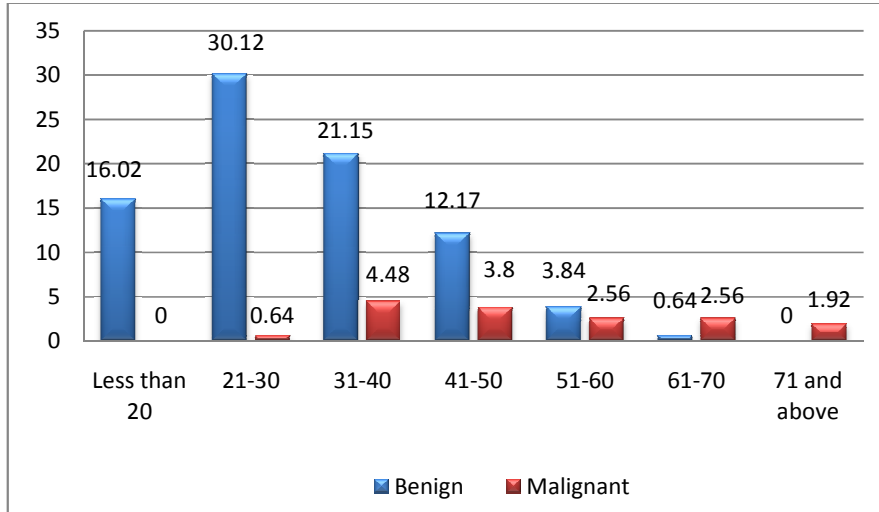


Figure No 4 & 5: Photomicrograph of FNAC smears & histopathological sections of granulomatous mastitis showing many lymphocytes, neutrophils with collections of epithelioid cells & giant cell (H & E10X)

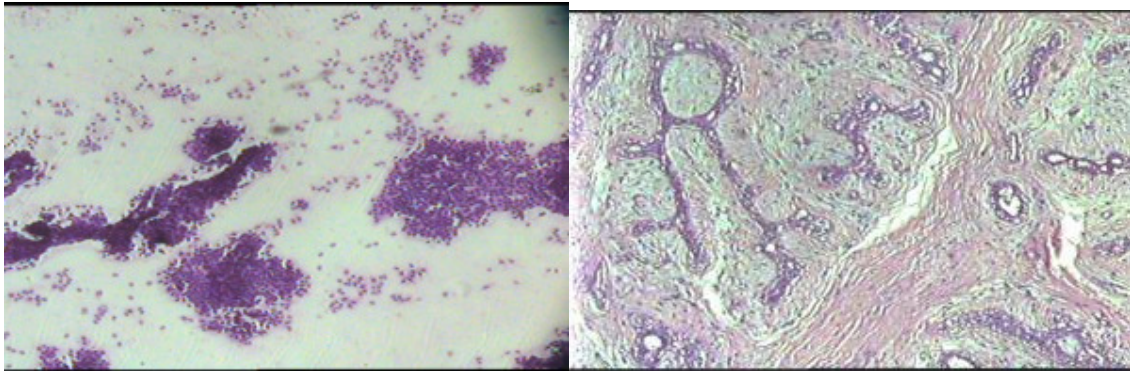


Figure No 6&7: Photomicrograph of FNAC smears & histopathological sections of Fibroadenoma (H & E 10X)

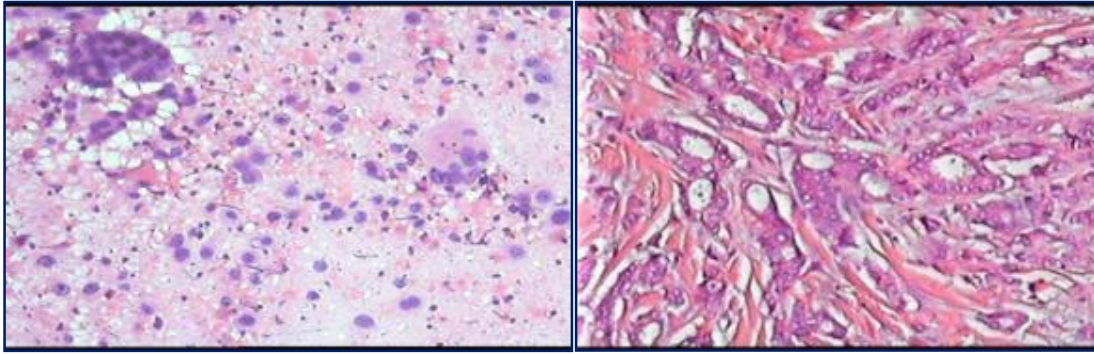


Figure No 8 & 9: Photomicrograph of FNAC smears & histopathological sections of Infiltrating ductal Carcinoma(NST) of Breast (H & E 10X)

DISCUSSION:

Breast carcinomas are one of the leading causes of cancer in women. Most cases of breast lumps are benign, but sometimes, it is difficult to determine whether a suspicious lump is benign or malignant, simply by doing a clinical examination.¹² Most of the patients with breast lumps are in a state of anxiety. So, in reducing anxiety and unnecessary surgical procedures as well as in minimization of delay in the diagnosis, FNAC proves very fruitful.

In the present study age of the patients varied from 16 to 80 years. The youngest case was 16 years old and oldest was of 80 years. These findings are comparable with findings of Tiwari et al¹³, Sahil Panjvani et al¹¹ and Nasar Y Alwahaibi et al¹⁴. In present study 94.48% patients were females and 5.52% were males, while H. P. Srilakshmi et al¹ had 1.53% males and 98.47% females and Nasar Y Alwahaibi et al¹⁴ had 1.28% males and 98.72% females.

In present study the incidence of benign lesions (83.98%) predominated over malignant lesions (16.02%). This correlates with findings of Tiwari M et al¹³ & Dominguez et al¹⁵ where incidence of benign lesions was 76.19% & 68.1% and of malignant lesions was 23.81% & 12.3% respectively.

The rate of sensitivity ranges from 83.3% reported by Tiwari M et al¹² to 97.82% reported by

Sahil I Panjavani et al¹². Sensitivity of present study was 88.89% which is comparable with the studies done by other authors. The specificity reported by H.P.Srilaxmi et al¹, Sahil Panjavani et al¹², Tiwari M et al¹³ is 100% which is comparable with present study which has 100% specificity too. The present study had false negative rate of 2.38%, which is comparable with studies done by, Sahil Panjavani et al¹², M.Karimzadeh et al¹⁶ who reported false negativity rate of 2.17% & 4.3% respectively. There were 2 false negative cases in the present study. One case was given as inadequate for opinion where we could only see mucinous background and no ductal cells on cytology and this case turned out to be colloid carcinoma on histopathology. The second case was infiltrating duct carcinoma, which was falsely given as benign phyllodes tumour on cytology where the smears showed only benign spindle shaped cells. On histopathology these spindle cells were seen as part of desmoplastic stromal component of infiltrating duct carcinoma NST.

The present study had false positive rate of 0 which is comparable with study done by Bofin AM et al¹⁷. The present study has inadequacy rate of 4.29%. Shrestha A et al¹⁸ reported 1.7% cases which were inadequate. They concluded that inadequate sample can be due to insufficient experience of the pathologist, radiologist or

clinician who perform FNA or due to nature of lesion itself.

SUMMARY AND CONCLUSION:

The present study was aimed to evaluate the cytological diagnosis of breast lesions, also to correlate cytological diagnosis with available histopathological diagnosis and thus to evaluate accuracy fine needle aspiration cytology in diagnosis of breast lesions.

During the period of study, i.e from January 2014 to August 2015, 163 patients were subjected to FNAC. Of these 126 patients underwent surgical excision. The cytological and histological diagnosis was compared in each these cases.

There were 154 females and 9 males with a female to male ratio of 17:1.

In the present study the age incidence varied from 16years to 80 years.

Benign lesions were common in earlier age group i.e 21-30 years, while malignant lesions were

common in later age group i.e. 31 years onwards. A malignant diagnosis was made 18 cases, 16 females and 2 males. The overall accuracy was 98.41%.

There were 2 false negatives and no false positive cases. The sensitivity was 88.89%, specificity of 100%, positive predictive value was 100%.

- Fine needle aspiration cytology is a easy, reliable, repeatable and simple diagnostic test.
- The diagnostic accuracy is very high, when performed by an expert pathologist.
- A high sensitivity and a high positive predictive value proved that a positive FNAC in the breast means a definite diagnosis of concerned pathology report if compared with final histopathology report.

Thus, with no hesitation it can be concluded that FNAC is a very important preliminary diagnostic test in breast lesions, the results show a high degree of correlation with the final histopathology report.

REFERENCES:

1. Srilakshmi HP, Chavda J. A study of cyto-histological correlation of breast lesions. *NJIRM*. 2013;4(2).
2. Khemka A, Chakrabarti N, Shah S, Patel V. Palpable breast lumps : Fine Needle Aspiration Cytology versus Histopathology : a correlation of diagnostic Accuracy. *The Internet Journal of Surgery*. 2009; 18(1).
3. Pandey J S, Sayami G, Dail S, Shrestha H G, Shrestha B, Adhikari R C, Bashyal R, Pant A. Fine Needle Aspiration cytology of breast lump in T.U. teaching hospital. *Journal of Nepal Medical Association*. 2002; 41: 388-391.
4. Goyal P, Sehgal S, Ghosh S, Aggarwal D, Shukla P, Kumar A et al. Histopathological Correlation of Atypical (C3) and Suspicious (C4) Categories in Fine Needle Aspiration Cytology of the Breast. *International Journal of Breast Cancer*. 2013;1-5.
5. Klevesath MB, Bobrow LG, Pinder SE, Purushotham AD. The value of immunohistochemistry in sentinel lymph node histopathology in breast cancer. *British Journal of Cancer*. 2005;92:2201-5.
6. Chauhan N, Pathak VP, Harsh M, Saini S, Gaur D. Cytohistopathological correlation in palpable breast lesions : *Indian Medical Gazzete*. December 2012.
7. Karimzadeh M, Sauer T. Diagnostic accuracy of fine-needle aspiration cytology in histological grade 1 breast carcinomas: are we good enough? *Cytopathology*. 2008;19:279-86.
8. Seema V, Kalyani R, Murthy VS. Multinucleate Giant Cells in FNAC of Benign Breast Lesions: Its Significance. *Journal of Clinical and Diagnostic Research*. 2014;8(12):01-4.

9. Berner A, Sauer T. Fine-needle Aspiration Cytology of the Breast. *UltrastructPathol.* 2011;35(4):162–7.
10. Kollur SM, El Hag IA. FNA of breast fibroadenoma: observer variability and review of cytomorphology with cytohistological correlation. *Cytopathology.*2006;17:239–44.
11. Mitra S.,Dey P Grey zone lesions of breast: Potential areas of error in cytology. *J Cytol.* 2015 Jul-Sep;32(3):145-52. doi: 10.4103/0970-9371.168812
- 12.Panjvani SI, Parikh BJ, Parikh SB, Chaudhari BR, Patel KK, Gupta GS et al. Utility of Fine Needle Aspiration Cytology in the Evaluation of Breast Lesions. *Journal of Clinical and Diagnostic Research.* 2013;7(12):2777-9.
13. Tiwari M. Role of FNAC in diagnosis of breast lumps. *Kathmandu University Medical Journal.*2007;5: 215-17.
14. AlwahaibiNY,AlfahdiHA et al. Fine Needle Aspiration Cytology of 108 BreastLesions with Histopathologic Correlation: A Retrospective Study. *Annual Research & Review Biology.*2014;4(21):3244-3250.
15. Dominguez F, Riera JR, Tojo S, Junco P Fine needle aspiration of breast masses. An analysis of 1398 patients in a community hospital. *Acta cytological* 1997, March-April;41(2) : 341-7.
16. Karimzadeh M, Sauer T. Diagnostic accuracy of fine-needle aspiration cytology in histological grade 1 breast carcinomas: are we good enough? *Cytopathology.* 2008;19:279–86.
17. Bofin AM, Lydersen S, Isaksen C, Hagmar BM. Interpretation of fine needle aspiration cytology of the breast: a comparison of cytological, frozen section, and final histological diagnoses. *Cytopathology.* 2004;15:297–304.
18. Shrestha A, Chalise S, Karki S, Shakya G. Fine needle aspiration cytology in a palpable breast lesion. *Journal of Pathology of Nepal.* 2011; 1: 131-135.